

Interactions in Asynchronous Courses: Students Perspectives and Instructors Design
Strategies

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DEDICATION

To my dear husband, Zhenghong Bao. Your support and encouragement have been the foundation of my Ph.D. journey. This accomplishment is as much yours as it is mine. I am forever grateful to have you by my side.

To our precious son, Alexander Bao. Your pure joy has been a constant source of motivation and light in my life. May you always pursue your dreams with curiosity, passion, and creativity.

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ABSTRACT

Asynchronous learning is becoming increasingly prevalent, making it essential to ensure its effectiveness for the academic success and satisfaction of distance learners. Designing interactive engagement in asynchronous courses is a challenge for many asynchronous instructors. This study aims to investigate students' perspectives and experiences regarding interactions within asynchronous courses and explore effective instructional design strategies to integrate meaningful interactions to foster students' learning.

This dissertation research addresses three primary questions: (1) What is the relationship between students' general satisfaction and diverse types of interactions, including learner-learner, learner-content, learner-instructor, and learner-interface interactions? (2) How do students rank the importance of these interactions? (3) What strategies do instructors use to facilitate these interactions?

Data were collected from 378 students using an online survey, and from 14 experienced asynchronous course instructors through qualitative interviews conducted via Zoom. For the survey quantitative data, correlations and multiple regression analysis were performed using SPSS, while interview qualitative data was analyzed using NVivo with descriptive coding.

The results of this study reveal that learner-content interaction is the strongest predictor of student satisfaction in asynchronous courses, highlighting the importance of high-quality, multimedia-rich, and well-organized course materials. While learner-instructor interaction also significantly influences satisfaction, the study emphasizes the need for timely communication, clear guidance, and a strong instructor presence.

Additionally, the findings underscore the role of user-friendly technological platforms and the integration of peer interaction to foster a supportive learning community.

Furthermore, the interviews with experienced instructors indicate that strategies such as the use of instructional videos, guided learning paths, and collaborative platforms, etc. are vital for improving learner engagement and success.

The findings suggest that enhancing student satisfaction and learning outcomes in asynchronous learning environments requires a balanced approach that prioritizes content quality, effective instructor support, and accessible technology. These insights contribute to the ongoing development of best practices in asynchronous course design, providing actionable recommendations that educators and instructional designers can implement to optimize the effectiveness of their courses.

Keywords: asynchronous courses, interactions, student satisfaction, design strategies, higher education.

TABLE OF CONTENTS

Chapter One Introduction	1
Background	1
Statement of the Problem.....	2
Purpose of the Study	3
Research Questions	3
Significance.....	4
Definition of Terms.....	5
Chapter Two Literature Review.....	7
Learning Theories	7
Constructivism	7
Connectivism	9
Cognitive Load Theory	11
Andragogy (Adult Learning Theory).....	12
Community of Inquiry Framework.....	13
Asynchronous Courses.....	15
Type of Asynchronous Courses	15
Strategies of Asynchronous Courses	16
Learning Outcomes of Asynchronous Courses.....	17
Theoretical Framework of Interactions.....	19
Learner-Content Interaction.....	21
Learner-Instructor Interaction	22

Learner-Learner Interaction	23
Learner-Interface Interaction	24
Existing Research about Interactions.....	24
Interactions in Online Courses.....	25
Interactions in Asynchronous Courses.....	26
Gaps in the Literature.....	27
Chapter Three Methodology	28
Research Design.....	28
Research Methods and Research Questions	28
Rationale for Methods Choice	29
Instruments.....	30
Survey	30
Interview Protocol.....	33
Data Collection Procedure	34
Institutional Review Board	34
Survey Data Collection	34
Interview Data Collection	35
Participants.....	37
Students for the Survey	37
Instructors for the Interviews	38
Data Analysis	40
Survey Data Analysis.....	40
Interview Data Analysis.....	44

Chapter Four Results.....	48
Pilot Survey Results.....	48
Dissertation Survey Results	49
Descriptive Statistics.....	50
Correlations.....	52
Multiple Regression Analysis	54
Rank of Importance.....	56
Students’ Comments	58
Interview Results	65
Strategies for Learner-Content Interaction	65
Strategies for Learner-Instructor Interaction	77
Strategies for Learner-Interface Interaction.....	82
Strategies for Learner-Learner Interaction.....	91
More Strategies for Designing Asynchronous Courses	99
Chapter Five Discussion and Conclusion	104
Students’ Perspectives	104
Relationship Between Students’ Satisfaction and Interaction Types	105
Rank of Importance of Interactions	107
Students’ Qualitative Insights	109
Instructors’ Design Strategies	109
Strategies for Learner-Content Interaction	110
Strategies for Learner-Instructor Interaction	116
Strategies for Learner-Interface Interaction.....	120

Strategies for Learner-Learner Interaction.....	125
More Strategies for Designing Asynchronous Courses	131
Implications.....	132
Implications of the Survey Findings.....	132
Implications of the Interview Findings	133
Limitations	135
Suggestions for Future Research	135
Conclusion	136
References.....	137
Appendix.....	162
Appendix A Asynchronous Course Satisfaction Survey-Dissertation.....	162
Appendix B Interview Protocol	171
Appendix C IRB Approval Letter.....	173
Appendix D Survey Invitation Email	174
Appendix E Interview Invitation Email.....	176
Appendix F Interview Post on AECT’s Higher Logic Platform.....	177
Appendix G Interview Invitation Flyer.....	179
Appendix H Interview Informed Consent Form.....	180
Appendix I Strategies for Facilitating Interactions in Asynchronous Courses.....	183
Vita.....	184

LIST OF TABLES

Table 3.1 Demographics of the Students	39
Table 3.2 Instructors' Information.....	41
Table 4.1 Descriptive Statistics of Variables	51
Table 4.2 Correlation Analysis	53
Table 4.3 Multiple Regression Analysis	55
Table 4.4 Rank of Importance	57
Table 4.5 Strategies for Learner-Content Interaction	67
Table 4.6 Strategies for Learner-Instructor Interaction	78
Table 4.7 Strategies for Learner-Interface Interaction.....	83
Table 4.8 Strategies for Learner-Learner Interaction	92

LIST OF FIGURES

Figure 2.1 Modified Theory of the Model of Interaction with Critical Elements of Each Type of Interaction.....	20
Figure 3.1 Parent Codes in NVivo.....	46
Figure 3.2 Parent Codes, Child Codes and Themes in NVivo.....	46
Figure 4.1 Google Document Exit Ticket.....	76
Figure 4.2 Google Form Exit Ticket.....	76

CHAPTER ONE

INTRODUCTION

Background

The rapid expansion of online education has led to the development of two primary modes of instructional delivery: synchronous and asynchronous courses. Synchronous courses involve real-time interaction between instructors and students, often through video conferencing platforms, allowing for immediate feedback and dynamic discussions in online settings (Amiti, 2020; Moser & Smith, 2015; Skylar, 2009). In contrast, asynchronous online courses provide flexibility by enabling students to engage with course materials, participate in discussions, and complete assignments at their own pace, without the constraints of a fixed schedule, which promotes self-directed learning and accommodates diverse learner needs (Lin & Gao, 2020; Peerveen, 2016; Varkey et al; 2022).

As the demand for flexible learning environments grows, asynchronous online courses have become a critical component of modern education. The COVID-19 pandemic accelerated the adoption of asynchronous learning in universities. Before the pandemic, the Horizon Report 2018 Higher Education Edition by EDUCASE suggested that asynchronous learning was a significant trend in higher education, supported by the increasing use of online learning, Massive Open Online Courses (MOOCs), adaptive learning technologies, and the evolution of Open Educational Resources (OER) initiatives (Becker et al., 2018). During the COVID-19 pandemic, universities worldwide faced unprecedented challenges, forcing a rapid transition to remote learning. The 2022 EDUCAUSE Horizon Report Teaching and Learning Edition reported the significant

changes brought about by the pandemic, such as the adoption of emergency remote teaching models and the subsequent transition to more sustainable and evidence-based models of hybrid and online teaching and learning, which encompassed asynchronous learning as a significant component of the changes brought about by the COVID-19 pandemic (Pelletier et al., 2022). Asynchronous learning saw a surge during the pandemic, with universities reporting a substantial increase in the creation and utilization of asynchronous course materials (Fabriz et al., 2021). This abrupt shift led institutions to rely more heavily on asynchronous methods as a means to deliver course content efficiently amidst the crisis. As asynchronous learning becomes popular in higher education, optimizing instructional strategies within this mode of delivery is essential. Gaining a comprehensive understanding of both students' experiences and instructors' approaches to teaching asynchronous courses is critical for crafting effective educational practices to enhance the quality and effectiveness of asynchronous education.

Statement of the Problem

As discussed in my previous pilot study (Yang & Romero-Hall, 2024), asynchronous courses are distinct from synchronous ones, particularly in the area of interaction. Interaction is a key feature for enhancing the learning experience in distance education (Moore, 1989). However, asynchronous learning presents a challenge in fostering and maintaining interactions. Unlike synchronous courses, where communication and engagement happen in real time, asynchronous courses typically rely on tools like forums, discussion boards, or emails, leading to delays in communication and fewer chances for active exchanges and interaction (Hrastinski, 2008). In asynchronous courses, the lack of real-time communication can obstruct real-time

discussions among learners and instructors, delay the immediate resolution of questions, and reduce the depth of collaborative learning experiences (Basri et al., 2021; Lin & Gao, 2020). This limitation inhibits the development of rapport among learners, which is vital for fostering a sense of community. Consequently, the lack of timely and meaningful interactions in asynchronous learning environments could hinder engagement, collaborative problem-solving, and the overall depth of learning experiences. Based on the limitations of asynchronous courses related to interactions, there arises a pressing need to understand student perspectives and experiences concerning interactions within asynchronous courses, as well as to explore effective instructional design strategies to integrate interactions in asynchronous courses to enhance their effectiveness.

Purpose of the Study

This study delves into students' viewpoints and experiences regarding interactions within asynchronous courses. Additionally, it seeks to explore and develop effective design strategies to integrate interactions in higher education asynchronous courses. Ultimately, the study aims to provide guidance and strategies to instructors and instructional designers in creating conducive, engaging and quality asynchronous courses.

Research Questions

This dissertation study explores three research questions. The first two research questions, which are identical to those in the pilot study (Yang & Romero-Hall, 2024), focus on students' perspectives using a questionnaire. The third research question, unique to this dissertation, examines instructors' teaching and design strategies through interviews.

RQ1: What is the relationship between students' general satisfaction and learner-learner interaction, learner-content interaction, learner-instructor interaction, and learner-interface interaction?

RQ2: How do students rank the importance of the four types of interactions?

RQ3: What strategies do instructors use to facilitate student-student interactions, student-instructor interactions, student-content interactions, and student-technology interactions in asynchronous courses?

Significance

Firstly, investigating student perspectives on interactions in asynchronous courses can shed light on the specific challenges they face. By gaining insights into students' experiences, challenges, and preferences regarding interactions, it is helpful to identify the gaps between what learners need and what current asynchronous learning environments offer. This understanding is fundamental in devising strategies to bridge these gaps effectively. Secondly, exploring effective instructional design strategies to integrate meaningful interactions in asynchronous courses is imperative. Research in this area can delve into innovative methods, tools, or platforms that could facilitate and simulate real-time interactions despite the asynchronous nature of the course. This includes examining the use of technology, designing engaging activities, or restructuring course frameworks, etc. to promote more dynamic and participatory learning experiences.

Overall, conducting research on student perspectives and effective instructional design strategies aligns with the broader goal of enhancing the quality of asynchronous courses. Asynchronous learning is becoming increasingly prevalent, and ensuring its effectiveness is crucial for the academic success and satisfaction of distance learners. By

addressing the limitations of asynchronous courses related to interactions, instructors and instructional designers can better meet the diverse needs of their students, thereby fostering a more inclusive and engaging learning environment.

Definition of Terms

To enhance the readers' understanding of the study, the following terms are defined as follows.

