

**INSTRUCTIONAL DESIGN AND DEVELOPMENT TOOLS FOR ONLINE
ADULT EDUCATION: A LITERATURE REVIEW**

by

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Abstract

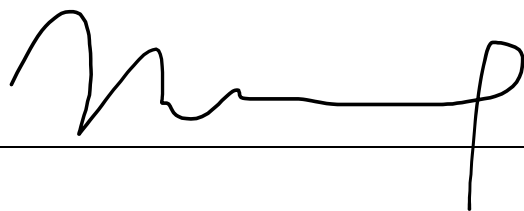
This paper examines the intersection of online learning, adult learning theories, and instructional methods in adult education. Through a comprehensive literature review, it analyzes prominent adult learning theories and models, emphasizing their implications for designing effective learning experiences. The study also explores adult learners' unique characteristics and needs, addressing key features such as self-directedness, experience, intrinsic motivation, and external factors influencing learning. Additionally, the paper discusses instructional design methods for online adult learners and identifies key principles, including the importance of feedback, engagement through collaborative activities, and personalized learning experiences. The analysis covers experience-based learning, scaffolding, blended learning models, and the role of technology, with a focus on learning management systems. The study also explores the significance of online communities of practice for collaborative adult learning, emphasizing factors influencing engagement and success. Overall, the findings provide valuable information for educators, instructional designers, and researchers seeking insights into online education for adult learners.

Keywords: adult learning theories, online learning, instructional methods

Author's Declaration

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Online Learning: An Overview

Online learning has seen significant growth in recent years, particularly as a foundational tool in various areas, from education to training and job readiness (Garrison & Kanuka, 2004; Kirkpatrick & Kirkpatrick, 2006). However, the design and development of effective online learning experiences for adult learners can be complex, requiring a deep understanding of adult learning theories (Knowles et al., 2020), methodologies for identifying adult learning needs (Davies, 1986; Valentino, 2013), and instructional methods that can inform and enhance the design and development of online courses (Garrison & Cleveland-Innes, 2005; Anderson & Dron, 2011; Mahmood, 2020). This paper intends to study the intersection of online learning and adult theory, adult learning needs, and the instructional methods used for content development.

While systematic reviews typically summarize and analyze recent empirical literature, this paper deliberately takes a different approach. The primary emphasis lies in a comprehensive examination of various adult learning theories, aiming to identify common principles that can effectively guide instructional designers and educators. This choice was motivated by the aim of providing a comprehensive understanding of diverse theoretical perspectives that can inform the design and facilitation of adult online education. Consequently, the review encompasses both recent and historical works to ensure a thorough exploration of theories related to adult learning, focusing on their implications for the effective design and delivery of online educational experiences.

The Growing Accessibility of Online Learning

The spread of the internet has led online learning to become an increasingly popular, flexible and cost-effective means of education and training for all learners (Palvia et al., 2018)

and, more significantly, for experienced learners seeking to enhance their proficiency in specific areas (Knowles et al., 2020). Remote interactions have become more normalized (Anderson et al., 2021), and as technology advances, the accessibility of online learning in various forms and contexts is expanding (Koksal, 2020). Moreover, the rise of mobile learning and the growing availability of online programs have increased access to education for adult learners (Rainie & Anderson, 2017). The growing number of online programs offered by accredited institutions has also made it easier for adult learners to find online learning programs that meet their needs (Diaz-Infante et al., 2022). The COVID-19 pandemic has resulted in institutions adapting quickly to remote environments since social distancing during the pandemic precluded physical face-to-face class meetings. When barriers to online learning are effectively addressed, it is argued that online learning has the capacity to make education more affordable and accessible (Sohail, 2022).

The current economic and technological landscape has led to a rapidly changing job market, with new jobs emerging and old jobs becoming obsolete at an unprecedented rate (Autor, 2015; Frey & Osborne, 2017; Gallardo-Gallardo & Collings, 2021). With the advent of automation and artificial intelligence, many traditional jobs are being replaced by technology, leading to the emergence of new jobs requiring new skills and knowledge (Smith & Anderson, 2014; Gallardo-Gallardo & Collings, 2021). Moreover, the global economy is constantly evolving, leading to changes in job market demands (World Economic Forum, 2020). As a result of these changes, adult learners are facing a growing need to stay competitive in the job market (U.S. Bureau of Labor Statistics, 2022).

Online Learning: From Trend to Mainstream

Online learning has the potential to drive innovation that may reshape traditional education, offering cost-effective alternatives while enhancing accessibility and maintaining or improving educational quality (Carey & Trick, 2013). The needs of the mainstream market intersect with the trajectory of improvement in online learning; however, the rate of disruption depends on the speed at which the technology enhances both accessibility and quality (Christensen et al., 2015). Online education has gained recognition as a valuable tool for learning. This recognition is highlighted in a shift in perception towards online education as a worthwhile investment in learning, with 87% of online learners agreeing or strongly agreeing that it provides value for the cost (Aslanian & Fischer, 2022). Moreover, the educational technology industry is growing exponentially, with a record-breaking investment of \$18.66 billion in 2019 and a projected market of \$350 billion by 2025 (Li & Lalani, 2020). It is worth noting that this growth may not directly reflect the overall quality of the educational experience.

The COVID-19 pandemic has also caused a shift towards hybrid work, and online learning familiarizes learners with personal responsibility, time management, and organization (Adams, 2021). Online learning also helps develop communication, technical, and digital collaboration skills (Alawamleh et al., 2020). Digital communication in online learning requires learners to be more concise and clearer in their communication. Adams (2021) argues that it prepares them for the types of communication they encounter in the workplace. Exposure to digital tools can help to build learners' confidence in navigating the internet and using technology to communicate and achieve outcomes.

However, the transition to online learning has caused a challenging adjustment for educators and raised stress levels (O'Dea & Stern, 2022). The impact of this change on

educational practices is not yet clear. While some learners value the collaborative and hands-on aspects of virtual learning, some still value in-person instruction to connect and network with peers and industry professionals face-to-face (O’Dea & Stern, 2022). Additionally, the increasing presence of big tech companies, such as Amazon, Google, Apple, and Microsoft, in the educational technology industry raises questions about the impact on educational equality and access despite their efforts to provide free educational tools to meet the demands of learners during the COVID-19 pandemic (Toczauer, 2020).

Online Learning and the Adult Learner

Adult learners are increasingly inclined to pursue advanced educational opportunities and enhance their skill sets (Boeren et al., 2020). Examining learning theories can enhance the understanding of the implications of online learning, as the instructor's role in providing an influential presence in online learning environments significantly impacts the learner. Adult learners can benefit from instructor presence and feedback, regardless of the learning approach used (Wilson et al., 2018). According to Arghode & Wang, 2016, to improve learning outcomes, instructional designers should consider incorporating different types of online instructor presence, such as providing guidance in discussions, answering student questions, or providing formal assessment feedback. Effective instruction also necessitates adequate content knowledge, conceptual comprehension, and an engaging presentation (Wilson et al., 2018).

Instructional theories suggest that instruction should be engaging and effective to improve learning. All theories emphasize the instructor's critical role in facilitating learning and promoting learner development. For example, cognitivism suggests that information should be presented logically to help learners assimilate knowledge, whereas constructivism emphasizes the creation of meaning by the learner (Boghossian, 2006; Arghode & Wang, 2016).

Behaviorism emphasizes the instructor's role in providing stimuli and feedback, whereas andragogy and humanism take a more holistic approach to overall development and growth (Boghossian, 2006; Arghode & Wang, 2016).

Barriers and Challenges

Barriers to adult learning can impact learners' success and fulfilment in the online learning environment. External and internal barriers can impede learning, so online learning platforms and instructors must be aware of and attempt to mitigate them (Merriam & Baumgartner, 2020).

External barriers such as ageing, life events, and role changes can pose difficulties for adult learners participating in online learning. It can be challenging for some adults to adapt to online learning due to technological difficulties and a lack of experience with digital devices (Palo et al., 2018). E-learning platforms should also ensure that their materials are accessible and usable for all learners, including those with disabilities, in order to overcome this barrier (Cross, 2004). Life events and role changes can also impact an adult learner's motivation and ability to engage in online learning. Through social interactions among learners, online learning platforms should provide flexible learning opportunities and foster a supportive learning environment while giving opportunity to an instructor's influence that is not solely instructional but also encompasses creating an environment that promotes collaboration, flexibility, and support among learners (Vella, 2002).

Internal barriers, such as negative perceptions of online learning and a lack of willingness to explore, can also impact adult learners participating in online learning (Cross, 2004). Online learning platforms should encourage learners to challenge themselves and broaden their

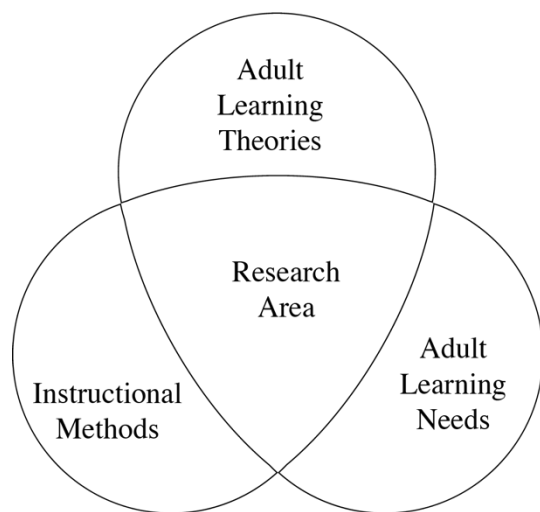
perspectives by providing resources and support to assist adult learners in overcoming anxieties and negative perceptions of e-learning. By actively addressing any barriers, online learning platforms and instructors should assist adult learners in having a more successful and fulfilling online learning experience. They can ensure that adult learners in the virtual classroom overcome obstacles and reach their full potential.

Research Questions

This research paper explores the relationship among three key domains in online learning: adult learning theory, adult learning needs, and instructional methods. By examining the intersection among these domains, the research aims to gain a deeper understanding of how to design and develop effective online learning experiences for adult learners. This approach aims to identify areas of alignment and connect the theoretical concepts to practical applications in online learning, thus providing insights and recommendations for enhancing the quality of online learning programs for adult learners. A visualization of the research area is presented in Figure 1.

Figure 1

Research Area



Note. This diagram highlights a preconception of the proposed research area.

First Research Question

The first research question is: “What adult learning theories have been shown to inform and enhance online and blended learning?” The research question explores the connection between adult learning theories and online and blended learning. It seeks to uncover how adult learning theories can inform and improve the design and delivery of online and blended learning experiences for adult learners.

Adult learning theories offer valuable insights into adult learners’ unique needs, motivations, and learning styles. Understanding these theories can help educators and instructional designers create online and blended learning experiences that are more effective, engaging, and meaningful for adult learners.

The study of adult learning theories has a long history, with notable theories such as andragogy (Knowles, 1978), self-direction (Merriam, 2001), and transformative learning (Mezirow, 1991), among others, offering insights into how adult learners approach education and the factors that influence their engagement and success. In the context of online and blended learning, these theories can guide how to create flexible and responsive learning experiences that cater to adult learners' diverse needs and preferences.

Second Research Question

The second research question is: "What methodologies can be used to identify and address adult learning needs?" This research question focuses on identifying the methodologies used to understand and meet the learning needs of adult learners in online and blended learning environments. It explores the various approaches to assessing adult students' unique requirements and preferences and how these insights can be used to design and deliver educational content that effectively meets their needs.

This research domain is crucial in ensuring that online and blended learning environments are not only accessible but also meaningful and engaging for adult learners, who often have distinct learning styles, needs, and expectations (Knowles, 1978). Exploring the methodologies utilized to identify and provide adult learning needs would, therefore, contribute to developing effective online learning programs that support the success of adult learners.

Third Research Question

The third research question is: "How have instructional methods been found to be useful in designing and creating online learning for adult learners?" This question focuses on the instructional methods employed to design and create online learning for adult learners. The

design and creation of online learning experiences for adults are becoming increasingly important as technology continues to shape how we learn (Jones, 2020). Understanding the effective instructional methods for adult learners is crucial for creating engaging and effective online learning programs. This research area aims to explore and identify the best practices in instructional design for adult learners in an online learning environment.

Instructional methods can range from traditional methods, such as lectures and reading materials, to more interactive and technology-enhanced methods, such as simulations, gamification, and collaborative learning activities. Each method has its benefits and drawbacks, and the effectiveness of each individual or combined approach will depend on the learning goals, adult learners' needs, and the specific context of the online learning program.

Given the diversity of adult learners, it is crucial to consider the instructional methods that are most effective for different types of adult learners. By identifying the instructional methods that have been shown to be the most effective for adult learners, this research can inform the design and creation of more effective online learning programs for adults.