Asynchronous online courses. An asynchronous online course is a type of distance learning where the learning materials, lectures, assignments, and interactions between instructors and students are not constrained by time or location, and students have the flexibility to access course content and participate in activities at their own pace and convenience (Hrastinski, 2008; Lin & Gao, 2020). In this format, course materials are typically pre-recorded, uploaded, and made available through a learning management system (LMS) or online platform. Students engage with these resources, complete assignments, and participate in discussions without the need for real-time interaction with instructors or peers (Hrastinski, 2008; Lin & Gao, 2020).

Synchronous online courses. A synchronous online course is a learning format where the instructor and students engage in planned educational activities simultaneously through video conferencing tools, despite being physically distant. Within this virtual classroom, real-time interaction between participants occurs, facilitated by text, audio, and/or video communication channels available in the chosen video conferencing platform (Moser & Smith, 2015; Skylar, 2009).

Interaction. In the context of online learning, interaction can be defined as reciprocal events that involve at least two objects and two actions, where these objects

and events mutually influence one another (Wagner, 1994). Based on this, interactions in online course encompass dynamic relationships and exchanges that occur between learners and other learners, learners and instructors or course facilitators, learners and content (Moore, 1989), and learners and interface (Hillman et al., 1994). These interactions are considered key features that define distance education and are essential for effective learning. The quality of interactions, including the medium in which they take place and the program's support and responsiveness to learners' individual needs, is critical for successful distance learning (Ustati & Hassan, 2013).

In conclusion, this chapter outlined the background of asynchronous online courses, focusing on the challenges of fostering interactions. It presented the study's purpose of exploring student experiences and instructor strategies, along with the significance of improving engagement and course design. Finally, the chapter introduced the research questions, laying the foundation for investigating student satisfaction and effective instructional strategies.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews the key theories and research relevant to understanding interactions in asynchronous courses. It starts by exploring major learning theories like constructivism, connectivism, cognitive load theory, and andragogy (adult learning theory), which help explain how students learn in online environments. The Community of Inquiry framework was then introduced as a useful tool for analyzing online learning experiences. Next, the focus shifts specifically to asynchronous courses, describing their types, strategies, and potential learning outcomes. Then, the chapter discusses the theoretical framework of interactions, including interactions between learners and content, instructors, other learners, and the course interface and technology. Finally, it summarizes existing research on interactions in online courses and asynchronous courses, identifying gaps in the literature that this dissertation seeks to address.

Learning Theories

To better understand how and when asynchronous learning can be most effective, it is crucial to examine the foundational learning theories and models that inform the design and implementation of asynchronous learning environments. This section delves into prominent learning theories and models, exploring their relevance and application in the context of asynchronous learning.

Constructivism

Constructivism asserts that learners actively construct their understanding of the world by assimilating new information into their existing mental frameworks and accommodating their beliefs when faced with new and conflicting information (Amineh

& Asl, 2015; Fosnot, 2013). This theory emphasizes the importance of social interaction, problem-solving, and hands-on experiences in fostering meaningful learning, and it has had a profound impact on educational practices, encouraging educators to create learner-centered environments that promote critical thinking, exploration, and the construction of knowledge rather than passive absorption of information (Laroche et al., 1998).

Constructivism encompasses several core theories and perspectives, each offering unique insights into how individuals acquire knowledge and understanding. First, there is cognitive constructivism by Jean Piaget. Jean Piaget's theory focuses on the cognitive development of individuals. He proposed that learners actively construct their knowledge through a series of developmental stages. Piaget emphasized the importance of interaction with the physical and social environment in shaping cognitive structures (Piaget, 2005; Wadsworth, 1996). Second, Lev Vygotsky's Social Constructivism theory underscores the social and cultural context of learning (Vygotsky, 1978). He argued that social interaction and collaboration play central roles in cognitive development. Vygotsky introduced the concept of the "zone of proximal development" (ZPD), where learners can accomplish tasks with the guidance and support of more knowledgeable individuals (Vygotsky, 1978). Third, Jerome Bruner's Discovery Learning, Cognitive Constructivism theory emphasizes the importance of active engagement and hands-on experiences in the learning process and argues that learners construct knowledge through discovery, experimentation, and problem-solving (Bruner, 1961). Fourth, Ernst von Glasersfeld's Radical Constructivism (2013) posits that knowledge is subjective and constructed by the individual based on their experiences, perceptions, and mental structures. Ernst von Glasersfeld (2013) emphasized the role of mental models and the

idea that individuals create their own understanding of the world. In this view, there is no objective reality; instead, reality is a product of each person's unique construction.

Asynchronous learning aligns closely with constructivist principles. First, in asynchronous learning environments, learners often have greater autonomy and responsibility for their own learning (Kaur & Sidhu, 2010). Constructivism aligns with this approach because it encourages students to actively engage with course materials, explore topics independently, and take ownership of their learning process (Brandon & All, 2010; Larochelle et al., 1998). Second, constructivism promotes reflective thinking as an essential aspect of learning (Amineh & Asl, 2015; Fosnot, 2013). In asynchronous settings, students have the opportunity to reflect on course content, their progress, and their evolving understanding over time. Third, Constructivism acknowledges that learners bring their own prior knowledge and experiences to the learning process (Vygotsky, 1978). In asynchronous learning, it provides learners with the autonomy to explore educational materials independently and engage with peers asynchronously (Kaur & Sidhu, 2010). This autonomy enables learners to construct knowledge at their own pace, reflecting on the content and making connections with their prior experiences (Ponton et al., 2004).

Connectivism

Connectivism is a contemporary learning theory that has gained prominence in the digital age, particularly in the context of online education and the rapid expansion of information networks. Proposed by George Siemens and Stephen Downes, connectivism posits that learning is not solely the acquisition of knowledge within an individual's mind but is instead a dynamic process of making connections between people, information, and

digital technologies and emphasizes the importance of networks and connections in the learning process (Downes, 2008; Siemens et al., 2020). They believe that learning occurs through the process of making connections, both with other people and with digital information sources and argue that learners must develop the skills to filter, assess, and make sense of the vast amount of information available in today's digital world (Downes, 2008; Siemens et al., 2020). Connectivism highlights the importance of adaptability, critical thinking, and the ability to navigate and evaluate vast amounts of information, making it a valuable framework for understanding learning in our interconnected and information-rich world (Dziubaniuk et al., 2023).

Connectivism provides a theoretical framework that aligns with many aspects of asynchronous learning. It underscores the importance of digital networks, self-directed learning, critical thinking, and social interactions in the context of online and asynchronous educational settings (Siemens et al., 2020). First, connectivism emphasizes the importance of networks and connections in the learning process. In asynchronous learning, students often rely on online resources, discussion boards, email, and other digital tools to connect with both content and peers. These connections are essential for collaborative learning and knowledge sharing (Yamagata-Lynch, 2014). Furthermore, asynchronous learning often grants learners more autonomy and control over their learning pace and path. Connectivism supports the idea of self-directed learning, where learners actively seek, evaluate, and make sense of information from various sources (Downes, 2008). In this context, learners become proficient at navigating digital networks to meet their learning goals. Third, connectivism recognizes the value of social interactions in the learning process (Downes, 2008; Siemens et al., 2020). In

asynchronous learning, discussions, forums, and collaborative projects can foster social connections among learners, even if they are not engaged in real-time interactions. These social connections allow for knowledge sharing and peer learning.

Cognitive Load Theory

Cognitive Load Theory (CLT) is a fundamental framework in cognitive psychology and educational psychology that delves into the limitations of human working memory and how these limitations impact learning and problem-solving (Paas et al., 2003). Developed by John Sweller in the late 1980s, CLT posits that our cognitive system can only process a finite amount of information at once, and when learners are confronted with excessive cognitive load, it hinders their ability to absorb new knowledge effectively (Sweller, 2010). CLT distinguishes between three types of cognitive loads. First, intrinsic cognitive load refers to the inherent complexity of the learning materials or tasks themselves (Sweller, 2010). Some concepts or tasks are naturally more complex and may require more cognitive resources to understand. For example, learning advanced mathematical concepts may have a higher intrinsic cognitive load than learning basic arithmetic. Second, extraneous cognitive load results from the way information is presented or the design of instructional materials (Sweller, 2010). Poorly designed materials or distractions can increase extraneous load, making it harder for learners to focus on the core content. Effective instructional design aims to minimize extraneous load. Third, germane cognitive load represents the mental effort learners invest in understanding and processing information to build a mental schema or mental model (Sweller, 2010). When germane cognitive load is appropriately managed, it can lead to better long-term retention and understanding of the material (Paas et al., 2003;

Sweller & Van Merriënboer, 2005). The theory has profound implications for instructional design, suggesting that educators should strive to minimize extraneous cognitive load and optimize intrinsic cognitive load to enhance learning outcomes (Paas et al., 2003) to promote effective learning and problem-solving in various educational settings.

CLT is also highly relevant to asynchronous learning which could offer valuable insights for designing and delivering effective asynchronous learning experiences. Foremost, in asynchronous courses, instructional materials, such as videos, text, and quizzes, are often pre-recorded and then presented in the format of modules (McQuaid, 2010), which matches the CLT that emphasizes the importance of presenting information in a way that optimizes intrinsic cognitive load and minimizes extraneous cognitive load, so students can focus on understanding the core concepts without being overwhelmed (Sweller & Van Merriënboer, 2005). Furthermore, CLT suggests learners should have the opportunity to control the pace of their learning to manage their cognitive load effectively (Sweller & Van Merriënboer, 2005), which also aligns with the typical feature of asynchronous learning that allows students to progress through the course materials at their own pace.

Andragogy (Adult Learning Theory)

Andragogy, proposed by Knowles, is a pedagogical theory that specifically addresses the principles and practices of adult education. Unlike traditional pedagogy, which primarily focuses on the teaching of children and assumes a more directive approach, andragogy is centered on the unique characteristics and needs of adult learners (Knowles, 1980). It recognizes that adults bring a wealth of life experiences, self-

directedness, and a readiness to learn based on their personal goals and interests.

Andragogy emphasizes learner autonomy, self-directedness, active participation, and problem-solving orientation as key components of adult learning, making it a foundational concept in the field of adult education (Knowles, 1978).

Andragogy is highly connected with asynchronous learning due to its alignment with the characteristics and preferences of adult learners in self-paced, online educational settings. In asynchronous learning environments, adults have the freedom to set their own pace, choose when and where to study, and decide which resources to explore. This self-directed approach resonates with the principles of Andragogy, as it empowers adults to be in control of their educational journey (Knowles, 1978). Also, asynchronous learning encourages learners to be autonomous, allowing them to make decisions about what, when, and how they learn (Vonderwell et al., 2007). This mirrors Andragogy's emphasis on adults being responsible for their own learning and making choices based on their individual needs and goals (Blondy, 2007). Furthermore, andragogy values flexibility in learning, and asynchronous learning platforms excel in offering anytime accessibility (Blondy, 2007; Knowles, 1978). Adults, who often have busy schedules and varying commitments, can access content when it suits them, promoting a learner-centric approach consistent with Andragogy's principles. Thus, the theory and principle of Andragogy support the mechanisms underlying asynchronous learning.

Community of Inquiry Framework

The Community of Inquiry Framework, originally developed by Garrison, Anderson, and Archer in the late 1990s, is a foundational pedagogical model that provides a structured approach for facilitating meaningful online and blended learning

experiences (Castellanos-Reyes, 2020). At its core, this framework recognizes the importance of fostering a collaborative and reflective learning environment that encompasses three key elements: cognitive presence, social presence, and teaching presence (Garrison et al., 2010). Cognitive presence focuses on the critical thinking and problem-solving aspects of learning, social presence emphasizes the interpersonal interactions and sense of community among learners, while teaching presence encompasses the role of the educator in guiding and facilitating the learning process (Garrison et al., 2010). Together, these components form a holistic approach to online education, promoting deep learning and engagement within digital learning communities.

The Community of Inquiry Framework serves as a robust theoretical foundation for asynchronous learning. The framework's social presence element highlights the importance of creating opportunities for interaction, discussion, and collaboration (Garrison et al., 2010). Even in asynchronous settings, learners also benefit from a sense of community and connection with their peers. In asynchronous environments, this might involve discussion forums, group projects, or peer feedback mechanisms that allow students to engage in meaningful social interactions, albeit without real-time communication (Kear, 2010). Furthermore, while instructors may not be physically present in an asynchronous learning environment, the teaching presence component of Community of Inquiry Framework emphasizes their role in designing and facilitating the learning experience. In this context, instructors can create structured learning materials, set expectations, and be available for asynchronous communication and support through email, discussion boards, or virtual office hours to promote teaching presence.

Asynchronous Courses

This section first explores the diverse types of asynchronous courses, including Massive Open Online Courses (MOOCs) and those offered by higher educational institutions. Then it discusses the various strategies employed in these courses, such as recorded lectures, discussion forums, and self-paced modules, and examines the learning outcomes they facilitate. Through this exploration, the section highlights the unique benefits and challenges of asynchronous learning, emphasizing its role in fostering self-regulation, critical thinking, and accessible education.

Type of Asynchronous Courses

Based on the current platforms or settings where asynchronous courses occur, there are two main types of asynchronous courses. First, Massive Open Online Courses (MOOCs). MOOCs are open to anyone with internet access, often free or low-cost, and can serve thousands of students globally. Platforms like Coursera, LinkedIn, Khan Academy, edX, Udacity and Udemy offer a diverse range of educational free and paid courses, providing accessible, self-paced learning experiences across various subjects and disciplines (Dang et al., 2017; Kurteva et al., 2023; Wang et al., 2022). They provide standardized, pre-recorded content and minimal interaction with instructors, with certificates of completion typically not equivalent to academic credit (Castillo et al., 2015). They often have no specific required start or end dates. Learners can get access to the platforms by downloading mobile learning apps or visiting websites for their own asynchronous learning. Second, asynchronous courses in higher education. These are offered by higher educational institutions where students have to enroll and register to earn credit for degrees. Universities use Learning Management Systems (LMS) like

Moodle, Canvas, Blackboard, etc. for asynchronous courses. They offer customized content aligned with the institution's curriculum. Students could asynchronously access the course materials, complete assignments, assessments and participate in discussions for a flexible learning experience (Hrastinski, 2008; Lin & Gao, 2020). These courses feature more direct interaction with instructors and peers. The asynchronous courses in higher education often have specific start and end dates within one academic semester.

This dissertation research study will focus on asynchronous online courses in higher education where students enroll to earn degree credits. In higher education, instructors must design asynchronous courses. The course materials are typically pre-recorded, uploaded, and made available through a LMS or online platform. Students engage with these course materials, complete assignments, assessments and participate in discussions without the need for real-time interaction with instructors or peers (Hrastinski, 2008; Lin & Gao, 2020).

Strategies of Asynchronous Courses

Asynchronous online courses are characterized by a set of strategies. One widely employed approach is the use of recorded lectures that enable students to access, review and revisit lecture materials at their convenience, promoting deeper comprehension (Metz & Metz, 2022; Schreiber, 2022; Skylar, 2009). In parallel, online readings and resources, including digital textbooks and curated web content, serve as foundational learning materials that students can explore independently (Buczynski, 2007; Murray & Pérez, 2011). Discussion boards or forums are another approach, providing students with a platform to engage in intellectual discourse and share insights on course materials (Ringler et al., 2015). These asynchronous discussions are often guided by instructors'

prompts. They foster collaborative learning experiences by stimulating asynchronous written exchanges among students, encouraging critical thinking, and facilitating peer interaction (Ajayi, 2009; Palloff & Pratt, 2007). Another essential strategy is the self-paced modules, which structure courses into manageable units, and enable students to progress through content at their own pace (Logan et al., 2021; Sterling & Hurtubise, 2021). Within these modules, quizzes and self-assessment tools offer opportunities for learners to gauge their understanding and reinforce concepts (Palloff & Pratt, 2008). Peer assessment is also prevalent, allowing students to evaluate each other's work and develop evaluation skills (Ellis & Hafner, 2005; Lin et al., 2011). Moreover, announcements and updates disseminated via LMS, or email keep students informed of course developments and deadlines (Adzharuddin & Ling, 2013; Oludele et al., 2014). Lastly, virtual office hours offer students opportunities for one-on-one consultations with instructors to enhance student-instructor interaction (Li & Pitts, 2009). Overall, asynchronous online course strategies encompass an array of techniques that support independent learning in online environments.

Learning Outcomes of Asynchronous Courses

Asynchronous online courses can cultivate various learning outcomes. Foremost, the implementation of the above asynchronous pedagogical strategies affords learners the valuable opportunity to exercise self-direction and scheduling in their educational journeys, thereby facilitating the cultivation of self-regulated learning (Artino, 2007; Kim et al., 2018). This approach necessitates that students autonomously establish their learning objectives and corresponding deadlines, thereby instilling a heightened sense of responsibility for their individual educational advancement (Varkey et al., 2022). It

requires students to be self-motivated and disciplined to stay on track and learn how to set goals, prioritize tasks, and persevere in their studies. The recorded lectures and self-paced modules allow students to progress through course content at their own pace, catering to individual learning preferences and enabling them to take charge of their education and adapt to different learning environments.

Moreover, asynchronous strategies facilitate the cultivation of critical thinking skills (Costley, 2016; Foo & Quek, 2019; Schindler & Burkholder, 2014). Unlike synchronous courses that require students to convene at specific times, asynchronous courses offer the flexibility for students to reflect on course materials, engage in comprehensive analysis and understanding, and craft well-considered responses independently to the asynchronous discussion boards (DiPasquale & Hunter, 2017; Foo & Quek, 2019).

Furthermore, the adaptability and accessibility are fundamental attributes inherent in asynchronous learning formats (Varkey et al., 2022) that facilitate the accommodation of a wide spectrum of learning preferences and scheduling constraints, such as work responsibilities or familial commitments (Jorgensen, 2012). This inclusive approach represents a notable departure from the synchronous learning models, which often demand adherence to fixed schedules. Also, by dismantling the temporal and geographical barriers that can hinder educational access, asynchronous learning fosters greater equity and inclusivity that contributes to the broader democratization of education (Varkey et al., 2022). Asynchronous learning strategies offer a wealth of opportunities for fostering diverse learning outcomes, from self-regulated learning and critical thinking to effective communication, and lifelong learning skills.

Theoretical Framework of Interactions

For this research study, I have developed a theoretical framework for interactions in asynchronous courses, as illustrated in Figure 2.1. The model presented in **Figure 2.1** is an updated version of the one used in the pilot study (Yang & Romero-Hall, 2024). In this updated version, I made slight adjustments and added references for each element within the four types of interactions.

As discussed in the pilot study (Yang & Romero-Hall, 2024), this framework incorporates Moore's Theory of Interaction (1989) and Hillman et al.'s concept of learner-interface interaction (1994). Based on Moore (1989), there are three types of interactions: learner-content interaction, learner-instructor interaction, and learner-learner interaction, which are essential for effective teaching and learning in distant education. Learner content interaction occurs when the learner engages with the course material or content. It is the process through which students acquire information, develop skills, and achieve their learning goals (Moore, 1989). Learner-instructor interaction involves communication and engagement between the learner and the instructor. It includes activities like feedback, guidance, and support provided by the instructor to the learner (Moore, 1989). Learner-learner interaction happens between learners, either in pairs or groups, and is often facilitated through discussions, collaborative projects, or peer reviews. Learner-learner interaction is important for fostering a sense of community, encouraging the exchange of ideas, and promoting deeper understanding through collaboration and discussion (Moore, 1989).

With the rise of more advanced technological tools, Hillman et al. (1994) critiqued Moore's Theory of Interaction and introduced the idea of learner-interface

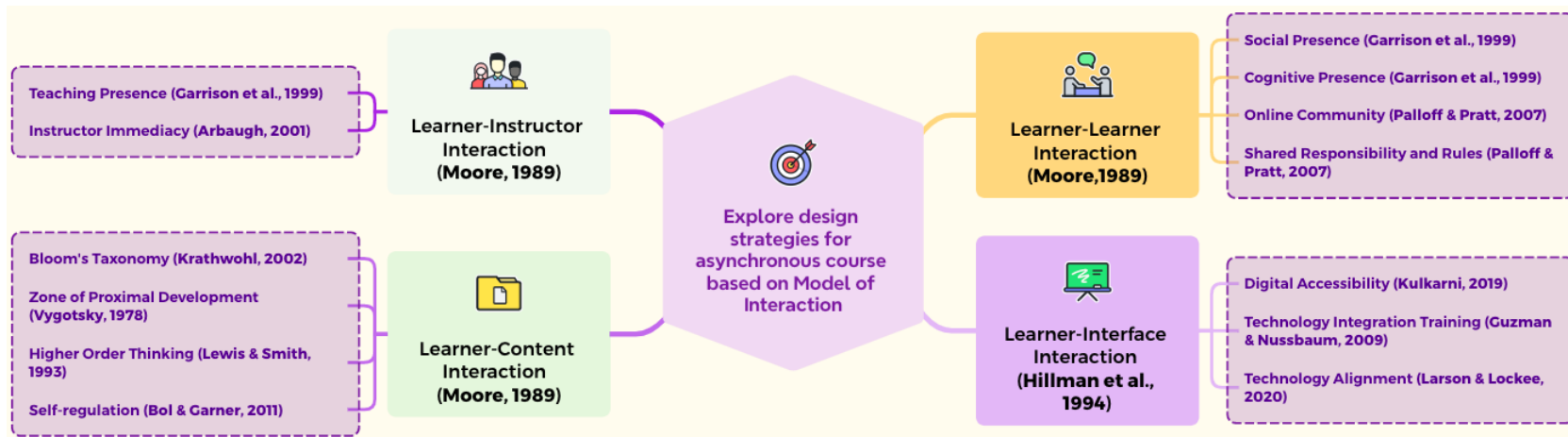


Figure 2.1 Modified Theory of the Model of Interaction with Critical Elements of Each Type of Interaction

interaction. This type of interaction happens between the learner and the tools or platforms they use to access and engage with course materials (Hillman et al., 1994). For example, it includes activities like navigating an online course, completing quizzes, participating in discussion forums, or using multimedia content. Learner-interface interaction is crucial because it directly influences how students engage with the content and participate in the learning process, ultimately shaping their overall learning experience.

It is worth noting that in the literature, one other type of interaction that is frequently cited is the “learner-to-self” interaction also known as self-reflection. Learner-to-self interaction is an introspective process where learners engage with their own thoughts and experiences as a means of deepening understanding (Soo & Bonk, 1998). This internal dialogue fosters metacognitive skills, allowing learners to develop self-regulatory skills and independent learning capabilities (Larson & Lockee, 2020). However, this dissertation research places its emphasis on the external factors that have a mutual influence and interaction with learners, such as other learners, instructors, content, and technology. Thus, the theoretical framework for this research does not include “learner-to-self” interaction.

For each type of interaction presented in this theoretical framework, I have outlined the key elements to consider when facilitating each type of interaction in asynchronous courses, as detailed below.

Learner-Content Interaction

In the design of learner-content interactions for asynchronous courses, instructors and instructional designers should thoughtfully incorporate foundational educational

concepts to foster an environment conducive to deep learning. Drawing upon Krathwohl's (2002) revision of Bloom's Taxonomy, it is vital to structure learning content that progresses through levels of understanding, from basic knowledge recall to complex analytical and evaluative thinking. This approach encourages the development of higher order thinking skills, a concept further elaborated by Lewis and Smith (1993), which is essential for cultivating students' ability to analyze, evaluate, and create based on the content they engage with. Simultaneously, Vygotsky's Zone of Proximal Development (ZPD) (1978), emphasizes the importance of delivering content that is slightly beyond the learners' current capabilities but accessible with appropriate scaffolding. This strategy ensures that content challenges students, thereby promoting significant cognitive growth within their ZPD. Moreover, the principle of Self-regulation, explored by Bol & Garner (2011), highlights the necessity for designing content that encourages students to set learning goals, monitor their progress, and reflect on their learning strategies and outcomes. This is particularly crucial in asynchronous settings, where learners often navigate their learning journey independently.