Methodology

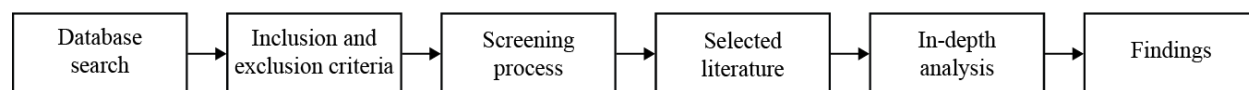
This literature review employs a systematic approach to synthesize a wide range of literature related to adult learning theories and their implications for online education. Unlike typical systematic reviews that often prioritize recent empirical studies, the approach used in this study intentionally avoids placing a date restriction on the literature search. The objective here is not only to review recent empirical work but also to comprehensively explore diverse theoretical perspectives.

The inclusion criteria for this review were centered on the relevance of the literature to adult learning theories and their potential application in online instructional design. I focused on identifying and examining the theoretical foundations that underpin various adult learning theories, aiming to extract common principles that can guide instructional designers and educators in online settings. This approach facilitates the capture of both recent and foundational works, ensuring a holistic understanding of the theoretical landscape.

Research Method

PRISMA (Moher et al., 2009), or Preferred Reporting Items for Systematic Reviews and Meta-Analyses, served as the framework for screening and selecting studies in this literature review. PRISMA is a comprehensive set of guidelines and standards for conducting and reporting systematic literature reviews to increase the transparency and reproducibility of systematic review results through a clear and concise reporting process.

In addition to using PRISMA as a guide, the screening and selection process for studies in this literature review was assisted by using Covidence software. Covidence is a web-based platform designed to conduct and manage systematic literature reviews (Babineau, 2014). It streamlines the screening, selecting, and tracking of studies, allowing for more efficient and effective review process management. Covidence facilitated the management of the review process, including tracking the status of studies and organizing and annotating studies while implementing search term inclusion and exclusion criteria. Figure 2 refers to the research framework.

Figure 2*Research Framework***Database Search**

To identify relevant studies, searches were conducted using five electronic databases: PsycArticles via ProQuest, ERIC via ProQuest, Academic Search Premier via EBSCO, Education Source via EBSCO, and Google Scholar (Table 1). The search was not limited by a time cutoff to avoid excluding literature related to adult learning theories. The initial search was conducted in October 2022 and followed a deliberately general format.

Table 1*Selected Databases*

Database	Website
Academic Search Premier via EBSCO	https://web-s-ebSCOhost-com.uproxy.library.dc-uoit.ca/ehost/search/advanced?vid=0&sid=c4ff65b1-9679-4a5c-88dd-e5222d660938%40redis
Education Source via EBSCO	https://web-s-ebSCOhost-com.uproxy.library.dc-uoit.ca/ehost/search/advanced?vid=0&sid=03c801a4-c273-42cf-b912-c01ca7699026%40redis
ERIC via ProQuest	https://www.proquest.com/eric/advanced
Google Scholar	https://scholar.google.ca
PsycArticles via ProQuest	https://www.proquest.com/psycarticles/advanced

A more comprehensive and systematic search strategy was conducted in March 2023 with the assistance of the faculty librarian. The search combined keywords and phrases related to

instructional design, development tools, online adult education, and Boolean operators to refine the results. In conjunction with the advice from the faculty librarian, the final search command used was: (“Online learning” OR e-learning OR “blended learning” OR “hybrid learning”) AND adult AND learning AND (“instructional methods” OR “learning theories”), and further criteria, such as peer-reviewed articles from academic journals and studies written in English, were established to refine the results. The same command was used to search all the selected databases, with the intent to address the intersections among the research domains.

Inclusion and Exclusion Criteria

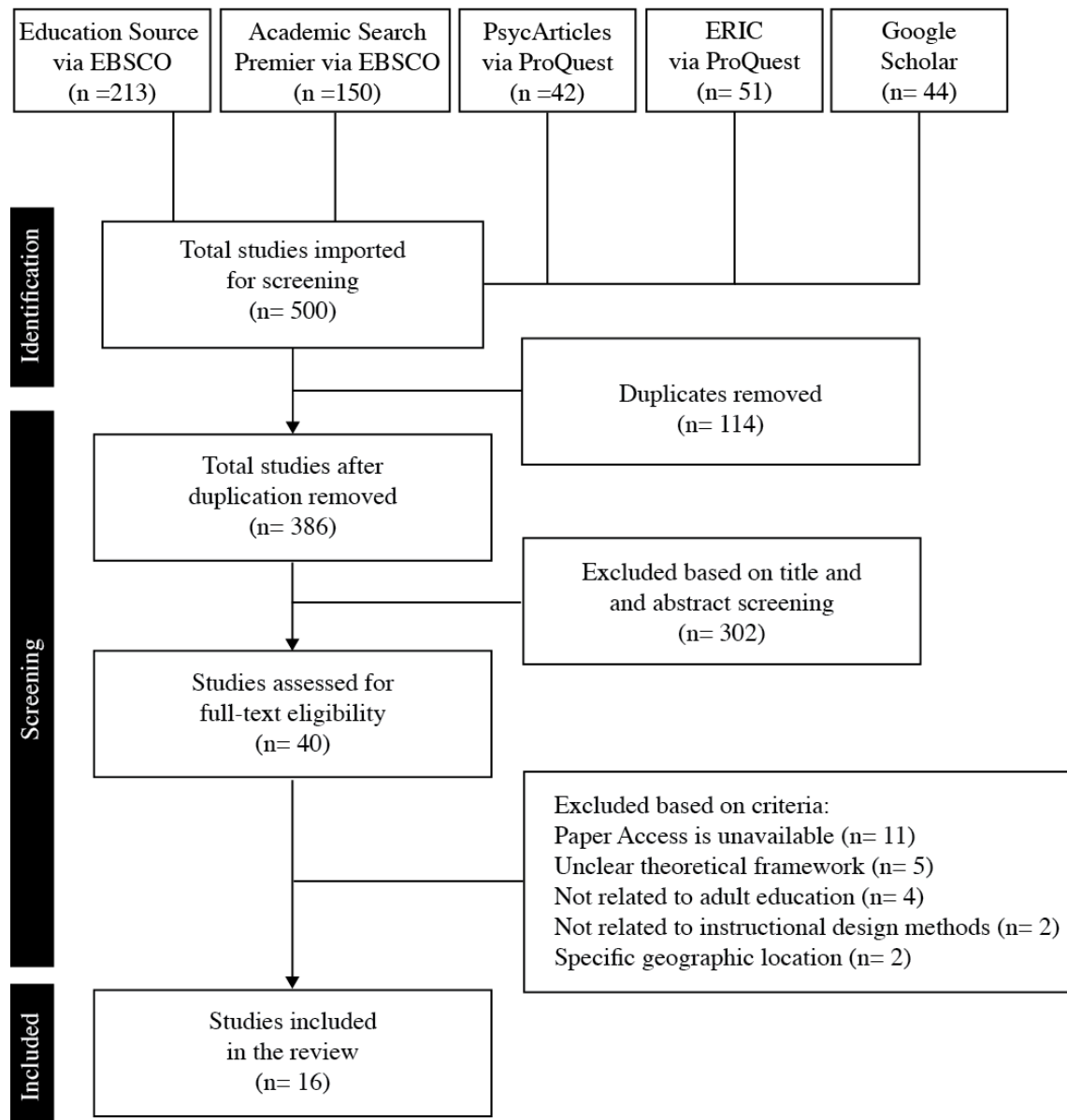
The inclusion criteria for the studies were established to ensure that the reviewed literature was relevant to online education, adult education theory, and instructional design methods. The main inclusion criteria were that the studies had to be relevant to online educational contexts, not limited to a specific geographic location, and focused on adult education. In addition, the studies had to relate to instructional design methods and cover more than one software tool. The combination of face-to-face and online learning (i.e., blended learning) was also considered an important inclusion criterion.

Exclusion criteria were established to eliminate studies that were not relevant to the research area of adult education and instructional design methods. This included studies solely relevant to a specific industry, such as nursing, medical, or automotive, as they are too narrow and limited and thus do not fit the context of the research. Studies with a very specific geographic location were also excluded as they were not representative of a broader context. Additionally, studies not related to adult education or instructional design methods were excluded to maintain the focus on the research area, and reviews of very specific software tools were excluded as they did not align with the broader scope of the research. The quality and

comprehensiveness of the reviewed literature was ensured by excluding studies whose paper access was unavailable via Ontario Tech's library, had an unclear theoretical framework, or were not available in the English language. The exclusion criteria were used to ensure that the reviewed literature was within the context of the research area.

Screening Process

The screening process consisted of two rounds of screening. In the first round, 500 research articles were imported for screening, and 114 duplicates were removed, resulting in 386 studies screened against title and abstract. 302 studies were excluded in this round based on their title and abstracts. In the second round, 40 studies were assessed for full-text eligibility, and 24 studies were excluded based on the following criteria: 11 studies were unavailable for access, 5 had unclear theoretical frameworks, 4 were not related to adult education, 2 were not related to instructional design methods, and 2 had a very specific geographic location. Finally, 16 studies were included in the review. The screening and selection process is outlined in Figure 3.

Figure 3*Screening and selection process*

Note. This diagram highlights the identification, screening and inclusion of the article in the selected databases.

Review Procedure

The literature review process involved a comprehensive examination of the existing research on adult learning theories, needs, and instructional methods. The aim was to answer three research questions related to the utilization of adult learning theories, identification of adult learning needs, and design of instructional methods to enhance adult learning in online contexts. To address research question 1, the papers were analyzed to determine the extent to which adult learning theories were employed as a foundation in the research process. Research question 2 sought to investigate the methodologies used to identify the specific requirements of adults in an online educational setting. Finally, research question 3 aimed to explore the design solutions suggested for improving adult learning experiences in online contexts. The analysis of the articles was conducted by comparing, categorizing, and analyzing the content to gain a better understanding of the existing research and to identify areas for research improvement.

The results of the studies were extracted from the relevant publications for subsequent in-depth examination. A manual categorization and synthesis process was carried out to analyze the data effectively. An exhaustive review of all the included studies was conducted to answer the research questions posed, utilizing the guidelines outlined in Table 2 as a reference.

Table 2*Guidelines for Data Extraction and Categorization*

Research Question	Classifying Guidelines
What adult learning theories are shown to inform and enhance online and blended learning?	Did the article refer to any adult learning theory? What was the focus of the article?
What methodologies can be used to identify and address adult learning needs?	What was the study evaluating/investigating? Are any factors affecting adult learning needs and outcomes reported in the article?
How have instructional methods been found to be useful in designing and creating online learning for adult learners?	Are there any suggested design or instructional solution outcomes?

Analysis and Findings

This section highlights the three research areas and their prevalence with the selected articles within the context of the research questions in Table 2. It also provides an in-depth overview of the theories, models and constructs within the literature's scope.