Learner-Instructor Interaction

When designing learner-instructor interactions in asynchronous courses, it is crucial to consider the concepts of Teaching Presence and Instructor Immediacy to foster a conducive learning environment. Teaching Presence, as defined by Garrison et al. (1999), consists of two general functions: instructional management and building understanding. Instructional management involves defining and initiating discussion topics, while building understanding focuses on sharing personal meaning and facilitating discussion to enhance the educational transaction. It emphasizes the importance of the

instructor's role in creating a structured, supportive, and engaging online learning experience. Meanwhile, Instructor Immediacy, articulated by Arbaugh (2001), refers to the behaviors that reduce the physical and psychological distance between instructors and learners, thereby enhancing the sense of closeness and personal connection in the asynchronous online class.

Learner-Learner Interaction

The design of learner-learner interactions should be informed by the principles of Social Presence, Cognitive Presence, Online Community, and Shared Responsibility and Rules to create an engaging and effective learning environment. Garrison et al. (1999) defined Social Presence as the ability of participants to identify with the community, communicate purposefully in a trusting environment, and develop interpersonal relationships by projecting their individual personalities. This is crucial for making the online environment feel welcoming and inclusive. Cognitive Presence, also outlined by Garrison et al. (1999), is essential for facilitating critical thinking and the construction of meaning through dialogue, enabling learners to explore, question, and apply new ideas collectively. Palloff and Pratt (2007) further contribute to this framework by emphasizing the importance of cultivating an Online Community, where learners actively participate, share experiences, and support one another, thus enriching the learning experience through collective wisdom and diverse perspectives. Moreover, the establishment of Shared Responsibility and Rules (Palloff & Pratt, 2007) ensures a structured environment where learners understand their roles and expectations, fostering a respectful and productive online learning culture.

Learner-Interface Interaction

When designing learner-interface interaction, it is necessary to consider the elements of digital accessibility, technology integration training and technology alignment. Kulkarni (2019) underscored the vital role of digital accessibility, advocating for course designs that accommodate diverse learning needs, ensuring equitable access to educational content for all students, including those with disabilities. This approach not only complies with legal standards but also enriches the learning environment by fostering inclusivity. Guzman and Nussbaum (2009) contributed to this discourse by emphasizing the significance of technology integration training for educators. Such training equips instructors with the necessary skills and knowledge to seamlessly integrate technology into teaching, thereby enhancing the educational experience and facilitating meaningful learning. Furthermore, Larson and Lockee (2020) stressed the importance of aligning technology with learning objectives, outcomes, assessments, and instructional strategies.

Collectively, taking a holistic approach to interactions in online education, this study seeks to advance our understanding of best practices and promote effective and engaging asynchronous learning experiences for learners in the future.

Existing Research about Interactions

This section starts by reviewing the current literature on interactions in online courses. It then specifically highlights the unique aspects of interactions in asynchronous courses as found in existing research. By examining key studies and identifying what has not yet been explored, it presents the research gap.

Interactions in Online Courses

In the existing literature, several dissertation studies investigated interactions occurring within online courses and their influence on student satisfaction in higher education contexts. Ahn (2012), Alston (2014), and Featro (2012) embarked on investigations into the multifaceted dimensions of interactions, encompassing learner-content, learner-instructor, learner-learner, and learner-interface interactions. Their collective findings underscore the pivotal role these interactions play in shaping students' overall satisfaction in online courses. Moreover, Featro's (2012) discernment of age and technical comfort as predictors of interaction satisfaction and overall contentment underscores the complexity of factors influencing the online learning experience. The study by Fladd (2007) provided invaluable insights into the intricate variations in interactions and satisfaction across diverse course delivery formats, highlighting the need for tailored approaches in different educational settings. Warren (2018) focused exploration into interaction quality within mathematics course content, contributing empirical evidence to the realm of instructional design and shedding light on nuances that impact learning experiences. Strachota (2003) emphasized learner-content interaction emerged as a primary predictor of satisfaction, alongside learner-instructor and learner-interface interactions, illuminating crucial satisfaction factors in the realm of distance learning. Fite's (2003) investigation into learner-learner interaction delineated the intricate interplay of cognitive styles and perceptions, offering profound insights that could inform the design and facilitation of online courses. These studies on interactions in online education provided a rich understanding of their significance in influencing student satisfaction.

Interactions in Asynchronous Courses

This study is centered on the design of interactions within asynchronous courses in the higher education context. Thus, I focused on research studies exploring and analyzing the design of interactions within asynchronous courses which were also discussed in my pilot study (Yang & Romero-Hall, 2024). Grant (2021) and Woo and Reeves (2008) highlighted the importance of diverse interaction types in online learning, such as engaging with content, discussions, collaboration, metacognitive skills, and providing necessary support. They recommend strategies like incorporating real-world activities, using well-structured course designs that align with learning goals, and ensuring that interactions are closely tied to course objectives. Similarly, Gasell et al. (2022) and Zingaro and Oztok (2012) explored the factors that sustain interaction in online courses, emphasizing the choice of discussion tools, the key role of instructor involvement, and the diversity of student characteristics within the course. Bickle and Rucker (2018) discussed the challenges of promoting student-to-student interaction in asynchronous courses and provided insights into effective technological tools for creating collaborative and engaging learning environments. Nandi et al. (2012) identified five types of asynchronous discussion forums, each serving different educational purposes, such as general discussions, Q&A sessions, debates, peer reviews, and group discussions, all of which are managed by instructors or tutors. These studies collectively underscore the critical role of well-designed interaction strategies, instructor engagement, and tailored technological tools in fostering effective asynchronous online courses.

Gaps in the Literature

By reviewing the studies exploring interactions in online course and asynchronous courses, there is a discernible research gap existing in analyzing student perspectives of interactions specifically within asynchronous courses in higher education and exploring design strategies to optimize these interactions. While studies by Ahn (2012), Alston (2014), and Featro (2012) and others shed light on various facets of interactions in online education, these works generally focused on online courses, but not specifically dedicated to asynchronous course designs. Existing research, exemplified by Bickle and Rucker (2018), Gasell et al. (2022), Grant (2021), Nandi et al. (2012), Woo and Reeves (2008), and Zingaro and Oztok (2012) touched upon diverse dimensions of interactions within asynchronous courses, emphasizing content engagement, conversation, collaborative efforts, and the challenges associated with fostering sustained interactions. Nonetheless, there is a pronounced need for more targeted exploration into student perspectives on these interactions and the nuanced design strategies employed in asynchronous courses within higher education. This gap presents an opportunity for in-depth examination and analysis to better understand how students perceive and engage with interactions in asynchronous settings, as well as to explore effective design strategies that can enhance these interactions.

In summary, this chapter reviewed key learning theories relevant to asynchronous courses, presented a theoretical framework for interactions, and then highlighted gaps in existing research. The literature review sets the foundation for addressing the research gap through the research presented in this study.

CHAPTER THREE

METHODOLOGY

This chapter describes the methodology used for this research. It begins with an explanation of the research design, including research methods and questions and the rationale for selecting a mixed research method. Then, the details of instruments employed for data collection are presented, which include a survey and a structured interview protocol. Following this, data collection procedure is described, emphasizing the steps taken to ensure the integrity and reliability of the data. Additionally, this chapter provides information about the participants. Lastly, the methods used for data analysis are then discussed, illustrating how the data were analyzed and coded to address the research questions.

Research Design

In this section, the research methods and research questions are first presented. Then the rationale for the chosen methods is discussed, providing justification for the mixed methods approach used in the study.

Research Methods and Research Questions

To address the research questions, this study used a mixed methods approach, using online survey and online interviews for data collection. An online survey created via Qualtrics was used to collect data about students' perspectives regarding the learner-learner interaction, learner-instructor interaction, learner-content interaction, and learner-technology interaction of asynchronous courses, so as to answer research questions one and two.

RQ 1: What is the relationship between students' general satisfaction and learner-learner interaction, learner-content interaction, learner-instructor interaction, and learner-technology interaction?

RQ 2: How do students rank the importance of the four types of interactions?

Qualitative interviews via ZOOM were conducted with asynchronous course instructors in higher education to collect data about instructors' perspectives, experience, and design strategies regarding interactions in asynchronous courses to answer research question three.

RQ 3: What strategies do instructors use to facilitate student-student interactions, student-instructor interactions, student-content interactions, and student-technology interactions in asynchronous courses?

Rationale for Methods Choice

I chose a mixed methods approach because it combines the strengths of both qualitative and quantitative approaches. This method allows for a more comprehensive understanding of the data by utilizing both qualitative and quantitative findings, providing a richer and deeper insight. First, online surveys are feasible, cost-effective, and allow to reach many respondents to increase the sample to increase the validity of this research study. Second, the qualitative interviews consist of open-ended questions which enable me to obtain in-depth information (Johnson & Christensen, 2020) about the instructors' thoughts, beliefs, and design strategies to promote interactions in asynchronous courses. Overall, this strategy allows for an in-depth analysis from varied perspectives, ensuring that the views and experiences of both students and faculty members are thoroughly represented and considered in the research findings.

Instruments

The instruments utilized in this study were designed to gather comprehensive data on students' perceptions and instructors' strategies related to asynchronous course interactions. Two primary instruments were employed: the Asynchronous Course Satisfaction Survey and an open-ended interview protocol.

Survey

The study collected students' perceptions through a cross-sectional online survey, originally adapted from Strachota's (2003) Online Satisfaction Survey. This section first presents the information about the first version of the modified survey which was used in a pilot study. After conducting a pilot study and analyzing the results, the survey was revised and further resulting in the final version, the Asynchronous Course Satisfaction Survey-Dissertation.

Asynchronous Course Satisfaction Survey-Pilot Study

To test the modified survey, I first conducted a pilot study in Spring 2024 semester at the University of Tennessee, Knoxville. The Pilot Asynchronous Course Satisfaction Survey included 60 questions in total, including questions about demographics, basic information about the asynchronous courses students took, use of discussion board in the asynchronous courses, satisfaction with learner-learner interaction, learner-content interaction, learner-instructor interaction, learner-technology interaction, and general satisfaction with their asynchronous courses (Yang & Romero-Hall, 2024).

A 5-point rating scale was used, where 1 = strongly disagree, 2 = disagree, 3 = neutral attitude, 4 = agree and 5 = strongly agree, to help the participant relatively

accurate express their attitudes (Johnson & Christensen, 2020). The Pilot Asynchronous Course Satisfaction Survey was converted into an online survey via Qualtrics. Qualtrics is an online survey platform that allows users to design, distribute, and analyze surveys and research data. The online survey link generated from Qualtrics was sent to students for data collection. The survey took approximately 10-15 minutes to complete (Yang & Romero-Hall, 2024).

The participants for this pilot study were undergraduate and graduate students who enrolled in asynchronous courses during either the Spring or Summer semester of 2023 in the College of Education at UTK (Yang & Romero-Hall, 2024). Participation was voluntary and anonymous. There were 35 responses, however, eight were deleted because they were incomplete. Thus, $n = 27$ students responded the pilot survey (Yang & Romero-Hall, 2024).

To evaluate the reliability of the pilot survey, the Cronbach's alpha values (Tavakol & Dennick, 2011) for specific constructs were calculated as follows: learner-learner interaction = .84, learner-content interaction = .87, learner-instructor interaction = .96, learner-technology interaction = .86, and general satisfaction = .93 (Yang & Romero-Hall, 2024). According to established guidelines, Nunnally (1978) suggested that a minimum reliability threshold of .70 is desirable, with higher values being preferred. These results indicated the high reliability of the Pilot Asynchronous Course Satisfaction Survey, suggesting its potential to measure constructs related to learner-learner, learner-content, learner-instructor, learner-technology interactions, as well as overall satisfaction (Yang & Romero-Hall, 2024). However, it is important to note that Cronbach's alpha can

be affected by small sample sizes. Thus, caution should be exercised in interpreting the results.