First Research Question: Learning Theories in Adult Learning Contexts

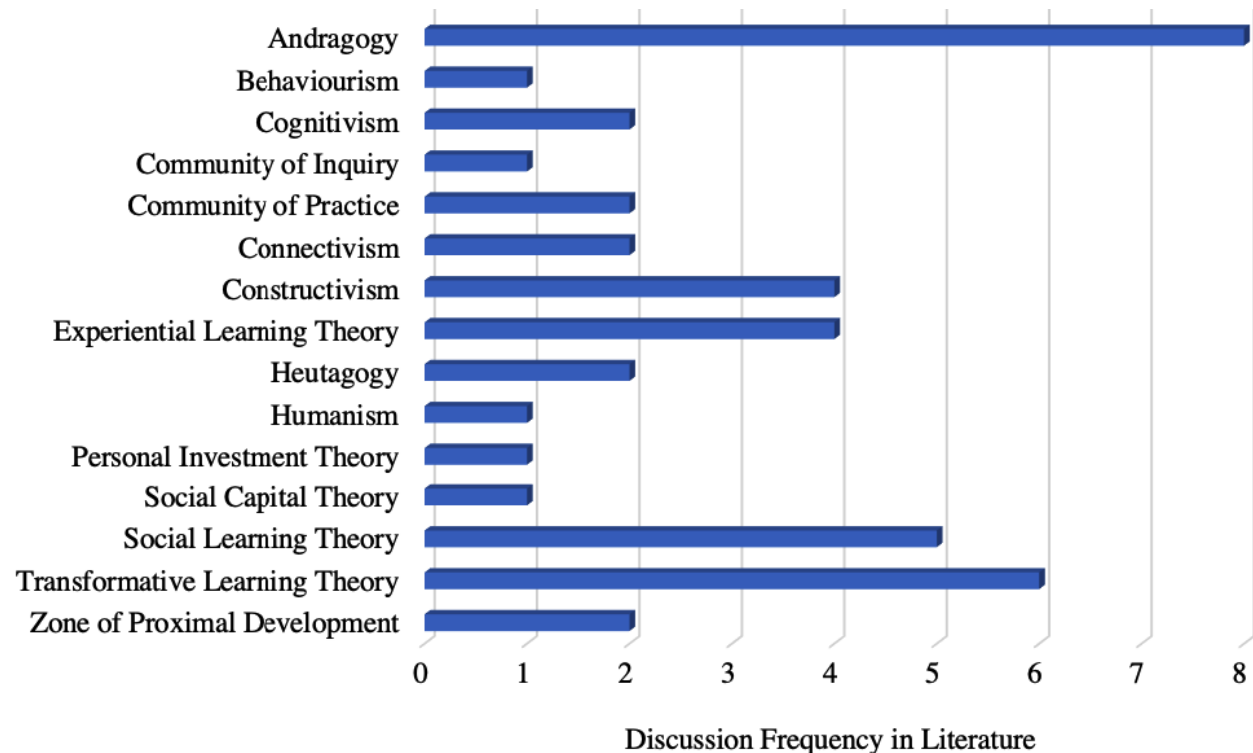
Adult learning is a complex process that involves transforming life experience into knowledge and skills. It is a lifelong process that is usually self-directed (Merriam & Bierema, 2013). Because it provides opportunities for lifelong professional and personal development, the rise of digital technologies has increased the importance of adult learning (Boeren, 2017). The lack of a clear definition or theory makes it difficult to grasp why adults learn and how to facilitate it fully. Although no single theory or model provides complete knowledge about adult learners, their learning context, and understanding (Merriam, 2001), the prevalence of each learning theory within the context of the articles included in this literature review is analyzed.

This analysis aims to gain insights and perspectives from multiple theories. By examining each learning theory, a deeper understanding of adult learning can help develop a more effective approach to facilitate it. Moreover, analyzing multiple theories can allow a more nuanced and comprehensive understanding of adult learners, their learning context, and their understanding, which can lead to more effective learning experiences.

An analysis of the literature was conducted to observe the frequency in which each learning theory and model in the articles is discussed and is outlined in Figure 4. See Appendix 1 for additional information.

Figure 4

Overall Discussion Frequency of Learning Theories and Models in Selected Articles



Measuring the frequency of each learning theory and model in the selected articles can provide valuable information about the current state of research and practice in the adult education field. This analysis can also give insights into which theories and models are most commonly discussed and which theories might be overlooked or underrepresented, which can help identify gaps in the current research. Moreover, the analysis aims to identify trends and shifts in adult learning theories and models and provide a perspective on the development of adult learning theories over the past decades. By understanding the prevalence of each adult learning theory and model, practitioners can make an informed decision about which theory to prioritize and investigate further. This can lead to developing a more evidence-based and practical approach to facilitating adult learning.

The following sections describe the five most frequent learning theories and models discussed in the selected articles and their fundamental assumptions. Additional learning theories and models are outlined in Appendix 2.

Andragogy

Malcolm S. Knowles is widely recognized for his andragogy theory, which focuses on the teaching and learning of adults as a distinct practice from the teaching and learning of children (pedagogy). Knowles's model challenged contemporary traditional instruction principles and proposes a learner-centred environment that fosters mutual trust and respect between learners and facilitators (Knowles, 1980).

Andragogy is based on six assumptions that reflect the proposed learning theory's goals, values, and methods. These assumptions are: (1) adults require a reason for learning, (2) adults transition from a dependent personality to a self-directed personality, (3) life experiences become valuable learning resources, (4) adults prefer learning that is relevant to their daily lives, (5)

adults develop from content-centred learners to problem-centred learners, and (6) adults are more intrinsically motivated (Knowles, Holton, & Swanson, 1998). According to Knowles, the relationship between instructors and learners should enable students to become independent, guided by instructors as needed.

It is important to note that while andragogy is widely used to understand adult learning, it is not considered a theory but rather a model under the theory of humanism. (Arghode et al., 2017).

Constructivism

Constructivism is a theoretical perspective that emphasizes the learner's active role in constructing their own knowledge and understanding of the world. This theory argues that learning is not just absorbing information but an active process of creating and refining mental models or concepts. Constructivism can be effective in an adult learning context because adult learners often bring experience and prior knowledge to the learning process. The emphasis is on learners actively engaging with the material and constructing their understanding rather than simply recalling memorized information. Constructivism reflects that instruction should encourage learners to construct meaning, resulting in enhanced learning (Vygotsky, 1978).

Furthermore, constructivism emphasizes the importance of collaboration and interaction in learning. Social constructivism assumes that all learning is socially mediated and knowledge is constructed through social interaction by sharing and involving in a conversation with others. In an adult learning context, this can take the form of group discussions, peer review of work, and collaborative problem-solving activities. These activities help learners to clarify their understanding and refine their mental models by engaging with the perspectives and ideas of others (Kim, 2001).

In essence, effective instructional practices should be matched with equally good student motivation for promoting learning (Sjøberg, 2010). An instructor can provide information and facilitate discussions, but a learner needs to understand the content. This is why constructivism supports learner-centred authentic, collaborative, constructive, and active learning environments. It is important to note that while effective instruction and content presentation skills are essential, successful learning can only take place with students' efforts and willingness to learn and apply the concepts (Sjøberg, 2010).

Overall, constructivism can be a powerful tool for facilitating meaningful learning experiences in adult education. This theory promotes hands-on, problem-solving activities by engaging adult learners in constructing their own knowledge and understanding. As we continue to move further into the information age, new competencies, such as the ability to innovate and create and solve ill-defined problems, are required. Constructivism can help develop these skills through teaching methods that encourage learners to engage with the material and actively construct their understanding.

Experiential Learning Theory

Experiential Learning Theory (ELT) is a valuable learning theory for adult learners as it proposes that learning occurs when people engage in concrete experiences that are followed by reflective observation, abstract conceptualization, and active experimentation. The cyclical pattern of experiential learning, moving from experience through reflection to conceptualization and then to action, forms the basis of many training and learning events and is increasingly being used for continuous professional development (Dewey, 1986; Kolb et al., 2014).

ELT is particularly relevant in adult learning as it enables learners to draw upon their wealth of experiences when learning something new, motivating them when they see the

relevance of new knowledge or skills to their lives (McCarthy, 2010). ELT can be applied in adult learning through reflection on experiences, individually or in group settings, and the use of simulations or other experiential learning activities that allow learners to engage with new concepts or skills in a concrete and meaningful way, enhancing their understanding and retention of the material.

However, the wholesale acceptance of experiential learning as the defining feature of adult learning must be cautioned, as uncritically affirming experiences risks idealizing and romanticizing them without recognizing the cultural contradictions that inform them. Therefore, it is crucial to consider the characteristics of the correct atmosphere for adult learners, recommendations for implementing experiential learning, and recommendations for interaction and collaboration among adult learners. ELT provides the basis for any adult learning experience, enabling learners to connect what they have learned to past experiences and see possible future implications (Kolb et al., 2014).

Social Learning Theory

Social Learning Theory emphasizes the role of social interactions in learning, where trust-building, exchanging ideas, and the observation and response to social environments are mechanisms through which learners acquire knowledge. The importance of social interactions in learning is a striking feature of this theory, as it results in knowledge sharing and creation. Social Learning Theory is essential in improving trainee skills and understanding their motivation, leading to better training design. In adult learning contexts, educators should design instruction that allows adult learners to group reflection and promotes intrinsic motivation, leading to the best academic performance. Social Learning Theory has important implications for adult

learning contexts, where learners observe and imitate others' behavior, and feedback is crucial in the learning process (Bandura & Walters, 1977).

Adult learners can benefit from feedback from different sources, including peers, mentors, instructors, and self-reflection, which will refine skills and improve performance. Learning programs are successful when learners integrate new content with prior knowledge and skills. The purpose of learning is to model new roles and change one's behavior, attitude, and opinion toward role models, leading to realistic expectations for achievement. In traditional learning settings, instructors and peers can serve as role models to learners, while in the workplace, social learning is used as a new employee training and development strategy, such as on-the-job orientation or management training (Akers & Jennings, 2015).

Social Learning Theory differs from other learning theories in its reliance on the interactions between learners in shaping learning, leading to knowledge sharing and its creation. Adult learners can be self-directed and motivated to learn, and educators should design instruction that provides opportunities for group reflection, leading to the best academic performance. Social Learning Theory has significant implications for adult learning contexts, where learners observe and imitate others' behavior, feedback is crucial, and social interactions are essential in the learning process (Bandura & Walters, 1977).

Transformative Learning Theory

Transformative learning theory is a learning theory introduced by Jack Mezirow (Mezirow, 1991) in the 1970s that posits that adult learners can experience a significant change in their perspectives, beliefs, and behaviors through learning experiences that challenge their assumptions and cognitive structures. The theory is particularly relevant to adult learning contexts because adults bring a wealth of experiences, knowledge, and values to their learning.

Learning involves improvement in knowledge, skills, ability and attitudes, and transformative learning enables learners to challenge the status quo, aspire for something better and bring behavioral change. This theory stresses learner needs and abilities to design instruction in a manner that promotes effective learning. Inherent to transformation is the notion of change, and learning is not a destination but a never-ending quest for knowledge, skills, and the shaping of attitudes and beliefs.

According to transformative learning theory, learners need to assess, question and sometimes even disregard their own beliefs in search of knowledge. Theorists acknowledge that, sometimes, it is difficult for learners to step away from their comfort zones. Being disturbed by the status quo and willing to accept the challenges for betterment is, however, essential to achieve learning. The theory encourages learners to evaluate and critically examine their learning, so the distinction between the former and final learning states is evident and promotes greater application and transferability (Kitchenham, 2008).

Transformative learning encourages learners to be inquirers, examiners and challengers while believing that only through continuous improvement can a learner learn. The theory also emphasizes the importance of interactive learning in adult learning contexts, which works well in the online arena. Educators can introduce online group assignments that challenge adult beliefs or initial understanding and monitor and reflect on their progress or shifting beliefs and learning to mark an overall change. Adult learners can work as a group, and educators can use discussion boards, blogs, wikis and cloud-based social sites as channels for communication within the group of adult learners.

Transformative learning is a process of critical reflection. It is about change in learners, and it is the kind of learning that occurs when individuals make meaning out of the world

through experiences. Transformative learning aims to understand why we see the world the way we do and to shake off the constraints of the limiting perspectives we have carried into the learning experience. Transformative learning helps adult learners understand their experiences, how they make sense or "meaning of their experiences, the nature of the structures that influence the way they construe experience, the dynamics involved in modifying meanings, and the way the structures of meaning themselves undergo changes when learners find them to be dysfunctional." (Mezirow, 1991)

Transformative learning is a crucial theory in adult learning contexts as it highlights the importance of continuous improvement and the ability to learn from experiences to enable learners to achieve a higher learning state. It encourages learners to be inquirers, examiners and challengers and promotes the design of instruction in a manner that promotes effective learning. The theory's focus on increasing interactions among learners and between instructors and learners is essential for adult learners. It helps them understand their experiences and make meaning out of them.

Second Research Question: Adult Learners Characteristics and their Needs

Adult learners have unique characteristics and learning needs that distinguish them from younger learners. Understanding these characteristics and exploring adult learning needs is essential to creating an effective adult learning experience.

Characteristics of Adult Learners

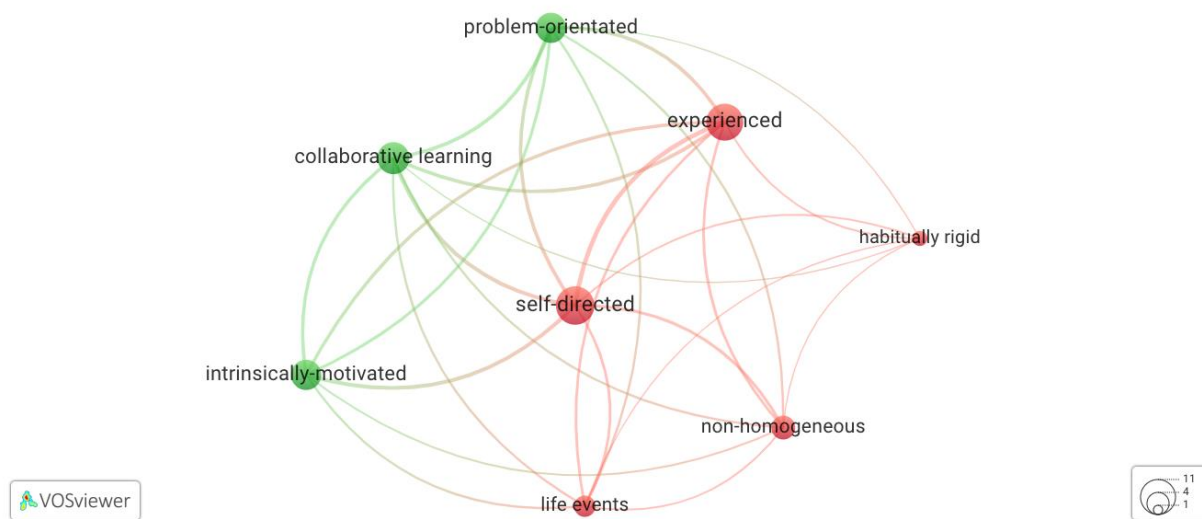
The characteristics of adult learners differ from those of children and young learners due to their complex backgrounds and accumulated life experiences. Adult learners can be self-directed, have prior experiences, are motivated by their needs and interests, are practical, have

multiple roles and responsibilities, and usually prefer learning experiences related to practical issues. Knowledge of adult learners' characteristics can help improve the effectiveness of learning and development professionals in designing training programs for adult learners (Cercone, 2008).

Since adult learners bring diverse experiences to the learning environment, they can shape their learning styles and preferences. As the workplace changes rapidly, adult learners are pushed to continually pursue education and seek professional development to maintain quality performance. The focus of adult education has shifted from general learning theories to specific adult characteristics with an emphasis on learner-centered teaching strategies. To achieve the desired learning outcome, adult educators should select appropriate learning methods based on adult learners' characteristics (Honigsfeld & Dunn, 2006).

A review of the selected articles identified the following adult learner characteristics: self-directed, experienced, intrinsically-motivated, problem-orientated, life events, habitually rigid, collaborative learning, and non-homogeneous. The instance frequency for the adult characteristics in each article was then recorded.

Moreover, a coding process was conducted to collectively identify the most frequent characteristic in all the selected articles using VOSViewer. This visual software tool constructs and visualizes bibliometric networks, and in this case, it was created by importing the instance frequency of each adult learner characteristic into the software. This visual analysis aims to gain insights into the significance of each of these traits and how they impact the learning experience based on the adult learner characteristic frequency in the selected articles.

Figure 5*Adult Learner Characteristic Frequency in Selected Articles*

This section elaborates on each mentioned characteristic of adult learners according to the literature's scope.

Self-directed. As self-directed learners, adults can be independent. Adult learners often have multiple responsibilities related to both work and home settings. When adults are not provided with control of their learning experiences, they often resist the learning process. Therefore, involving adults in their learning is crucial, and this involvement can include collaborative activities that ensure that the learning experience allows active participation. This process can ensure that the learning is both relevant and meaningful and can help promote better knowledge retention (Loeng, 2020).

Experienced. Adult learners' experience and prior knowledge can serve as a foundation for new learning. As adults learn, they connect new information and knowledge to their experiences to evaluate the validity of new ideas and concepts and how they relate to their life

experiences. Hence, interaction among adult learners is crucial for sharing ideas, experiences and perspectives. Through this interaction, adult learners can learn new ways to apply new knowledge, which is essential for deep learning (Cercone, 2008).

Intrinsically-motivated. Adult learners can be motivated by their needs, interests and willingness to learn. The learning content's relevance to their individual needs and the ability to achieve outlined goals are the most significant factors in motivating adult learners. Furthermore, adult learners learn with intent; that is, they usually require a reason behind learning a particular content or skill. The source of motivation for adult learners is that their learning is typically voluntary, and the skills they learn are related to career progression, professional development, and job skills. Therefore, learning content is required to be well-structured, organized and relevant, with clearly defined objectives (Kapur, 2015).

Problem-orientated. Adult learners are motivated by practicality, problem-solving, and acquiring knowledge that will benefit their personal and professional development. They are usually committed to comprehending the learning content and its potential implications and tend to feel dissatisfied with hypothetical concepts that lack immediate practical application. They prefer theoretical concepts to be contextualized in functional problem-solving scenarios. As such, learning content must be designed to be practical and cater to the identified requirements of adult learners (Loyens et al., 2008).

Commitments. Adult learners have multiple responsibilities, such as managing their job, household duties, and caring for their families. As a result, their focus on learning may be secondary to fulfilling their other responsibilities. The competing demands of their multiple roles can limit the time and energy they have available for learning activities, such as planning, reading, researching, or attending training programs. Moreover, adult learners' priorities vary

depending on their life cycle stage. Therefore, adult learning content should consider adult learners' time constraints and be flexible to their priorities (Cercone, 2008).

Habitually rigid. Habits play a crucial role in the learning process of adults. Adults may find it difficult to alter their pre-existing habits and may become more resistant to change. Adult learners are often embedded in their ways and may perceive change as an unfavorable option that could yield unpredictable outcomes. As a result, they prefer having ample time for reflection. Therefore, learning content should explain why change is necessary for adult learners by connecting the new concepts with pre-existing ones. Learning experiences should also allow adult learners adequate time for reflection to internalize and assimilate the new information effectively (Malone, 2014).

Collaborative Learning. Adult learners generally prefer a facilitator learning experience rather than a lecture in a formal learning situation (Huang, 2002). They also prefer a peer relationship rather than a hierarchical one. Therefore, learning content should focus more on the process of learning and present material in various ways to accommodate different learning styles. Adult learners value a sense of belonging, recognition, and respect, and they appreciate giving and receiving support. They also prefer to be free to express their concerns, views, and opinions. Therefore, case studies, problem-based learning exercises, role-playing, discussion, simulation, reflection, and self-evaluation can be useful as adult learning activities (Huang, 2002).

Non-homogeneous. Adult learners are not typically a homogenous group; they can differ in various ways, such as gender, age, experience, learning preferences, beliefs, and education. Most adult learners prefer to be challenged beyond their current ability level, but the task's difficulty level should be carefully calculated to avoid stress, demotivation, and disengagement.

Learning content should account for relevancy by identifying the real needs of adult learners (Malone, 2014).

Adult Learner Needs

Attention to adult learning needs is a crucial factor in ensuring successful learning outcomes in adult educational settings. Understanding the needs of these learners is important to designing educational programs that cater to their individual learning requirements and promote their motivation to learn (Herbold, 2012).

Adult learning needs are most prominent where learners typically have prior learning experiences and unique motivations for engaging in education. Boone et al. (2002) argue that the failure of educational programs to address adult learners' immediate interests and needs can result in a lack of motivation. This oversight highlights the importance of understanding and addressing the unique learning needs of adult learners to ensure their engagement in the learning experience.

However, identifying and addressing adult learners' needs can be challenging. For example, adult learners may express trivial wants rather than genuine needs, leading to educational experiences that fail to meet their actual needs. Hence educators need to avoid a "customer service mentality" and instead filter adult learners' needs through their own philosophical lens to define genuine learning needs (Ayers, 2010, p. 343).

The philosophical beliefs of positivism and subjectivism also play a critical role in defining adult learning needs. Positivism is based on scientific empiricism, which translates learners' needs into assessable objectives and maintains that education aims to help people solve problems. The positivist approach distinguishes between genuine educational needs and learners'

wants or desires. In contrast, subjectivism emphasizes the empowering function of education to enable learners to critically challenge the various powers and systems that affect their lives. Practitioners following this paradigm consider needs socially constructed and think that all needs are real, whether they are classified as needs, interests, wants or desires (Pearce, 1995).

Furthermore, adult learners require an approach, which acknowledges their personal experiences, and treats them as capable of self-direction. The learning needs of adults are closely related to their changing social roles. Adult learners have a rich resource of experiences that the educator can use. They are problem-centered and interested in the immediate application of knowledge (Malone, 2014).

Factors Affecting Adult Learners

Adults are motivated to learn by internal and external factors (Knowles, 1980). As a result, understanding the factors that affect adult learners is crucial in creating effective educational programs that meet their specific needs.

External Factors. External factors can play a significant role in shaping the learning needs and experiences of adult learners. These external factors can be broadly categorized into physical constraints and course-related factors.

Physical constraints are factors that are outside of an individual's control, such as work, family responsibilities, and time constraints. Adult learners are often balancing various roles and responsibilities and, as a result, may be more susceptible to absenteeism or low efficiency. The burden of these physical constraints can lead to feelings of overwhelm, frustration, and burnout, ultimately impacting an individual's ability to persist with online learning. Therefore, it is crucial to provide adequate support and encouragement to adult learners who are juggling multiple

responsibilities. According to Park and Choi (2009), family and organizational support can positively impact adult learners' learning experiences, affecting their intentions to continue learning by influencing mediating variables of perceived usefulness. By acknowledging and addressing the physical constraints that adult learners face, educators can create a more supportive and conducive learning environment, thereby facilitating greater engagement and success. Physical constraints can also influence adult learners' course preferences. Adult learners prefer courses that are flexible and relevant to their occupations (Chang et al., 2015). Flexibility allows adult learners to set their own pace, avoiding scheduling conflicts between learning and work. Additionally, relevance is essential to adult learners as they seek to solve problems in the present rather than prepare for the future. Thus, by providing flexible and relevant learning content, educators can better meet the unique needs of adult learners, thereby promoting successful learning outcomes (Park & Choi, 2009).

Course-related factors refer to various variables that impact an adult learner's experience with learning content. Different studies have examined factors such as management credibility, technology ease of use, technical advantages, compatibility, classroom flexibility, evaluation, satisfaction, and flow experience (Lu et al., 2022). Educators must consider these various course-related factors when designing and delivering courses. Doing so can create a learning environment conducive to adult learners' needs, promoting better engagement and satisfaction (Lu et al., 2022).

Internal Factors. Internal factors can affect the learning needs of adult learners. Scholastic aptitude is one critical factor in adult learners' learning needs. It refers to skills related to learning, such as self-regulated learning, learning strategies, and achieving goals. According to Choi and Park (2018), scholastic aptitude affects adult learners' achievement and can indirectly

cause them to give up. Similarly, Lai (2011) found that self-directed learning readiness and network literacy were significant predictors of learning effectiveness. Other studies have also highlighted the importance of intrinsic motivation, metacognition, self-regulated learning, learning strategies, core self-evaluation, and self-efficacy in improving adult learners' online learning outcomes. However, adult learners may struggle with scholastic aptitude factors more than traditional students. Adult learners do not monitor their learning as well as college students (Boelens et al., 2018). In addition, learners studying towards a higher education degree were significantly better at self-regulating their learning than low-education or employed adult learners (Hood et al., 2015). Therefore, providing support for adult learners in scholastic aptitude may be critical for improving their learning experience. Adult learners may benefit from learning content that focuses on developing their self-regulated learning skills or provide strategies for achieving their learning goals.

Motivation is another key internal factor affecting adult learners' learning needs. Motivation can be attributed to both extrinsic and intrinsic consequences of behavioural paths, with intrinsic motivation being a more effective incentive for learning than external rewards or test scores (Redding, 2014). Intrinsic motivation stems from achieving personal objectives, and a sense of independence is a powerful driving force that can encourage an adult learner's persistence in learning. In contrast, external rewards, such as test scores and rewards for academic performance, are less effective at sustaining engagement over time (Rothes et al., 2014).

Learning Behaviors

The distinction between high-context and low-context learning behaviors proposed by Morse (2003) is a more appropriate way of understanding the needs of adult learners. High-

context learners prefer content and knowledge-based learning, formal teacher/student relationships, and an emphasis on teaching inputs with students as recipients and reproducers of material. In contrast, low-context learners prefer to explore and develop their knowledge, with an emphasis on learning outcomes, the development of personal skills, and using a wide variety of learning tools and assessment instruments in informal student/teacher relationships.

Designing learning content to support the development of learning skills in those whose preference is for high-context instruction as well as meeting the needs of those who are already functioning within the low-context environment, requires careful execution. The Cognitive Apprenticeship framework (Brown et al., 1989) can meet this requirement, particularly in designing online learning environments. This learning model challenges teaching approaches that treat learners as passive recipients of information, where the knowledge developed is often inert. The fundamental tenet of Cognitive Apprenticeship pertains to participation in authentic activities—the ordinary practices of the culture—as the core of learning and teaching transactions. In this approach, modelling, scaffolding, and coaching are facilitated by the instructor or more experienced peers, upon which they fade into the background once confidence and competence is achieved. Learners are guided to perform authentic activities that practitioners and experts engage in during real problem-solving situations. This approach makes expert cognitive processes visible and accessible to novice learners. The Cognitive Apprenticeship model recognizes that effective learning is not abstract and that learners need to be able to see the results of what they learn (Collins, 1991). The model provides a way for instructors to present learning practically and realistically that engages adult learners, and allows them to apply what they learn in real-world scenarios.