Asynchronous Course Satisfaction Survey-Dissertation

Data from the pilot study indicated that approximately 23% (eight out of 35) students quit the study. Upon reflection, there were two plausible explanations. First, there were too many questions (60 questions in total). Second, the questions about students' satisfaction began at question 22, which was too late in the survey. Thus, I modified the survey again by combining or deleting repetitive questions and reorganizing the survey's structure. This resulted in the final version of the survey for this dissertation, the Asynchronous Course Satisfaction Survey-Dissertation (See Appendix A).

At the beginning of the survey, there was an informed consent page which included purpose of the survey, time, voluntary participation, data use and confidentiality, criteria to participate the survey, contact information, etc. There were two filter questions and another two questions about the basic information about students' chosen asynchronous course for completing the survey. Then I used a matrix format to organize the questions about students' satisfaction with the four types of interaction and their general satisfaction. For example, there were seven questions under the section of satisfaction with learner-learner interaction in the pilot survey. I deleted one repetitive question and then used the matrix format to combine the six questions together as question five in the Asynchronous Course Satisfaction Survey-Dissertation. Following the questions about satisfaction, there was one question to ask students to rank the importance of the four types of interactions. Then I added one open-ended question for students to provide their perspectives. The last section focused on demographic

questions. By remodifying, the survey became more organized and concise. In total, there were 17 questions, and it took about 10 minutes to complete.

378 students completed the survey. Cronbach's alpha was conducted again based on the data completed by 378 students, to assess the reliability of the dissertation survey (Tavakol & Dennick, 2011). The Cronbach's alpha value for the constructs were: learner-learner interaction = .89, learner-content interaction = .92, learner-instructor interaction = .94, learner-technology interaction = .89, and general satisfaction = .91, which affirmed the high reliability of the Dissertation Asynchronous Course Satisfaction Survey.

Interview Protocol

To gather information on strategies used to facilitate interactions in asynchronous course, a standardized open-ended interview protocol (See Appendix B) was used. Open-ended interviews allowed all interviewees to answer the same questions, thus increasing comparability of responses (Johnson & Christensen, 2020). This interview protocol allowed participants to provide detailed, qualitative data about their teaching practices and the various interactions within the asynchronous courses in higher education. I developed the interview protocol, grounding it in the theoretical framework for interactions in asynchronous courses, as illustrated in Figure 2.1. It comprised four main sections corresponding to different types of interactions within the asynchronous learning environment: learner-learner, learner-instructor, learner-content, and learner-interface. Within each section, a series of open-ended questions prompted instructors to discuss their strategies, examples, and experiences. These questions are designed to elicit responses that can offer insights into effective practices for facilitating interactions in asynchronous courses.

Data Collection Procedure

The data collection process for this study involved a combination of survey and interview methods to gather comprehensive insights from both students and instructors involved in asynchronous online courses. This section first introduces approval from the Institutional Review Board (IRB) at the University of Tennessee, Knoxville (UTK). Then it presents detailed information about survey data and interview data collection process.

Institutional Review Board

The study adhered to ethical standards. To protect human subjects' rights, before collecting data from students and instructors, this study was reviewed by the IRB at the UTK and was approved in April 2024 (See Appendix C).

Survey Data Collection

I submitted a data request form to the Data Central at UTK to obtain the email list of undergraduate and graduate students enrolled in at least one asynchronous course in Spring 2024. The Data Central informed me that there were 11,402 unique students meeting this criterion. To estimate the appropriate sample size and ensure that the results from the sample are generalizable to the population ($N = 11,402$), leading to high-quality research outcomes (Kotrlík & Higgins, 2001), I applied Cochran's formula, which was formulated by William G. Cochran in his book "Sampling Techniques" (1977). This formula is widely used in survey research to calculate an appropriate sample size that ensures the results are representative of the target population. Using Cochran's formula with a 95% confidence level and a 5% margin of error (Cochran, 1977), the appropriate sample size for a population of 11,402 was approximately 372. To achieve around 372 survey responses, once I received IRB approval, the Data Central provided me with a

randomly selected email list of 6,000 students from the total 11,402. As Johnson and Christensen (2020, p. 240) explain, “Random sampling is frequently used in survey research, which is a nonexperimental research method in which questionnaires or interviews are used to gather information, with the goal of understanding the characteristics of a population based on the sample data”.

Upon receiving the email list, I sent out survey invitation emails (see Appendix D) to the students every Tuesday for four consecutive weeks. Each email included a link to the electronic Qualtrics survey. In the emails sent during the second, third, and fourth weeks, I included a note stating, “If you have already completed the survey, please ignore this email.” The survey was open from April 23 to May 31. Participation for completing the questionnaire was voluntary, and the responses gathered were monitored securely to ensure both anonymity and confidentiality.

Interview Data Collection

At the same time while collecting questionnaire data, I recruited instructors to interview one by one via ZOOM. I developed two criteria to select participants. First, the instructors should be lecturers, adjunct faculty, assistant professors, associate professors, and full professors. Second, the instructors should have more than five years’ experience teaching asynchronous online courses in higher education. Their experience in designing asynchronous courses was crucial for me to extract useful information about strategy use when designing interactions in asynchronous courses.

To capture diverse perspectives, experiences, and practices in asynchronous course teaching and design, I intentionally recruited instructors from different universities and teaching different or diverse subjects, to help enrich the findings. To do so, I

employed the following three recruiting methods. First, I sent interview invitation emails (See Appendix E) directly to the instructors at UTK and other universities that I had connections with to invite their participation. Second, as a member of the Association for Educational Communications and Technology (AECT), a key organization in the field of Instructional Design and Technology, I used AECT's Higher Logic platform to post the interview invitation (See Appendix F) once a week for four consecutive weeks from April 17 to May 7. Third, I created an Interview Invitation Flyer (see Appendix G). I sought help from individuals who might know instructors meeting the inclusion criteria. These individuals included the Executive Director of Online Learning & Course Production at UTK, participants from the previous two sources, and instructors I knew personally. I asked them to distribute the Interview Invitation Flyer to experienced instructors who might be interested in contributing to the study.

When instructors who met the criteria reached out to me, I sent them the Interview Protocol and the Interview Informed Consent Form (see Appendix H). The Informed Consent Form addressed the purpose of the interview, time, use of data, pseudonyms, voluntary participation, and the right to withdraw. I kindly asked them to review the interview questions in the Interview Protocol and sign the Informed Consent Form. Once they signed and returned the form, I also signed it and sent them a copy. We then scheduled a Zoom meeting.

During the interview, I began with a brief introduction to build rapport. Then, I explained the key points in the Informed Consent Form, such as the purpose of the interview and that the audio and video of our conversation would be recorded by Zoom in MP4 format. Additionally, I informed them that I would be using Otter.ai in the Zoom

meeting to automatically generate a transcript of the conversation. Otter.ai is an advanced transcription tool that seamlessly integrates with Zoom, providing accurate and real-time transcriptions. This feature ensured that every detail of the interview was captured efficiently, allowing for a thorough and precise analysis of the data. Then I used questions in the Interview Protocol as a guide but was flexible enough to explore interesting points that come up during the conversation. I also used “probes and follow-up questions to obtain response clarity and depth of responses” (Johnson & Christensen, 2020, p.190). I listened attentively, showing genuine interest in their responses to encourage them to share and elaborate their design and teaching experience. At the end of the interview, I expressed gratitude to the faculty members for their time and insights.

After the interviews, I downloaded the transcripts generated by Otter.ai and saved them on my personal computer for later data analysis. For added security, the recorded Zoom videos and Otter.ai transcripts were stored in my personal accounts, ensuring that only I had access to them. This measure was taken to protect the privacy of the participants and to prevent data loss.

Participants

This section provides an overview of the participants involved in the study, which includes the students who completed the survey and the experienced asynchronous course instructors who participated in the interviews.

Students for the Survey

A total of 528 students responded to the Dissertation Asynchronous Course Satisfaction Survey. After removing incomplete responses, 387 responses remained. From there, responses completed in less than one minute and straight-line responses were

further removed. This resulted in a final total of $n = 378$ participants for this dissertation survey research study.

Participants are 18 years old or older and have completed or are taking at least one asynchronous course. The demographic profile of the survey participants was diverse. **Table 3.1** shows the demographics information of the students.

Instructors for the Interviews

In total, 14 experienced asynchronous course instructors participated in the interview portion of this dissertation research study. Among them, three participants who were recruited through direct email invitations, five participants who responded to the AECT Higher Logic platform posts, and six participants who joined the study through the distribution of the Interview Invitation Flyer.

The instructors who participated in this study represented a diverse and experienced cohort in the field of asynchronous online education. The group included a mix of associate professors, assistant professors, adjunct instructors, and distinguished lecturers, each bringing a wealth of knowledge and expertise to the table. With years of experience ranging from almost five to over twenty-one years, these educators taught a variety of subjects, including Statistics, Business Writing, Organizational Leadership, Educational Technology, Instructional Design, and more. Their roles were not confined to teaching alone; many held significant additional responsibilities such as directors of instructional design, deans of online instruction, and senior instructional designers. The platforms they used for delivering their courses were also diverse, with a majority currently using Canvas, while others employed Blackboard, Brightspace (D2L), and Moodle.

Table 3.1 Demographics of the Students

Demographic Information	n	%
Gender		
Male	96	25.4
Female	270	71.4
Non-binary	8	2.1
Prefer not to say	4	1.1
Race		
White	322	85.2
Black or African American	18	4.8
Asian	14	3.7
Alaska Native	1	0.3
Native Hawaiian or Other Pacific Islander	1	0.3
Prefer not to say	9	2.4
Prefer self-description	13	3.4
Current level of study		
Undergraduate (bachelor's degree)	261	69.0
Graduate (master's degree)	68	18.0
Graduate (Doctoral's degree)	45	11.9
Professional degree	4	1.1
Program		
On Campus Program	277	73.3
Distance Online Education Program	99	26.2
Other	2	0.5
Study Status		
Full time (12+ undergrad or 9+ grad credits)	305	80.7
Part time (<12 undergrad or < 9 grad credits)	73	19.3
Work Status		
Full time (32-40 hours in a week)	114	30.2
Part time (less than 30 hours in a week)	164	43.4
Do not work	100	26.5
Reason for Taking this Asynchronous Course		
Required course	283	74.9
Elective course	77	20.4
Personal growth	17	4.5
Other	1	0.3
Computer Access		
Home	308	81.5
UTK campus	50	13.2
Work	15	4.0
Library	3	0.8
Other	2	0.5

It is important to note that the criteria for participants in this dissertation study required instructors to have at least five years of experience teaching asynchronous courses in higher education. Although the instructor Grace has four years of teaching experience, her extensive seven years of instructional design experience, coupled with her role as Senior Instructional Designer at University L, made her a valuable contributor to this study. The courses she taught, such as Multimedia Design and e-Learning Design and Development, further demonstrated her expertise in both instructional design and teaching. Detailed background information for each instructor is presented in **Table 3.2** Instructors' Information.

The participants in this dissertation study represented a diverse and experienced cohort of asynchronous course instructors from various universities, each bringing unique insights from their extensive teaching and instructional design backgrounds. Overall, their rich experience provided a solid foundation for exploring effective strategies for facilitating interactions in asynchronous courses.

Data Analysis

This section provides information about the methods used to analyze the survey and interview data collected in the study. It details the processes of cleaning and analyzing quantitative data using SPSS, as well as the coding and thematic analysis of qualitative data using NVivo.