Third Research Question: Instructional Design Methods for the Online Adult Learner

The advent of the Internet is argued to be the center of an ongoing unprecedented global transformation. This transformation has significantly impacted learning, particularly in terms of the trajectory of instructional design methods, with a notable rise in online learning (Harasim, 2006). New methods have increased accessibility to education by eliminating time and space barriers and allowing more convenience. On the other hand, technological advancement affected learning methods and resources by offering adult learners highly customizable learning experiences (Haleem et al., 2022).

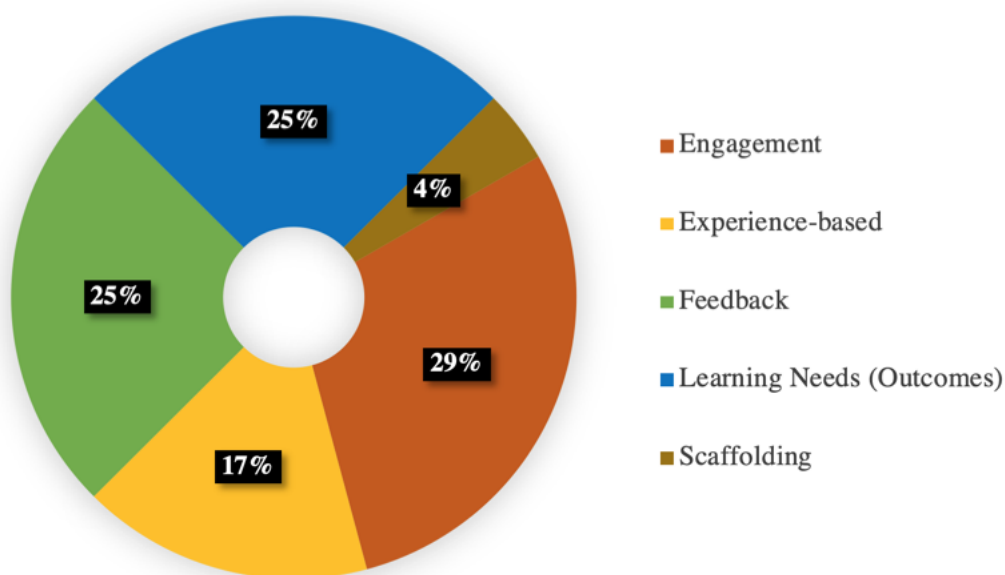
The potential of online learning in adult learning contexts is vast, and instructional design methods play a significant role in its success. A qualitative data analysis was conducted to identify what elements of instructional design are discussed in each article. The process involved identifying each article's main theme or model specifically related to instructional design. See Appendix 3 for additional information.

A deductive coding method was then used to identify the key principle related to each instructional design theme or model discussed in each article. This method measured the frequency of each key instructional design principle discussed in the selected articles. See Appendix 4 for detailed information.

The resulting data deduced the prevalence of each driving principle behind the instructional methods discussed in the papers collectively (Figure 6).

Figure 6

Prevalence of Key Instructional Design Principles in Selected Articles



Feedback

Instructional design approaches utilized in adult education consistently refer to feedback's significance. The ARCS model (attention, relevance, confidence, satisfaction) emphasizes feedback through the need to gain the learners' attention while being informed about the relevance of the instruction. A mechanism that includes effective feedback can enhance learner confidence, resulting in improved motivation (Brieger et al., 2020).

Various instructional design models theorize that successful instructional design starts with understanding and establishing connections with learners. For instance, the Kemp Instructional Design Model highlights the importance of considering the characteristics of learners throughout the design process (Morrison et al., 2010). In this context, feedback plays a vital role by facilitating communication and aligning instructors and adult learners, ensuring that instruction meets learner needs (Chuang, 2021).

Effective instructional design in blended learning, which includes online and face-to-face elements, requires an in-depth understanding of how each delivery modality supports effective learning. Feedback mechanisms become essential for bridging the gap between online and in-person interactions, allowing teachers to provide timely assistance and assessment in both environments (McKenna et al., 2019).

The notion that technology should support a learner-centred approach rather than dictate the learning process emphasizes the need for feedback mechanisms. Learner-centred design necessitates responsive systems that adapt to the demands of learners and provide feedback as they develop. Feedback is critical to guarantee that technology effectively meets the learning objectives (Tynjälä & Häkkinen, 2005).

A key principle in instructional design is the concept of an interactive, collaborative, and constructive online learning community. Feedback is critical in building these kinds of communities. According to Snyder (2009), it promotes the creation of a collaborative learning environment, whether in the form of peer feedback or teacher feedback.

Accordingly, feedback is a critical component in many instructional design paradigms, underpinning the effectiveness of adult online education. It can increase learner engagement, motivation, and satisfaction while generating an instructor presence in the digital learning environment. Educators may develop more meaningful and impactful online learning experiences for adult learners by understanding and integrating feedback mechanisms into instructional design.

Engagement

Instructional design models are critical in increasing adult online education engagement. Engagement is an essential component in these models and critical to developing effective and meaningful online learning experiences.

Incorporating weekly collaborative discussion activities into online learning designs is an effective method for increasing participation. This method is consistent with instructional design theory ideas that emphasize the necessity of developing interactive and collaborative learning communities (Snyder, 2009). Collaborative conversations enable adult learners to actively participate, share ideas, and interact with course content, considerably increasing their retention of the subject (Arghode et al., 2017).

Understanding and developing connections with learners is another critical part of engagement essential to successful instructional design (Chuang, 2021). Recognizing what motivates and facilitates adult learners is critical for engaging them in self-directed and collaborative learning (Diep et al., 2019). Instructional designers can provide more relevant educational content by adapting learning experiences to learners' choices and requirements.

Moreover, engagement is reinforced by emphasizing its importance in e-learning instructional design methodologies (Britt et al., 2015). Creating realistic and relevant learning experiences that attract learners' attention, create a sense of success, and establish a connection between the subject and their real-life experiences is what designing for engagement entails. This strategy is consistent with the larger goal of increasing adult online education engagement.

Gaining learners' attention and designing for success are inextricably tied to engagement. As emphasized in many instructional design frameworks, these principles consistently increase adult learners' engagement and motivation (Brieger et al., 2020).

Experience-based Learning

In adult online education, instructional design methods play an important role in supporting experience-based learning. Experience-based learning involves giving learners meaningful and relevant experiences that allow them to apply new information and skills in real-world situations.

The emphasis on delivering meaning and relevance to the student learning experience is crucial to experience-based learning. Adult learners want learning experiences that are engaging and meaningful to their lived experiences. Instructional designers should develop experiences that engage with adult learners by tying the content to real-life settings and motivating learners to apply new information to make a genuine difference (Bricknell & Muldoon, 2012).

Creating genuine learning experiences that engage students in problem-solving is fundamental to instructional design methods. The necessity of authenticity is amplified in online contexts, where learners may feel removed from the learning process. This method is consistent with instructional design concepts, which support interactive, collaborative, and constructive learning environments (Snyder, 2009). Adult learners need to see the practical implications of their learning through authentic experiences, which increases motivation and engagement (Britt et al., 2015).

According to Lawson (2005), adult learners contribute abundant life experiences to the learning process. Instructional designers may use these many resources to improve their

approaches. This strategy is consistent with understanding and connecting with learners, a critical component of effective instructional design (Chuang, 2021). Instructional designers can develop more relevant and relatable learning experiences for adult learners by discovering and exploiting their experiences.

Learning Needs (Outcomes)

In online education, instructional design models play a significant role in meeting adult learners' learning needs and desired outcomes. A fundamental principle in this setting is to adapt instructional design to the characteristics and demands of adult learners.

Understanding and addressing the specific needs of adult learners is critical in instructional design. Cercone (2008) underlines the need to employ instructional design strategies adapted explicitly to adult learners' needs and characteristics. This strategy aligns with producing practical learning experiences that correspond to desired learning outcomes.

The identification of learning objectives is a critical component of instructional design. According to Chimalakonda and Nori (2020), well-designed courses are crucial for improving learning and achieving targeted learning outcomes. This approach to developing specific learning objectives is consistent with numerous instructional design frameworks, such as the Dick and Carey Instructional Model, which emphasizes specifying performance targets to guide training (Dick et al., 2015).

Furthermore, Diep et al. (2019) emphasize the necessity of aligning instructional design with learners' motivations and facilitators by emphasizing understanding the needs of adult learners and employing a conceptual framework to drive instructional design. These methods,

such as the ARCS and the Dick and Carey models, highlight designing for success and relevance, which contribute directly to achieving desired learning outcomes.

McKenna et al. (2019) emphasize the importance of understanding how each delivery method might support effective learning in blended learning. According to Tynjälä and Häkkinen (2005), it is critical that technology not drive the learning process but rather take a learner-centered approach. Rather than focusing merely on technological characteristics, instructional designers must explore how technology might best assist adult learners' learning needs and outcomes.

Scaffolding

As an educational concept, scaffolding is inextricably linked to instructional design models in adult online education. It provides a structured framework to help establish disciplined online learning patterns.

Scaffolding involves guiding and supporting learners as they tackle challenging learning activities. This concept is consistent with instructional design models such as the ADDIE and Dick and Carey models. These models emphasize the need to set explicit learning objectives and create instructional resources that steer learners toward goals (Arghode et al., 2017; Dick et al., 2015).

Scaffolding can also be integrated into the Kemp Instructional Design Model, which offers a non-linear and flexible approach. Instructional designers can give various resources and guidance at various stages of the learning process, ensuring learners have the support they need to proceed effectively (Morrison et al., 2010).

Furthermore, recognizing the requirements and characteristics of adult learners is critical in scaffolding. Recognizing adult learners' different backgrounds and experiences allows designers to adjust scaffolding strategies to match individual needs, ensuring that the help provided is relevant and successful (Chuang, 2021; Diep et al., 2019).

Online learning and the adult learner: An Overview

This section provides an in-depth overview of the theories, models and constructs related to adult online learning within the scope of the selected articles. The aim is to focus on the research related to online learning within the selected articles.

Blended Learning and Adult Learners

Technological advancements have significantly changed how people learn (Goodman et al., 2016). Traditional learning settings require learners to meet at a physical location and learn through face-to-face instruction. With the advent of advanced technology, the opportunity and flexibility to access information and continuous development have become more accessible. Online learning can be an alternative learning method that provides flexible time to participants (Goodman et al., 2016). Blended courses combine online and face-to-face modalities, which can offer adult learners the advantages of both worlds in an optimal learning environment. According to Huang (2016), most adult learners prefer blended learning to either face-to-face or online learning alone, as it offers advantages such as flexibility and personalized learning.

Technology has also dramatically enhanced the cognitive level of student learning compared to traditional teaching methods (McLoughlin & Lee, 2008). Emerging technologies and learning platforms have enabled students to access various learning resources, interactive tools for collaborative work, web-based activities, and scaffolding tools for information searches,

self-assessment, monitoring, feedback, and progress tracking (Laurillard, 2013). These functionalities have empowered students to become more self-directed learners, but they require a conceptual framework and models to understand adult learners' needs and interactions in a blended learning environment. Educators can implement blended learning in different ways. This section highlights some blended learning models.

Rotation Model

The rotation model involves instructors rotating learners between online and face-to-face learning in a fixed way. In general, learning takes place in a physical space. The rotation model has various types of models, including station rotation, flipped classroom, and individual rotation. Station rotation involves a set number of stations where at least one is a face-to-face instructor station and at least one is an online station, and learners rotate through all of them. In a flipped classroom, students engage in learning off-site prior to attending class, and activities and practice take place in the classroom. In an individual rotation model, the instructor sets up a variety of learning activities, and learners are given an individualized "playlist" that dictates where to go, ideally based on their needs and learning preferences (Acree et al., 2017).

Flex Model

In a flex model, student learning takes place primarily online. As such, learners move through the online content according to their own needs and understanding. Learners take the course in-site, and instructors provide support as needed to individuals or small groups (Wang et al., 2021).

A La Carte Model

The A La Carte blended learning model, also referred to as the Self-Blended model, is a model that allows learners to take one or more courses entirely online with an online instructor of

record while simultaneously continuing to have brick-and-mortar learning experiences. This hybrid approach provides learners with the opportunity to take courses beyond what is already offered face-to-face (Stecyk, 2018).

Enriched Virtual Model

In an enriched virtual model, students attend one or more required face-to-face meetings and then complete the remainder of the coursework online at their own pace. The majority of learning takes place online, with only a few supporting face-to-face experiences (Wang et al., 2021).

Optimizing Online Learning for Adult Students

The functionalities of technological tools such as web-based applications or learning management systems (LMS) have become increasingly important for course designers to consider as classroom instruction is being replaced or augmented by technology. Educational researchers have widely adopted the theory of planned behaviour and technology acceptance models to explain learners' intentions and actual use of technology, with perceived usefulness and perceived ease of use being the two most important features of technology-supported learning environments that have been confirmed as valuable by learners. To effectively perform online learning activities, adult learners require transparency, technical support, and system functionalities. Instructors play a crucial role in facilitating learners' development of digital literacy, which positively affects their attitude toward online courses and reinforces their confidence in using technology to achieve their learning goals. By providing these conditions, instructional designers and instructors can create a positive online learning experience for adult learners.

Technical support

A recent study by Asoodar et al. (2016) found that learners' attitudes toward online courses and computer and internet anxiety do not significantly impact their learning experience. The authors attribute this to the availability of institutional support and instructors' technological competence and guidance. Instructors play a vital role in providing technical support and facilitating technology usage for learners, which positively affects their attitude toward the course. Knowing that instructors are available to solve technological issues can reduce learners' computer anxiety and reinforce their confidence in using technology to achieve their learning goals.

Digital Literacy

Apart from technical support, it is equally important for instructional designers and instructors to help learners develop digital literacy. Digital literacy refers to the ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others in specific life situations (Martin, 2006). Instructors play a crucial role in facilitating learners' development of digital literacy, especially as recent literature indicates that the assumption that the new generation of learners is digital natives may not necessarily hold true. To equip adult learners with sufficient conditions to effectively perform online learning activities, transparency, instructors' technical support, and system functionalities, such as perceived ease of use and perceived usefulness, must be made available. Additionally, instructors should focus on facilitating the development of learners' digital literacy, which in turn increases learners' self-efficacy and motivation to be more active in online interaction.

Adult Online Learning and Technology Acceptance

Understanding the factors that influence user acceptance of online learning technologies is essential for the success of information systems and the continued use of these systems. User acceptance is vital for the success of information systems, as it directly influences whether or not users continue to use the system. According to Islam (2016), two critical outcomes are linked to user technology acceptance: information systems success and continued use of the system. Therefore, understanding how end-users feel about a system or service is crucial in analyzing their acceptance of it.

In adult educational contexts understanding user acceptance of online learning is crucial for evaluating and designing systems that enable technology acceptance among learners. Student technology acceptance is a principal factor in the success of online learning (Cole et al., 2014). According to Liaw (2008), understanding student attitudes toward e-learning is critical to improving e-learning usage. Critical success factors can indicate the different acceptance levels when evaluating technology acceptance. These critical success factors are the comprehensiveness of the content, its accuracy, user-friendly navigation and accessibility, and the responsiveness of course staff (Naveh et al., 2012). Moreover, demographic variables such as age are significant contributors to technology acceptance, particularly in adult learning platforms (Dalcher & Shine, 2003). The advent of online learning has also led to the development of online learning environments, such as learning management systems (LMS) and various digital tools, which can significantly impact the learning process and outcomes. Therefore, understanding the role of technology acceptance among adult learners in online learning environments is crucial.

Technology Acceptance Model

The Technology Acceptance Model (TAM) is widely used for examining how users accept and adopt new technologies. Developed by Davis et al. (1989), TAM includes two key

elements: perceived usefulness and perceived ease of use. These elements help predict whether potential users are likely to adopt and use a technology. Since its creation, TAM has been applied in various contexts and domains of information systems to investigate technology adoption behaviors (Chen et al., 2011). Over the years, additional conceptual elements such as attitude towards use and behavioral intention to use have been added to expand the TAM model (Holden & Rada, 2011; Venkatesh et al., 2003; Venkatesh & Bala, 2008). According to Rogers (2003), adoption of an innovation must occur before implementation.

According to the Technology Acceptance Model (TAM), users' attitudes toward technology are strongly determined by perceived usefulness and perceived ease. Perceived usefulness refers to the extent to which users believe that a technology tool or resource enables improvement in job performance (Davis et al., 1989). Perceived ease of use refers to the degree to which users expect the tool or resource to be effortless (Davis et al., 1989). Attitude towards use refers to users' overall enjoyment or dislike of the tool or resource (Davis et al., 1989), while the intention to use estimates users' willingness to use the tool or resource if it is available (Davis et al., 1989). By combining perceived usefulness and perceived ease of use, attitude, and behavioral intention, researchers can measure the actual use of an information technology system. Therefore, applying TAM to examining an information technology system can help researchers understand how users' perceptions of the system's usefulness and ease of use affect their attitude, which, in turn, impacts their intention to use the system (Davis et al., 1989).

Designing online learning technologies requires knowledge of how different groups perceive the technology, which is a critical factor in the design process. Each group's unique life experiences can affect their perceived usefulness and ease of use of the technology, and thus their technology acceptance levels may differ. Recent studies have adapted and applied the

Technology Acceptance Model (TAM) to examine perceptions of technology in educational institutions. Perceived ease of use was found to have a significant impact on perceived usefulness of technology tools. Additionally, a positive relationship was found between an instructor's behavioral intention to utilize technology and perceived usefulness, perceived ease of use, and attitude towards use (Alharbi & Drew, 2014; Joo et al., 2018). Previous studies have demonstrated the reliability of TAM as a model for predicting technology adoption in various settings, including mobile learning technologies (Park et al., 2011), electronic portfolio systems (Shroff et al., 2011), and Learning Management Systems (LMS) in higher education institutions (Fathema et al., 2015).

Online communities of practice and the Adult Learner

Online communities of practice (OCOPs) have increasingly become an essential tool for adult learning in online learning contexts. They provide a platform for adults to engage in collaborative learning experiences and share their knowledge and experiences with others. A range of studies has pointed out that online communities of practice offer opportunities to their members to become interactive participants (Agrawal & Snekkenes, 2017; Diep et al., 2016; Jesionkowska, 2020; Nuutinen & Filho, 2018).

According to Jacobson (2008), wikis can be classified as Online Communities of Practice (OCOPs) due to their asynchronous nature, allowing for participation at individuals' convenience. Wikis also serve as a repository of knowledge, where concepts, dialogue, and information can be recorded and accessed virtually anywhere. Despite the increasing use of OCOPs by adults in specialized sectors, there still needs to be a greater understanding of the features of online adult learning in these communities and the factors that impact participation. Abedini et al. (2021) suggest that adults should play a more active role in OCOPs, leading to

greater opportunities for exchanging information, collaboration, and the long-term sustainability of these connections.

Zhang and Watts (2008) argue that Online Communities of Practice (OCOPs) provide adults with a significant online learning environment where learning is linked to community participation patterns. However, this education differs significantly from formal education, such as professional certification programs, as it is not supervised by an educator and does not involve fixed educational content. Andragogy focuses on uncovering adult learners' attributes rather than the learning process itself. Jung and Lee (2018) found that adults are selective in their participation in OCOPs, engaging to achieve personal goals and aspirations through their approaches and resources. However, most research focuses on identifying adult learners' attributes and examining how their learning outcomes are impacted. It is necessary to have a detailed understanding of adult learning traits to maintain adult learners' interest in OCOPs and ensure a consistent learning process (Zhang & Watts, 2008). The challenge of developing engaging OCOPs is not related to technological complexities but rather the need for continual administrative support.

Abedini et al. (2021) categorize adult learners into five characteristics: specialist-centred, autonomous, proficiency-centred, problem-centred, and lifelong learning. The specialist-centred characteristic emphasizes the efforts of adult learners to enhance their career paths, either by improving their employability or advancing their careers. The autonomous characteristic highlights adult learners' capacity to direct their learning independently in OCOPs. The proficiency-centred characteristic suggests that adults rely on their personal experiences as the primary resource for learning in OCOPs. In contrast to subject-centred younger learners, the problem-centred characteristic emphasizes the problem-solving approach to learning among

adult learners. Lifelong learning is an essential attribute of adult learning, where the professional lifecycle dominates most of the individual's life.

Success Factors and Barriers to Adult Engagement in OCOPs

It has been generally acknowledged that these communities function as a catalyst for improving adult engagement (O'Neill et al., 2018). According to Matzembacher et al. (2019), such engagement is a vital part of the learning process. However, promoting adults' engagement through OCOPs is not a straightforward process. It has been shown that there needs to be a sustainable level of engagement in the online community for it to be successful. The absence of engagement degrades the members' learning efficiency and effectiveness of the process (Cheng et al., 2011; Jung & Lee, 2018; Lee & Desjardins, 2019; Shang & Wu, 2019). Hence, understanding adults' engagement is critical for the success of learning strategies and the enhancement of one's learning process in OCOPs.

The adult learning process can be influenced by age, impacting participation in learning activities. Ageism can hinder engagement, as the gradual decline of learning processes may hinder their participation ability (Abu Bakar et al., 2017). Despite having an internet-connected device, some adults may require support for daily online activities. Additionally, adults' busy schedules can make them too fatigued to participate in VCoPs. Furthermore, some adults may be hesitant to engage in learning activities if their learning is directed by others (Kleinke & Lin, 2020).

Shift towards decentralization of the learning process

One of the critical aspects of adult engagement in OCOPs is the shift toward the decentralization of the learning process. This has resulted in a stronger emphasis on sharing experience than in traditional settings and a higher volume of problem-solving using past

experience. Therefore, participants have become involved in a wide range of engagement practices, from experience sharing to contributing to real-world projects. Adults possess greater self-regulation abilities, enabling them to engage in learning activities by concentrating on the components relevant to their needs and adapting their learning strategies accordingly.

Sense of belonging and purpose of engagement

Another essential aspect of adult engagement in OCOPs is the sense of belonging to a community and the purpose of engagement. These are two determining elements which affect participation in OCOPs (Tang & Chung, 2016). The sense of belonging is important because it creates a feeling of community and shared purpose among participants, which enhances engagement. Similarly, the purpose of engagement is crucial because it motivates participants to engage in OCOPs and helps them to focus on their learning goals. Collaborative learning environments enhance engagement and improve learning activities by aligning with the needs and expectations of adult learners (Kleinke & Lin, 2020).

Diversity of backgrounds and past experiences

Members of online communities may have diverse backgrounds and are, therefore, influenced by different contexts and past experiences. They are more likely to exchange information if they share a common understanding and skill (Kumi & Sabherwal, 2018). This would also provide a frame of reference to comprehend the values that guide expectations in an online community of practice. Therefore, it is necessary to consider the diversity of backgrounds and past experiences of members while designing OCOPs to promote engagement and learning.

Impact of engagement in real life

We need to consider not only the causes of the online adults' engagement process but also its consequences in real life. The effects of participating in OCOPs range from immediate

results to the gradual acquisition of new knowledge (Marcaletti et al., 2018). Through engagement, members of an OCOP share their experiences and learn from each other (Kumi & Sabherwal, 2018). OCOPs mitigate distance hinderers and time limitations due to an adult's busy life, increase knowledge-sharing opportunities, engage in collaborative activities, and sustain these interactions (Jesionkowska, 2020; Pesare et al., 2017).

LMS in Adult Learning Contexts

Online learning depends on learning management systems as a foundation (Campbell, 2022). An LMS is a self-contained webpage that includes instructional tools that enable instructors to organize academic content and involve students in their learning. It can be utilized in fully online and blended learning environments (Gautreau, 2011). The utilization of learning management systems (LMSs) has become widespread in the context of adult education (Black et al., 2007). By using synchronous and asynchronous technologies, most LMSs are designed to function across multiple web-based platforms, which facilitates access to content and administration, and can improve information sharing between learners and instructors, as well as administering the curriculum in a secure and timely manner (Zheng et al., 2018). The adoption of an LMS in learning is a complex process that can be influenced by various interrelated internal and external factors affecting both learners and instructors. According to Fung and Yuen (2012), the adoption of LMS is impacted by students' and teachers' usage behavior, as well as individual and external contextual factors. The acceptance of LMS can also be determined by factors such as the compatibility of the system with the adopters' needs, the benefits of replacing a previous system, the possibility of trialing the system before adoption, and the ease of use within the system (Rucker & Frass, 2017). According to Bonk and Graham (2006), LMSs can be used in fully online programs or blended learning environments. The success of a blended learning

environment can be determined by the quality of the LMS characteristics such as system quality, information quality, and service quality (Al-Busaidi & Al-Shihi, 2011).