Survey Data Analysis

Once the survey data was collected, I closed the survey and downloaded an SPSS (.sav) data file from Qualtrics containing the raw data, along with the variable and value labels. Then I cleaned the data by excluding respondents who only answered a portion of

Table 3.2 Instructors' Information

ID	Name	Title	University	Additional Roles and Affiliations	Asyn. Courses Taught	Years of Teaching Asynchronously
1	John	Associate Professor	University A		Statistics I, Statistics II and Multi-Level Modeling	7
2	Ava	Distinguished Lecturer	University A		Business Writing/Technical and Professional Writing/Introduction to Drama	9
3	Mike	Assistant Professor	University B	Director of Instructional Designer at University A	Organizational Leadership/Educational Leadership/Educational Psychology	13
4	Robert	Adjunct Instructor	University C	Instructional Designer at University A	Introduction to Research/Action Research/Introduction to Quantitative Research	7
5	Sarah	Associate Professor	University D		Instructional Design and Technology/Theories and Models/Technology Integration	5
6	Laura	Adjunct Professor	University E		Mathematics Science	21
7	Grace	Adjunct Instructor	University F	Senior Instructional Designer at University L	Multimedia Design/e-Learning Design and Development	4 + 7 years' instructional design experience
8	Emily	Instructor	University G		Educational Technology/Computer Applications	5+16 years' instructional design experience

Table 3.2. Continued

9	Olivia	Adjunct Instructor	University H	Instructional Designer at University A & Past Director of Distance Learning	Computer Applications/Learning Technology/Business and Human Health	11
10	Emma	Adjunct Professor & Dean of Online Instruction	University I	Adjunct Professor at University M	Educational Psychology/English/Literature/Senior Seminar/Educational Technology	5
11	Alice	Assistant Professor	University A		Educational Technology	7
12	Sophia	Assistant Professor	University J	Adjunct faculty at 5 more other universities	Introduction to the Instructional Design and Technology/Developing an Interactive Learning Environment	10
13	Mia	Assistant Professor & Director of Instructional Design	University K		Interdisciplinary Research /Introduction to Instructional Design/Instructional Design Theory/Instructional Design Tools and Technologies/Performance Evaluation	7
14	Liam	Adjunct Instructor	University K	Principal of Online High School	Educational Technology/Instructional Leadership	15

the questions, sped through the survey in less than one minute, or provided straight-line answers. Once the data was cleaned, the survey data was analyzed with SPSS. In SPSS software, I conducted correlations and multiple regression analysis to answer research question one. Correlation analysis was used to evaluate the strength and direction of the relationship between the constructs (Senthilnathan, 2019). Multiple regression analysis was used to analyze the relationship between the one dependent (outcome) variable and two or more independent (predictor) variables (Stolzenberg, 2004). In this study, students' general satisfaction was the dependent variable, and the four types of interactions were the independent variables. To address research question two, a frequency analysis of the rankings was performed to show how students prioritize the importance of the four types of interactions in asynchronous courses.

Furthermore, the survey included an open-ended question asking students to share any additional thoughts about their satisfaction with asynchronous courses. "Is there anything else that you would like to share with me about your satisfaction with this course?" A total of 71 students provided comments in response to this question. To analyze the qualitative data, I first transferred the responses from SPSS to Excel. I then immersed myself in the data by reading through the responses multiple times to gain an understanding of the overall content and identify emerging themes.

For coding the data, I categorized the 71 comments into three main categories: positive comments, neutral comments, and negative comments. Each category was organized into separate spreadsheets in Excel. I applied Descriptive Coding, as described by Saldaña (2021), which involves summarizing each passage of qualitative data with a single word or short phrase that captures its basic topic. This method helped in

identifying common themes within each type of comment. After establishing these themes, I reviewed and refined them to ensure they accurately represented the data, supporting them with direct quotes or examples from the students.

Interview Data Analysis

Upon completing the interviews, I cleaned and verified all the transcripts by listening to the audio recordings while simultaneously proofreading the text. During this process, I corrected any incorrect words or sentences, deleted repeated words, and removed irrelevant information, such as greetings and closing remarks, to ensure the transcripts were accurate and focused on the interview questions. This process allowed me to become familiar with the transcripts and gain an in-depth understanding of the strategies shared by the instructors. With the data prepared, I imported the cleaned interview transcripts into NVivo and started the coding process.

Based on Saldaña (2021), “a code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (p.4). According to Adu (2019), coding means looking for relevant information that meets the research questions and research purpose, extracting this relevant information, and tagging it appropriately. The coding process for the interview transcripts included first cycle coding and second cycle coding. I started with the first cycle coding, using Descriptive Coding within NVivo. According to Saldaña (2021), Descriptive Coding is a method used in the first cycle of qualitative data analysis. It involves summarizing a passage of qualitative data with a single word or short phrase that captures the basic topic of the passage. This

method is particularly useful for providing an overview of the material and for organizing large amounts of data into manageable segments. Based on this method, initially, I created nodes based on my research questions and theoretical framework. This involved setting up parent codes for broader themes, which included learner-content interaction strategies, learner-instructor interaction strategies, learner-learner interaction strategies, learner-interface interaction strategies, other strategies for designing asynchronous courses, and notes. I then opened each transcript and coded the data by reading through the transcripts line-by-line to identify significant statements about specific strategies related to each type of interaction. **Figure 3.1** shows the parent codes in NVivo. Simultaneously, I created child codes for the specific strategies under each parent code, assigning the related statements to the appropriate child codes. This iterative coding process helped me identify key strategies for each type of interaction.

After completing the first cycle of coding for all 14 transcripts, I moved on to the second cycle of coding to refine and categorize the initial codes. Saldaña (2021) emphasizes that second cycle coding is about reorganizing and reanalyzing data to construct a coherent narrative and to facilitate deeper analysis. The second cycle coding process involved methods such as Pattern Coding, which helps to group similar codes into broader themes (Saldaña, 2021). This stage is crucial for reducing the large volume of initial codes into a more manageable number of categories that capture the essence of the data. By identifying patterns and relationships between codes, I was able to develop more comprehensive and nuanced themes. For example, as shown in **Figure 3.2**, under the parent code of Learner-Content Interaction Strategies, I categorized the child codes

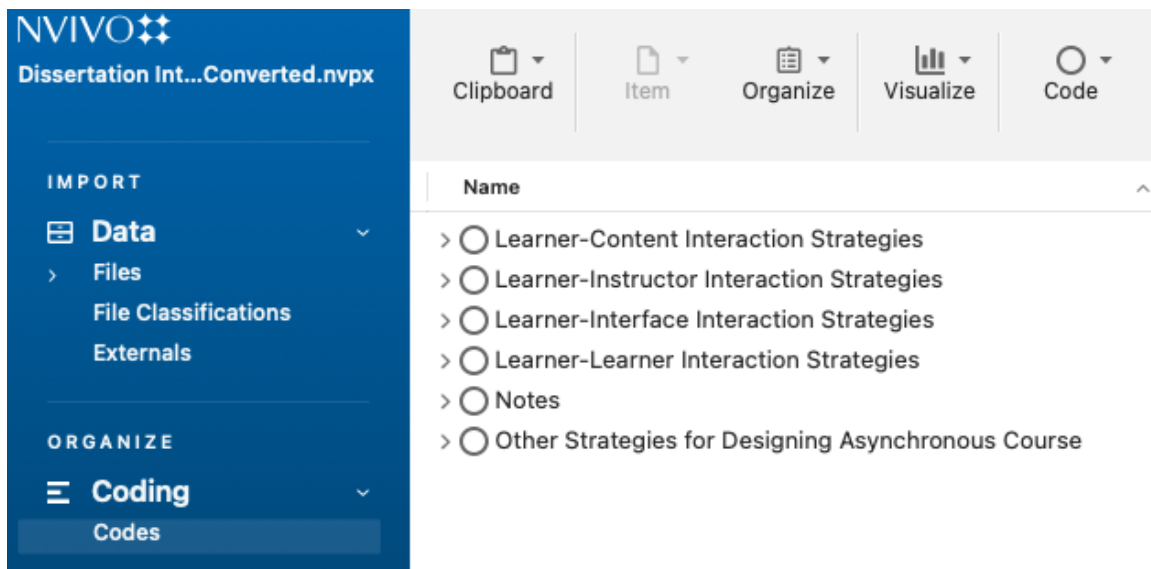


Figure 3.1 Parent Codes in NVivo

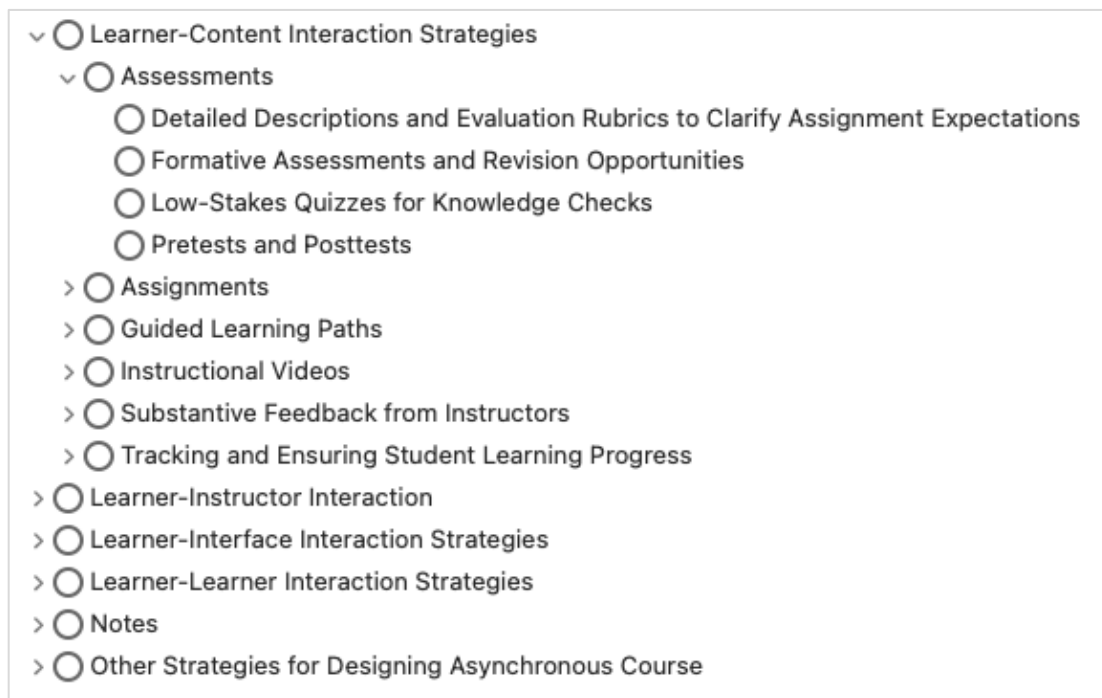


Figure 3.2 Parent Codes, Child Codes and Themes in NVivo

such as Formative Assessments and Revision Opportunities, Low-Stakes Quizzes for knowledge Checks, Pretests and Posttests, etc., creating the theme of assessments. This iterative process allowed me to refine my understanding of the data and to draw more meaningful themes regarding the strategies that facilitate interactions in asynchronous courses.

After completing the two coding cycles, I refined the themes iteratively to ensure they were distinct, comprehensive, and accurately represented the data. This process involved carefully reviewing and adjusting the themes to encapsulate the essence of the data without overlap or redundancy. Once I confirmed the themes, to ensure the trustworthiness of the coding, I exported the coding report for each participant and then sent these reports back to the instructors, inviting them to review the accuracy of my interpretation of their responses, so as to enhance the credibility and reliability of the interview results.

In conclusion, this chapter outlines the research methodology, explaining how a mixed methods approach was used to gather both quantitative and qualitative data. The design included online surveys and interviews to explore student and instructor perspectives on interactions in asynchronous courses. The data was analyzed using both statistical methods and thematic coding. This chapter sets the stage for the next part of the study, where the results will be presented.