System Quality Significance in LMS Adoption

Delone and McLean (2003) republished an improved model that facilitates the comprehension of information systems' success. The model identifies and describes six essential success dimensions that can be utilized to evaluate an information system. One of these dimensions, known as system quality, explains the desirability of a system and is measured based on "adaptability, availability, reliability, response time, and usability" (Delone & McLean, 2003). In the case of an LMS, system quality can be defined as the system's performance in terms of "functions, speed, features, contents, and interaction capability" (Fathema et al., 2015). The desirability of an LMS impacts users' intent to use it; when an LMS is desirable, users find it useful and intentionally use it (Fearnley & Amora, 2020). According to Fathema et al. (2015), system quality significantly and positively affects both the perceived usefulness and perceived ease of use of an LMS. Faculty members prioritize quality issues, and system quality is seen as the most influential factor that affects a user (Fathema et al., 2015). Enhancing the quality of an LMS has a positive effect on faculty members' perception of its usability (Fathema et al., 2015). As for students, an LMS is deemed helpful if it enhances productivity, communication, student engagement, and usability (Francom et al., 2020).

What factors effect LMS utilization

The utilization of an LMS is influenced by various factors, which can be categorized as internal and external factors. External factors include organizational, technological, and social facilitating conditions, while internal factors encompass factors such as personal innovativeness, technological anxiety, teaching style, self-efficacy, and competency. In order to adopt an LMS

successfully, service providers must provide adequate technical support to lecturers to build their confidence in using the system. Users must receive sufficient training before and after deployment, as users who receive training are more likely to utilize technology effectively (Al-Busaidi & Al-Shihi, 2011). Additionally, the availability of accessible hardware and software infrastructure is crucial to the system's reliability (Coleman & Mtshazi, 2017). Internal factors affecting LMS use can be more challenging to address due to their overlapping nature. Research indicates that there is a direct correlation between personal innovativeness and perceived ease of use, and usefulness (Al-Busaidi & Al-Shihi, 2011). Furthermore, a faculty's belief in their ability to incorporate technology significantly influences their actual usage (Lee & Lee, 2014). Simplified guidelines and proper instructions can reduce the effort expectancy for users, along with training to assist with computer self-efficacy. Consistent use of an LMS can enhance users' skills, ultimately leading to more effective utilization.

Discussion

This paper helps inform the design and delivery of adult online education by providing insights into adult learners' characteristics, preferences, and learning styles. It offers guidance for instructional design, emphasizing the importance of interactivity and real-world applications. The systematic approach in this paper aimed to comprehensively explore diverse theoretical perspectives related to adult learning theories and their application in online education. Effective online adult education relies upon sound learning theory and instructional design principles that explicitly connect to adult learning needs. Understanding the unique characteristics of adult learners is essential for tailoring instructional strategies that maximize engagement and learning outcomes. Feedback mechanisms are crucial components of instructional design, emphasizing the iterative nature of the design process and the importance of adapting to the needs and

preferences of adult learners. This review reinforces that a deep understanding of adult learning theories should inform effective instructional design.

Engagement emerged as a central theme in the literature, underlining its pivotal role in the success of adult online learning. Strategies such as collaborative discussions, interactive activities, and personalized learning experiences are shown to significantly impact adult learners' motivation and participation, reinforcing the need to integrate these strategies into instructional design. Moreover, the Technology Acceptance Model (TAM) provides valuable insights into users' attitudes and behaviors towards adopting new technologies.

Online communities of practice (OCOPs) are identified as significant tools for adult learning in online contexts. OCOPs have the potential to facilitate collaborative learning experiences and knowledge sharing among adults. Understanding adult learning traits and needs is crucial for designing and sustaining engaging OCOPs. Furthermore, Learning Management Systems (LMS) have become foundational tools in organizing academic content and enhancing communication in online education. Factors influencing LMS utilization, such as system quality and user-related factors, were explored, underlining the importance of both external and internal elements.

Conclusion

This literature review delved into online adult learning, instructional design methodologies, technology acceptance, online communities of practice, and learning management systems. By analyzing and synthesizing various studies, this review shed light on the critical factors influencing adult engagement, adult learning needs, and the role of instructional design in facilitating effective online learning experiences. Understanding the

nuanced characteristics of adult learners and the impact of diverse learning environments is vital for designing effective educational strategies. Moving forward, the findings of this review can inform the development of tailored instructional approaches that can enhance online learning experiences for adult learners. It is imperative to consider learners' diverse backgrounds and past experiences, prioritize system quality in technology adoption, and promote a sense of belonging and purpose in online communities of practice. This research underscores the importance of a learner-centric approach and highlights the need for ongoing research and collaboration to refine and optimize online education methodologies and platforms continually.

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Appendix 1

Learning Theory and Model	Papers Discussing Learning Theory and Model
Andragogy	Abedini et al. (2021) Allen (2016) Arghode et al. (2017) Britt et al. (2015) Cercone (2008) Mason (2006) McKenna et al. (2019) Snyder (2009)
Behaviourism	Arghode et al. (2017)
Cognitivism	Arghode et al. (2017) Briegeer et al. (2020)
Community of Inquiry	Allen (2016)
Community of Practice	Mason (2006) Tynjälä & Häkkinen (2005)
Connectivism	Briegeer et al. (2020) Diep et al. (2019)
Constructivism	Arghode et al. (2017) Chuang (2021) Hrastinski (2009) Snyder (2009)
Experiential Learning Theory	Britt et al. (2015) Cercone (2008) Mason (2006) Tynjälä & Häkkinen (2005)
Heutagogy	Abedini et al. (2021) Briegeer et al. (2020)
Humanism	Arghode et al. (2017)
Personal Investment Theory	Abedini et al. (2021)
Social Capital Theory	Abedini et al. (2021)
Social Learning Theory	Abedini et al. (2021) Briegeer et al. (2020) Chuang (2021)

	Diep et al. (2019) Hrastinski (2009)
Transformative Learning Theory	Allen (2016) Brieger et al. (2020) Cercione (2008) Diep et al. (2019) Snyder (2009) Tynjälä & Häkkinen (2005)
Zone of Proximal Development	Brieger et al. (2020) Diep et al. (2019)

Appendix 2

The following sections describe the less frequent learning theories and models that were outlined in the literature.

Behaviorism

Behaviorism is a learning theory that emphasizes the role of observable behavior in comprehending and forecasting human behavior (Skinner, 1938). This theory posits that all behavior is learned and shaped by environmental factors. Reinforcement and shaping through positive reinforcement are integral to the learning process.

Behaviorism is known for its focus on external stimuli and the connection between stimuli and responses in the learning process. This approach prioritizes knowledge acquisition over knowledge construction, which differentiates it from constructivism. However, it has received criticism for its narrow perspective on behavior and disregard of internal processes such as thoughts and feelings (Mcleod, 2022).

In adult learning, behaviorism provides insight into how adults are motivated to learn. For instance, it can explain why an adult might attend a training program or pursue self-directed learning. The theory suggests that adults are motivated to learn when they believe that their efforts will result in positive outcomes such as job satisfaction, career advancement, or personal fulfillment.

Despite its limitations, behaviorism remains a useful framework for understanding and predicting adult learning behaviors. By designing activities that condition a response cycle in learners, behaviorism principles can be effectively applied in online learning contexts (Marisa Keramida, 2015).

Cognitivism

Cognitivism is a learning psychology theory that emphasizes the role of mental processes in the acquisition of new knowledge. In adult learning contexts, cognitivism regards learners as active information processors who integrate new information based on prior knowledge and experiences. This theory was developed in the second half of the twentieth century by prominent psychologists such as Piaget (1964), Gagné (1970), and Vygotsky (1978).

According to the theory, learning occurs in stages that include attention, encoding, storage, and retrieval. Motivation, prior knowledge, and metacognitive strategies all have an impact on these stages. Cognitivists study how the mind stores, processes, and retrieves information, seeing learning as an active and internal mental process (Michela, 2015).

In cognitivism, the approach to learning is to draw learners' attention and encourage active participation, allowing them to develop their own goals and activities. The emphasis is on knowledge acquisition, processing, and assimilation rather than what learners do. Piaget (1964) considered learning to be a biological activity in which one adapts to one's surroundings.

In the context of online learning, cognitivism emphasizes the importance of reducing learners' cognitive load. This includes reducing intrinsic cognitive load by presenting material in a clear and concise manner, reducing extraneous cognitive load by keeping instructions concise and understandable, and increasing germane load by giving learners opportunities to create new schemas or activate existing ones (Loveless, 2022). The nature of the stimuli and course activities is also affected by a learner's prior knowledge.

Cognitivism emphasizes the significance of feedback in the learning process. Feedback enables students to identify their own strengths and weaknesses and adjust their thinking and

behaviour accordingly (Ertmer & Newby, 2008). Feedback in adult learning contexts can take many forms, including self-reflection, peer review, and formal evaluation. Cognitivism is important in adult learning contexts because it considers learners to be active information processors, emphasizes the role of mental processes in acquiring new knowledge, and stresses the importance of reducing cognitive load and providing feedback.

Community of Inquiry

The Community of Inquiry (CoI) framework is an important theory for adult learning contexts. According to this theory, online learning environments can be designed to foster an environment of collaboration, inquiry, and critical reflection, all of which are necessary components of deep learning. The CoI framework is built around three interconnected components: social presence, cognitive presence, and teaching presence (Garrison et al., 2000).

The degree to which learners feel a sense of belonging and community in the online environment is referred to as social presence. Cognitive presence refers to learners' ability to engage in critical thinking and problem-solving, whereas teaching presence refers to the instructor's role in creating and maintaining a learning environment that encourages inquiry and critical reflection (Randy & Ben, 2007).

Because of the flexibility and convenience of online learning, as well as the wealth of life experiences and perspectives that adult learners bring to the learning process, the CoI framework has been widely applied in adult learning contexts, particularly in online and distance learning. The CoI framework can be used in adult learning contexts to create online learning environments that encourage interaction, collaboration, and critical reflection among adult learners (Akyol & Garrison, 2010). Adult learners can engage in meaningful learning experiences that are relevant

to their personal and professional lives by fostering a sense of community and encouraging inquiry-based learning.

A community of inquiry can only succeed if there are clear expectations about the nature of critical discourse, academic objectives, phases of inquiry, and level of discourse. It is also necessary to establish and sustain the community, which emphasizes the significance and role of teaching presence. From a design standpoint, the distinction between facilitation and direction must be clear, and teaching presence must consider the dual role of moderating and shaping the direction of the discourse. The CoI framework is an important tool for adult learning contexts because it allows for the creation of online learning environments that foster collaboration, inquiry, and critical reflection, ultimately leading to deeper and more meaningful learning experiences (Akyol & Garrison, 2010).

Community of Practice

Many theorists, notably Brown et al. (1989), Lave and Wenger (1991), and Wenger (1998), have stressed the notion of contextual learning and its applicability in adult learning environments. The concept of communities of practice (CoP), which refers to groups of persons who join together around a similar interest or profession to learn from one another and enhance their grasp of a subject or field, is one of the primary ideas connected with this theory. CoP stresses the value of social contact and cooperation among individuals in developing their collective understanding and expertise of a subject. A community of practice, is a group of individuals who share a similar interest, a collection of challenges, a love for a subject, and a desire to increase their understanding and skill in a certain field by constant engagement with the community (Wenger-Trayner & Wenger-Trayner, 2022).

CoP is an important learning paradigm in adult education since it promotes lifetime learning and continual professional development. It provides a structure for people to get together, share their information and thoughts, and collectively enhance their grasp of a subject or field. CoP encourages people to learn from one another, exchange best practices, and work together to solve challenges in their sector or profession (Abedini et al., 2021). According to the idea, learning happens via social activities and the negotiation of meaning within a group, which can aid in the creation of a common understanding and identity among its members.

Adult learners may use CoP to engage in communal learning and increase their knowledge and skills. It provides a supportive network for those who have common interests and promotes social contact and collaboration among its members. It has the potential to be a useful method in adult learning environments and to assist continuous professional development.

Connectivism

Connectivism is a learning theory that has emerged in response to the changing landscape of technology and knowledge. As the access to education increases through online learning and Massive Open Online Courses (MOOCs), the theory has gained importance in adult learning contexts (Clarà & Barberà, 2013). In connectivism, learning occurs when knowledge is actuated through the process of learners connecting to prior knowledge and feeding information into a learning community (John, 2016). The diversity of opinion is a critical aspect of learning in connectivism. The ability of learners to share knowledge and build a learning network is highlighted in the research. According to connectivism, knowledge is distributed across an information network of nodes and can be stored in various digital formats (John, 2016). This framework provides a better understanding of what sets connectivism apart from other learning theories. In objectivism, reality is external to the mind, and knowledge and perception are

experientially acquired. In pragmatism, knowledge is a negotiation between reflection and experience, inquiry and action, whereas interpretivism posits that knowledge is an internal construction and is informed through socialization and cultural cues.

According to Ryberg, Sinclair, and Bayne (2012), when designing courses that align with connectivism, it is important to consider activities and structures that facilitate learning in a complex, variably tied, and scaled network rather than a strongly-tied community of mutually-dependent learners following a course within a specific timeframe. Connectivism addresses how individuals build knowledge in a networked environment as a personal pursuit but must adequately address power, voice, access, and inclusion issues (Diep et al., 2019). Connectivism is closely related to networked learning theory, which proposes that learners should engage in collaborative dialogues and that knowledge emerges through negotiation between learners in the networks.

Connectivism is a learning theory particularly relevant in adult learning. It emphasizes the ability to access and utilize information networks instead of relying solely on memorizing specific facts or procedures (Siemens, 2005). With the widespread availability of technology and the internet, large-scale learning communities have become possible, and social networking sites provide an environment for exchanging ideas and learning. Course designers can utilize connectivism principles when designing courses. Despite some critics' resistance to the idea that connectivism belongs among other learning theories, it remains an influential phenomenon that inspires instructors and learners to change their practice (Kropf, 2013).

Heutagogy

Heutagogy is a contemporary learning theory that emphasizes the importance of self-directed learning. It proposes that learners should actively participate in the learning process, taking full responsibility for their learning experiences and outcomes. This approach replaces the traditional sage-onstage teaching method with one more learner-centric. This theory encourages learners to seek out and create their own learning experiences rather than depend on instructors (Blaschke, 2012).

Heutagogy seeks to develop learners' ability to plan, manage, and evaluate their learning and to cultivate their critical thinking and problem-solving skills. In adult learning contexts, the approach can recognize the diversity of adult learners' backgrounds, experiences, and motivations for learning. It also can acknowledge that adult learners are often self-directed and motivated to learn and can benefit from being empowered to take control of their own learning experiences (Bhoyrub et al., 2010).

In this theory, instructors are passive, serving as course designers, resource providers, path creators, and monitors. The emphasis is on equipping learners with the skills to become independent and develop a capacity and penchant for learning. Online learning environments allow instructional designers and instructors to offer flexible instructional approaches, enabling adult learners to gain control of the learning process (Blaschke, 2012).

Heutagogy places a significant emphasis on lifelong learning, recognizing the importance of learners continuing to develop their skills and knowledge throughout their lives. In contrast to other learning theories, such as pedagogy and andragogy, heutagogy assumes that learners can design their learning paths and should be encouraged to take an active role in this process. In adult learning, heutagogy can empower learners to take control of their learning experiences and

become more self-directed, critical, and reflective learners (Blaschke, 2012).. It is a theory that acknowledges the diversity of adult learners and emphasizes the importance of lifelong learning.

Humanism

Humanism is a learning theory that emphasizes the human capacity for growth, potential, and self-determination. This approach focuses on the individual learner's needs, interests, and abilities, emphasizing personal choice, responsibility, and experience as crucial components of the learning process. Humanism also stresses that learning involves not only a learner's inclination to learn but also their awareness of their own ability to learn. Additionally, humanism focuses on the affective domain apart from cognitive abilities (Jackson, 2009).

Humanism can be particularly relevant in adult learning contexts as adults are often motivated to learn by their own interests and goals rather than external pressures or requirements. Humanism recognizes that adult learners bring their own experiences, knowledge, and perspectives to the learning process, encouraging them to use these assets to shape their learning experiences. Furthermore, humanism emphasizes the importance of creating a supportive and encouraging learning environment that empowers learners to take responsibility for their learning.

Humanism involves the most instructor involvement, whereas constructivism and cognitivism are at the other end. Humanism emphasizes individual motivation and proactivity more than imposing concepts and learning. Humanism promotes learning through experiential learning, creative writing, and meaning-making. It believes that human beings control their destiny, are inherently good, and are free to act. It also states that behavior is a consequence of human choice, and people have unlimited growth potential.

However, the focus on affective parameters in humanism makes it difficult to gauge, assess, and objectify learner development and understanding. Humanism focuses on self-actualization and personal growth, which is difficult to ascertain and quantify in a learning situation. For humanists, learning is not merely cognitive and behavioral processing; it includes motivation, decision-making, and exhibiting responsiveness (Merriam et al., 2007).

Humanism thus informs andragogy and other adult learning theories (Merriam et al., 2007). Humanists support increasing learners' potential and inclination to learn to promote lifelong learning, judgment, and ability to make decisions (Jackson, 2009). Humanism envisions a holistic perspective by emphasizing how individuals learn, develop, and attain an ideal self-actualization state. Humanists visualize undergoing learning in ideal conditions and striving for the ultimate goal by focusing on the affective rather than the cognitive domain.

Therefore, humanism has implications for online learning, as it encourages online educators to design the content considering the affective domain and not just cognitive principles. In adult learning contexts, humanism provides a valuable perspective on learning, emphasizing the importance of individuality, self-directedness, and a supportive learning environment.

Personal Investment Theory

Personal Investment Theory (PIT) is a learning theory that emphasizes the importance of personal investment in the learning process. PIT seeks to answer when and why individuals invest time and energy in a particular activity. According to previous research, domain knowledge facilitates learning-related content, and one's prior domain knowledge influences course performance (Torres & Beier, 2018). PIT suggests that personal investment in learning

can take many forms, including emotional, social, or financial investment, and a sense of self-efficacy, motivation, and personal relevance drives it.

Personal Investment Theory is particularly relevant in adult learning contexts because adult learners are often highly motivated by their personal goals and aspirations. They are typically more self-directed and have a greater sense of agency in their learning. Educators and trainers should create learning experiences that are relevant and meaningful to the learners in a process that allows learners to set their own learning goals, use real-world applications, and create opportunities to collaborate and apply their learning in practical settings.

Another important implication of PIT for adult learning is that educators and trainers should focus on building learners' self-efficacy or their belief in their ability to learn and succeed. When learners feel confident in their ability to learn and apply new skills and knowledge, they are more likely to invest in the learning process and achieve better learning outcomes (Torres & Beier, 2018).

Social Capital Theory

Social capital theory posits that relationships are a critical resource for community members, and individuals benefit from being associated with the community. Social capital is rooted in human relationships and provides the basis for other forms of capital, particularly human capital, to be leveraged. Although difficult to quantify, social capital requires investment and maintenance and encompasses the goodwill, structures in human interaction, and the resources and information that emanate from these structures (Kumi & Sabherwal, 2018).

The literature on social capital has focused on different aspects and dimensions of social interaction and relations to explain the sources and benefits of social capital. Social capital

theory can be applied in adult learning contexts to understand how social connections and networks can facilitate learning and personal development. Adult learners who are members of a community of practice or professional association can access valuable resources, such as expert knowledge, mentoring, and feedback, to support their learning and professional growth. Similarly, learners who participate in online communities or discussion forums can leverage their peers' collective knowledge and experience to deepen their understanding of a particular topic or skill.

Social capital theory also highlights the importance of social relationships and networks in providing emotional and social support to adult learners. Learning can be a challenging and sometimes isolating experience, and having supportive relationships and networks can help learners overcome obstacles and persist in their learning journey. Developing and maintaining social relationships and networks can be important to adult learning. These relationships can provide various resources and support to facilitate learning and personal growth (Kessels & Poell, 2004).

Zone of Proximal Development

Zone of Proximal Development (ZPD) is a theory of learning proposed by Lev Vygotsky that emphasizes the importance of the gap between a learner's potential and their current learning state. Strauss (1993) built on Vygotsky's framework and noted that learning takes place in social interactions in the ZPD. Weibell (2011) highlighted that Vygotsky's theory emphasizes the internalization of knowledge through social interaction and individually mediated cognitive change. Vygotsky's theory stresses the role of individual effort and instructors' external assistance.

Vygotsky urged instructors to encourage independent learning while also focusing on learners' future development. Instructors play a crucial role in fostering learning through social mediation. ZPD theory supports facilitated learning that can be achieved through external interventions, such as instruction. According to Vygotsky's theory, learning is not solely a personal endeavour, but rather it involves guidance, help, and direction from someone who is more knowledgeable, skilled, and experienced.

ZPD theory is important in adult learning contexts because it supports an independent learner more than a dependent learner and is geared almost equally to the cognitive and affective domains. Moreover, it emphasizes social learning and requires self-awareness more than cognitivism, placing it more towards the affective than the cognitive domain. ZPD theory supports an independent learner more than a dependent learner and promotes social learning and self-awareness, making it relevant in adult learning contexts. Instructors must encourage independent learning and also provide external assistance for adult learners to achieve their full potential.

Appendix 3

Article	Main Instructional Design Themes
Arghode et al. (2017)	<ul style="list-style-type: none"> ● The importance of instructor presence and feedback seems to be consistent across various adult learning approaches employed in online education. ● Both instructional designers and instructors should incorporate weekly collaborative discussion activities into their online learning designs.
Bricknell & Muldoon (2012)	<ul style="list-style-type: none"> ● Providing meaning and relevance to the student learning experience and encouraging learners to use new information to do something that has an impact in real-life contexts ● The use of scaffolding in the instructional design, which provides a structured framework to support the development of a disciplined online study pattern
Brieger et al. (2020)	<ul style="list-style-type: none"> ● ARCS model of motivation emphasizes gaining learners' attention, informing them of the relevance of the instruction, designing for success, and providing effective feedback
Britt et al. (2015)	<ul style="list-style-type: none"> ● Instructional design methods used in e-learning and highlights the importance of engagement and authenticity in creating effective online courses. ● Create authentic learning experiences and engage students in solving real-world problems, which is important in online education, where students may feel disconnected from the learning experience.
Cercione (2008)	<ul style="list-style-type: none"> ● Importance of using instructional design methods that are tailored to the characteristics and needs of adult learners.
Chimalakonda & Nori (2020)	<ul style="list-style-type: none"> ● Instructional designers use various methods to create content, such as identifying learning objectives, assessing the target audience, and choosing appropriate instructional strategies ● Well-designed course can enhance student learning and help achieve desired learning outcomes

Chuang (2021)	<ul style="list-style-type: none"> ● A successful instructional design begins by understanding and establishing connections with learners.
Diep et al. (2019)	<ul style="list-style-type: none"> ● Emphasizes the importance of understanding the needs of adult learners and using a conceptual framework to guide instructional design to ensure that it remains pedagogically driven. ● Understanding the motivators and facilitators of adult learners is crucial for engaging them in the collaborative and self-directed learning process
Lawson (2005)	<ul style="list-style-type: none"> ● Adult learners can leverage both their life experiences through the utilization of diverse resources to enrich instructional methods
McKenna et al. (2019)	<ul style="list-style-type: none"> ● Effective instructional design in blended learning requires a solid understanding of how each delivery mode can promote effective learning
Snyder (2009)	<ul style="list-style-type: none"> ● Elements of instructional design theory include the methods that should support an online learning community that is interactive, collaborative, and constructive. ● Instructional methods that incorporate web should be developed.
Tynjälä & Häkkinen (2005)	<ul style="list-style-type: none"> ● Highlights how technology often dictates the learning process, emphasizing that computer-assisted instruction was initially designed with a technological focus rather than adopting a learner-centered approach.

Appendix 4

Paper	Key Principle
Arghode et al. (2017)	<ul style="list-style-type: none"> ● Engagement ● Feedback
Bricknell & Muldoon (2012)	<ul style="list-style-type: none"> ● Experience-based ● Scaffolding
Brieger et al. (2020)	<ul style="list-style-type: none"> ● Engagement ● Experience-based ● Feedback
Britt et al. (2015)	<ul style="list-style-type: none"> ● Engagement ● Experience-based
Cercone (2008)	<ul style="list-style-type: none"> ● Learning Needs (Outcomes)
Chimalakonda & Nori (2020)	<ul style="list-style-type: none"> ● Learning Needs (Outcomes)
Chuang (2021)	<ul style="list-style-type: none"> ● Engagement ● Feedback
Diep et al. (2019)	<ul style="list-style-type: none"> ● Engagement ● Learning Needs (Outcomes)
Lawson (2005)	<ul style="list-style-type: none"> ● Experience-based
McKenna et al. (2019)	<ul style="list-style-type: none"> ● Feedback ● Learning Needs (Outcomes)
Snyder (2009)	<ul style="list-style-type: none"> ● Engagement ● Feedback ● Learning Needs (Outcomes)
Tynjälä & Häkkinen (2005)	<ul style="list-style-type: none"> ● Engagement ● Feedback ● Learning Needs (Outcomes)