CHAPTER FOUR

RESULTS

This chapter presents the findings from the pilot survey, the survey conducted for the dissertation, and the interviews. The survey quantitative results address the first two research questions: What is the relationship between students' general satisfaction and learner-learner interaction, learner-content interaction, learner-instructor interaction, and learner-interface interaction? How do students rank the importance of the four types of interactions? Additionally, for the open-ended questions in the survey, the survey qualitative survey results are presented as students' comments. Then, the interview results provide insights into the third research question: What strategies do instructors use to facilitate student-student interactions, student-instructor interactions, student-content interactions, and student-technology interactions in asynchronous courses?

Pilot Survey Results

To ensure transparency in how initial findings of the pilot survey informed the main study, the pilot survey results are presented in this section. A total of 27 participants completed the pilot survey. In the pilot study, to address the first research question, correlation analysis and multiple regression analysis were conducted. To address the second research question, rank of importance of the four types of interaction was conducted.

Correlation analysis demonstrated strong positive relationships between general satisfaction and both learner-learner interaction ($r = .75, p < 0.01$) and learner-content interaction ($r = 0.66, p < 0.01$). However, no significant correlations were found between general satisfaction and learner-instructor interaction ($r = 0.36, p > 0.05$) or learner-

technology interaction ($r = 0.48, p < 0.05$) (Yang & Romero-Hall, 2024). These findings suggested that peer interactions and content engagement were crucial for enhancing student satisfaction in asynchronous learning environments (Yang & Romero-Hall, 2024).

The multiple regression analysis indicated that the model accounted for 64.6% of the variance in general satisfaction ($R^2 = .65$). Among the predictors, learner-learner interaction emerged as a significant factor ($\beta = .64, p < .01$), while learner-content interaction ($\beta = .18, p = .48$), learner-instructor interaction ($\beta = -.17, p = .32$), and learner-technology interaction ($\beta = .22, p = .26$) were not statistically significant (Yang & Romero-Hall, 2024).

When participants ranked the importance of interaction types, 47.8% identified learner-learner interaction as the most critical, followed by learner-instructor and learner-content interactions (34.8% each), and 17.4% for learner-technology interaction (Yang & Romero-Hall, 2024).

Dissertation Survey Results

This section presents the survey results for the dissertation, starting with the descriptive statistics for variables related to student satisfaction. Following this, it addresses research question one by providing the results of the correlation and multiple regression analyses. Then it addresses research question two by presenting the rank of importance of the four types of interactions. Additionally, students' responses to the open-ended question in the survey are presented qualitatively to capture their additional comments about the asynchronous courses they took.

For the dissertation survey, a total of $n = 378$ participants completed the survey. As stated in the survey data collection section, “Using Cochran’s formula with a 95% confidence level and a 5% margin of error (Cochran, 1977), the appropriate sample size for a population of 11,402 was approximately 372.” Therefore, having $n = 378$ participants was an appropriate sample size to ensure that the results are generalizable to the population.

Descriptive Statistics

Table 4.1 presented descriptive statistics for the variables related to student satisfaction, with values ranging from one (strongly disagree) to five (strongly agree). The variables include Learner-Learner interaction (LLearn), Learner-Content interaction (LCont), Learner-Instructor interaction (LInstr), Learner-Interface interaction (LInter) and General Satisfaction (GenSat).

The mean scores indicated overall student satisfaction levels for each variable. The highest mean score was for Learner-Content interaction at 4.15, suggesting that students felt most satisfied with their interaction with the content in their asynchronous courses. This was followed by Learner-Instructor interaction with a mean of 3.91, indicating a high level of satisfaction with the interaction between learners and instructors. Learner-Interface interaction and General Satisfaction had mean scores of 3.68 and 3.72, respectively, reflecting a moderate level of satisfaction with their interaction with interface and technology, and overall general satisfaction. The lowest mean score was for Learner-Learner interaction at 3.36, indicating that while students felt satisfied with their interaction with other learners, it was to a lesser extent compared to other areas.

Table 4.1 Descriptive Statistics of Variables

	n	Min	Max	Mean	SD
LLearn	378	1	5	3.36	.96
LCont	378	1	5	4.15	.82
LInstr	378	1	5	3.91	1.03
LInter	378	1	5	3.68	.78
GenSat	378	1	5	3.72	1.10

The standard deviation (SD) values showed the variability of responses. LLearn had an SD of .96, indicating a relatively high variability in students' experiences with learner-learner interaction. LCont had the lowest SD at .82, suggesting more consistent satisfaction with learner-content interaction. The highest variability was observed in GenSat (General Satisfaction) with an SD of 1.10, indicating diverse opinions on overall satisfaction.

Correlations

To address RQ 1 (What is the relationship between students' general satisfaction and learner-learner interaction, learner-content interaction, learner-instructor interaction, and learner-technology interaction?), a correlation analysis was conducted. **Table 4.2** displayed the correlation analysis results between General Satisfaction and four types of interactions. All correlations with General Satisfaction were significant at the 0.01 level (2-tailed), indicating strong relationships between General Satisfaction and the different types of interactions. The mean correlation value of these interactions with General Satisfaction was approximately .68, showing an overall strong positive relationship. Among these, Learner-Content interaction had the highest correlation with General Satisfaction at .75, suggesting that effective interaction with content had the most substantial impact on general satisfaction. This was followed by Learner-Interface interaction, with a correlation of .68, indicating that the quality of interface interaction significantly influenced general satisfaction. Learner-Instructor interaction had a correlation of .64 with General Satisfaction, demonstrating a significant, yet slightly lower, impact on overall satisfaction compared to content and interface interactions.

Table 4.2 Correlation Analysis

	LLearn	LCont	LInstr	LInter	GenSat
LLearn	1				
LCont	.53**	1			
LInstr	.48**	.66**	1		
LInter	.61**	.66**	.55**	1	
GenSat	.63**	.75**	.64**	.68**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Lastly, Learner-Learner interaction had a correlation of .63 with General Satisfaction, showing that it had the least influence among the four types of interactions.

Multiple Regression Analysis

To address RQ1, a multiple regression analysis examined the relationships between students' General Satisfaction (dependent variable) and four independent variables: Learner-Learner interaction, Learner-Content interaction, Learner-Instructor interaction, and Learner-Interface interaction. The analysis results, presented in **Table 4.3** Multiple Regression Analysis, showed an R value of .82, indicating a strong positive relationship between these interactions and General Satisfaction. The R² value of .68 indicated that approximately 68% of the variance in General Satisfaction could be explained by the four interactions, while the adjusted R² value of .67 showed that 67% of the variance was explained after adjusting for degrees of freedom.

Each independent variable's standardized coefficient (β), t -values, and significance (Sig.) levels indicated the strength and statistical significance of their relationships with General Satisfaction. Learner-Content interaction exhibited the highest standardized coefficient (β) of .39 and a t -value of 8.72, making it the most influential factor on General Satisfaction. This was followed by Learner-Learner interaction with a β of .22 and a t -value of 5.66, showing it also had a substantial positive impact. Learner-Interface interaction had a β of .21 and a t -value of 4.77, indicating a significant positive relationship, though its influence was less pronounced than learner-content interaction. Lastly, Learner-Instructor interaction had the lowest β of .16 and a t -value of 4.02, demonstrating a positive but comparatively smaller impact on General Satisfaction. All

Table 4.3 Multiple Regression Analysis

	R	R^2	R^2_{adj}	Standardized Coefficient β	t	Sig.
	.82 ^a	.68	.67			
LLearn				.22	5.67	<.001
LCont				.39	8.72	<.001
LInstr				.16	4.02	<.001
LInter				.21	4.77	<.001

Note: Dependent Variable: GenSat

Independent Variables: LLearn, LCont, LInstr, LInter

relationships were significant at the $<.001$ level, highlighting the importance of these interactions in shaping overall student satisfaction.

Rank of Importance

To address RQ2, in the survey, a question was designed to ask students to rank the importance of the four types of interactions for a satisfying asynchronous course. An analysis of frequency of the rankings for each type of interactions was conducted and organized in **Table 4.4** Rank of Importance. Based on the data, the importance of each interaction type for a satisfying asynchronous course can be analyzed as follows.

The most important interaction type, as indicated by the highest number of responses rating it as “1” (most important), was Learner-Content interaction. It received a total of 246 responses in the “1” category, with a mean importance rating of 1.48 and a mode of one. This signified that most learners consider interaction with the course content to be the most critical aspect of an asynchronous course. Following Learner-Content interaction, Learner-Instructor interaction held the second spot in terms of importance. This category received 171 responses as “2” (very important), with a mean rating of 2.10 and a mode of two. This suggested that while not as crucial as content interaction, instructor interaction was still highly valued by learners. Learner-Interface interaction was ranked third, as it received 181 responses in the “4” (least important) category but maintained a significant mean rating of 3.19 and a mode of four. Lastly, Learner-Learner interaction was deemed the least important among the four types. It received 170 responses as “4” (least important) and had a mean rating of 3.23 with a mode of four. This indicated that peer interaction was considered the least critical element for a satisfying asynchronous course.

Table 4.4 Rank of Importance

	1	2	3	4	Total	Mean	Mode
LLearn	17	50	141	170	378	3.23	4
LCont	246	88	39	5	378	1.48	1
LInstr	95	171	90	22	378	2.10	2
LInter	20	69	108	181	378	3.19	4

Note: 1 = most Important, 2 = Very Important

3 = Moderately Important, 4 = Least Important

Overall, the students prioritized content interaction the most, followed by instructor interaction, interface interaction, and finally, peer interaction.

Students' Comments

The analysis of students' qualitative comments on asynchronous courses revealed a diverse range of experiences and perspectives. The comments were categorized into positive, negative, and neutral responses, each highlighting distinct aspects of the asynchronous learning experience. Positive comments emphasized the flexibility, quality of content, supportive instructors, and general enjoyment of the courses. In contrast, negative comments focused on challenges such as communication issues, lack of peer interaction, workload concerns, technical difficulties, and a preference for in-person learning. Neutral comments reflected mixed experiences, suggesting that the effectiveness of asynchronous courses can vary significantly depending on various factors, including course design, instructor quality, and individual student preferences.

Positive Comments

In analyzing student positive comments on asynchronous courses, several key themes emerged, reflecting the overall positive experiences and satisfaction with this mode of learning, which include flexibility and convenience, quality, and organization of course content, supportive instructors, and general enjoyment. These themes highlight the aspects that students appreciated the most, demonstrating the effectiveness and appeal of asynchronous learning in various aspects.

First, flexibility and convenience. Students commented that asynchronous courses are flexible and convenient, allowing them to learn at their own pace with recorded lectures. They appreciated the ability to fit their studies around full-time work and

personal schedules, and they valued the freedom to complete coursework in a comfortable setting. The organized course structure and support for time management also contributed positively to their experience. For example, one student said:

I particularly enjoyed that the live lectures were recorded so that I could learn at my own pace and rewatch / rewind on the portions that I needed more time learning. I would recommend that for all courses.

Second, great content quality. Students praised the quality and organization of course materials in their asynchronous classes. For example, they found having access to resources like PowerPoint notes made the courses easier to follow and facilitated their learning. They appreciated the well-organized and helpful videos for each class. One student commented:

Videos for every 'class' were extremely helpful and well organized.

Some students highlighted that the course content itself was enjoyable and well-suited to the asynchronous format, with the generally easier content being a good fit for this mode of learning. Overall, these elements contributed to a positive perception of the course and its content quality.

Third, instructor's support. Students highly valued the role and support of their instructors in asynchronous courses. They appreciated instructors who were understanding and non-judgmental, meeting students where they were and clearly communicating a genuine interest in helping them succeed. Students also appreciated the effort instructors put into making the classes cohesive and engaging. They said:

One of the main reasons why I am so satisfied is because our instructor was able to meet the students where they are. Meaning that he was not judgmental and clearly communicated his interests in wanting to help.

I really enjoyed this course due to the excellent teacher/facilitator.

The professor did everything possible to make the class as cohesive and engaging as possible.

Instructors' efforts play an important positive impact on students' overall satisfaction with their asynchronous learning experience.

Fourth, general enjoyment. Many expressed overall enjoyment and satisfaction with their courses, noting that they had participated in several that were very good and educational. There was a desire for more asynchronous course and program options, highlighting the format's appeal. For example, they said:

It was very fun and enjoyable.

More asynchronous course and program options should be offered.

I have had some that are very good courses and have learned a lot from them.

These positive comments indicated that students found the courses fun and enjoyable, contributing to a positive perception of their asynchronous learning experiences.

Negative Comments

By categorizing the negative comments, several themes emerged, reflecting various aspects of concerns that students have experienced in asynchronous course, including challenges with instructor communication and support, lack of peer interaction,

workload issues and disorganized content, technical issues, a preference for in-person learning, and general dissatisfaction.

First, challenges with instructor communication and support. Students highlighted several concerns regarding the instructors' lack of communication and responsiveness in asynchronous courses. One of the students said:

It was very difficult to communicate with my instructor through this course which I found very frustrating.

They also expressed frustration with instructors who did not participate in scheduled office hours or respond to student emails, resulting in a lack of support and guidance. Some students felt that their concerns and feedback were ignored, and some noted a lack of empathy and compassion from their instructors. Students also expressed that the feedback and grading on assignments were very impersonal, often perceived as AI-based, which lacked the personalized touch and constructive feedback necessary for meaningful learning. Additionally, there were instances where instructors failed to adhere to course schedules, such as altering assignments without notice. These issues contributed to a negative experience for students, emphasizing the importance of effective communication and instructor engagement in asynchronous learning environments.

Second, lack of peer interaction. Students raised concerns about the lack of peer interaction in asynchronous courses. Some students mentioned that they had no interaction with peers at all, which negatively impacted their overall experience. For instance, one student said:

There was never any student interaction in any of the asynchronous courses I took.

Furthermore, students expressed the format's flexibility often led to difficulties in coordinating group assignments, particularly for those with varying work schedules. Some students were disappointed as the courses were not conducted synchronously, where real-time discussions with fellow students could have enhanced their understanding of the course material. These comments collectively highlight that students hope to have some peer interactions even in asynchronous courses.

Third, workload issues and disorganized content. Students expressed concerns about workload and content in their asynchronous courses. Some felt that the workload was significantly heavier compared to most synchronous courses, with long readings and extensive content covered in single chapters. One of the students said:

The workload felt significantly heavier than in most synchronous courses.

Also, some students stated that the large number of homework assignments consumed a lot of time, yet these did not significantly contribute to their final grades. Conversely, some students noted that there were very few readings or resources provided to support their learning, making it challenging to succeed. Additionally, there were students who expressed that some courses seemed poorly planned, with disorganized content that lacked coherence. Students found it frustrating to have to jump between modules to locate information, making it difficult to navigate the course content efficiently. One student expressed:

Often time you would have to jump between modules to find information which is frustrating as a student.

These issues about workload and content contributed to a feeling of dissatisfaction and frustration among students in asynchronous courses.

Fourth, technical issues. Students also reported technical issues in their asynchronous courses. Some students felt that discussions over Canvas were not effective substitutes for in-class discussions, lacking the immediacy and depth of real-time interactions. Some encountered technical difficulties on Canvas, such as videos failing to load on discussion boards. One student expressed:

Canvas was useless when videos failed to load on a discussion board.

Additionally, they expressed dissatisfaction with Cengage, which is an online educational platform used for accessing digital course materials and resources. Students noted it limited learning opportunities and penalized incorrect answers without providing a chance for students to learn from their mistakes. These technical issues created obstacles that detracted from their overall learning experience.

Fifth, preference for in-person learning. Several students expressed a preference for in-person learning over asynchronous courses. While some appreciated the convenience of online classes, they felt that in-person interactions were more valuable and effective. They expressed a desire for face-to-face classes, even if it meant attending sessions only once a week, as they believed the cost of education should include access to instructors. For example, one student said:

Make the classes in person even if they meet once a week. I don't pay thousands of dollars to not even see my instructor.

Overall, these students felt that traditional classroom settings offered a superior learning experience and would have preferred to take their courses in person if given the choice.

Sixth, general dissatisfaction. Some students just expressed a general dissatisfaction with asynchronous courses. They felt that these courses essentially

required them to teach themselves from textbooks, offering little instructional support or engagement. They said:

Having an asynchronous course is basically just teaching yourself from a textbook. It is useless for learning.

I am thoroughly dissatisfied with this course and other asynchronous courses I have taken.

Some even suggested that asynchronous classes should only be used when absolutely necessary. Also, there were also concerns about the effectiveness of online classes, with some students feeling that they were not taken seriously and that the opportunity for academic dishonesty was higher. Overall, these students found the asynchronous format to be an unmotivating medium for them.

Neutral Comments

There were some neutral comments on asynchronous courses revealing a mix of experiences and perspectives. Some students expressed that their experiences varied significantly depending on the instructor's quality. One student said:

I've taken several asynchronous courses in both undergraduate and graduate school, and quality is heavily dependent on the instructor.

Another student said:

While I answered based on my most recent asynchronous course which was a fairly negative experience, most asynchronous courses I have taken have been extremely helpful and better than face-to-face classes.

Some noted that certain subjects, such as Introduction to Statistics, were challenging to learn asynchronously and might be better suited to in-person formats. Furthermore,

personal preferences also played a role, with some students not feeling the need for peer interaction and they found group projects in asynchronous settings to be counterproductive. These comments suggest that the success of asynchronous learning depends on the course context, instructor, and individual student needs and preferences.

Overall, the student comments underscore the importance of carefully designing asynchronous courses to address both the strengths and challenges identified, ensuring a more effective and satisfying learning experience for all students.

Interview Results

To address research question three, interviews were conducted with 14 experienced higher education instructors, focusing on strategies that facilitate interactions in asynchronous courses. Based on the results of students ranking importance of the four types of interaction, learner-Content interaction as the most important, followed by Learner-Instructor, Learner-Interface, and Learner-Learner interactions. This section organizes strategies based on these ranked interactions. This section organizes strategies for facilitating interactions according to their importance to students.

Strategies for Learner-Content Interaction

The data analysis resulted in six themes for facilitating learner-content interactions in asynchronous courses. The themes include instructional videos, assignments, assessments, feedback from instructors, guided learning paths, and methods for tracking and ensuring student learning progress used by experienced asynchronous course instructors to enhance student participation and learning outcomes.

Instructional videos, assignments, assessments, and instructors' feedback directly address course content. Instructional Videos include methods like interactive lecture

videos with embedded questions, analytical and explanatory videos, short and direct instruction videos, and optional recorded workshops for assignment troubleshooting. Assignments discuss various types, such as application-based and problem-solving assignments, active hands-on assignments, critical thinking assignments, scaffolding and buildable assignments, and personal passion assignments, all designed to make learning practical. Assessments cover formative assessments with revision opportunities, pretests and posttests, low-stakes quizzes, and the use of evaluation rubrics and detailed assignment descriptions to provide clear expectations and opportunities for improvement. Feedback from Instructors details approach for giving detailed and constructive feedback, encouraging students to post questions within assignments, and creating feedback videos.

The guided learning path helps organize this content systematically, ensuring students can interact with it smoothly. Additionally, tracking and ensuring students' learning progress ensures that students remain on track throughout the course. Specifically, Guided learning path strategies focus on consistent and structured module design, phased module release with locked tasks, and open access modules with flexible pacing to help students navigate the course effectively. Tracking and ensuring student learning progress discusses incorporating a self-regulation orientation module, using consistent weekly due dates and clear deadlines, balancing diverse student needs through flexibility, and utilizing monitoring systems in the LMS, along with personalized communication and reminders, color-coded calendars, weekly exit tickets, and timely grading to encourage on-time submissions. Detailed information for each Learner-Content Interaction strategy is presented in **Table 4.5** Strategies for Learner-Content Interaction.

Table 4.5 Strategies for Learner-Content Interaction

Strategy	Description	Example Evidence
Instructional Videos		
Interactive Lecture Videos with Embedded Questions	There are several methods of embedding questions in lecture videos: 1. Embedding questions in recorded videos, requiring students to watch the video to obtain the answers. After viewing, students take quizzes within the LMS. Students might retake the quiz as many times as they like to master the content. 2. Incorporate questions directly into the video, prompting students to answer as they watch. Students cannot advance the video without answering these questions, ensuring active engagement with the content. 3. Include direct instruction on key takeaways in the videos and use EdPuzzle to embed the video and pause it every few minutes to pose reflective questions or knowledge check questions. 4. Use interactive notes and reflective questions within the videos to maintain student engagement and focus on key concepts.	Emily addressed the third method as follows: <i>I give them a little bit of direct instruction on some of the key takeaways. Then I don't just have them watch the video. I embed the video in EdPuzzle. And then every minute or two or three minutes I pause the video for some kind of reflective question, or direct instruction on a key takeaway.</i>
Analytical and Explanatory Videos	Instructors analyze or explain the learning content in the instructional videos. For example, in writing or literature classes, instructors produce analysis videos, where they dissect documents or passages, explaining their significance and how they relate to course content. Additionally, for research-focused courses, instructors use instructional videos to guide students through processes like qualitative data coding, or SPSS running.	Ava explained: <i>Something that a couple students have told me it's very helpful are videos that I call analysis videos where I'll put up a document and I'll go through whatever we've been studying, and how we see that in the document or where it's good or where it's bad or how it works.</i>

Table 4.5 Continued

Short and Direct Instruction Videos	Use short and direct instruction to cater to the attention spans of learners by creating concise videos, typically 10 to 15 minutes long to maintain student engagement and effectiveness. These micro-lecture videos deliver essential content in a focused manner. Instructors can also post announcements to inform students about the video lengths and encourage them to watch. For example, for project-based classes, instructors use micro-lecture videos to provide step-by-step guidance on assignments, address issues, and reinforce key concepts.	Liam expressed: <i>I like short videos, 10 minutes, 15 minutes of direct instruction. I don't like more than that. If you show somebody a 30-minute-long video, an hour-long video. They're not going to learn from that.</i> Olivia explained: <i>The project-based class is a micro lecture or mini lecture. [...] I'll bring up the project on the screenshare and I' explain how to do the project each step by step.</i>
Optional Recorded Workshops for Assignment Troubleshooting	Provide optional recorded workshops to address specific assignments or technical tasks, such as performing statistical tests in SPSS or using Excel for statistical analysis. Encourage voluntary participation. Make recordings of the sessions available for those who cannot attend live, ensuring that all students have access to the instructional support.	John said: <i>I've tried to hold like optional Zoom. People have asked for like, oh, you know, like optional classes just to walk through how to perform a T test in SPSS or something. [...] I'll record that as well. People who can't make it can have that recording.</i>
Assignments		
Application-Based and Problem-Solving Assignments	Instructors can design application-based assignments that require students to research and apply content to real-world problems. Instructors can use Articulate Storyline to create scenario-based questions or case studies for an engaging, interactive learning experience. Scenarios should be inclusive, reflecting diverse cultural, ethnic, and experiential backgrounds to foster an inclusive environment.	Mike shared: <i>If I'm talking about educational leadership, so one question we have to do is how to write a grant and how to apply for grant. I just have some scenarios and use Articulate to create that scenario. [...] They have learned how to apply for grants, so they can use it right away. I feel like that's great experience. I have a lot of great feedback regarding the two scenarios.</i>

Table 4.5 Continued

Active Hands-on Assignments	Instructors emphasize engaging students through practical, hands-on activities. For instance, in a statistics course, students work with real or simulated datasets and use tools like Excel and SPSS to deepen their understanding by actively analyzing and working with data.	Robert shared: <i>I would say majority of my assignments are pretty active. [...] One of the things that they do in our assignments is they do a little descriptive and correlational study. I give them a dataset and I showed them how to use Excel to run that and then they will do it.</i>
Critical Thinking Assignments	Instructors underscore the importance of promoting critical thinking by requiring students to engage in analysis, explanation, reflection, and evaluation. There are various ways: 1. Use structured asynchronous group debates in LMS, where students are divided into groups to argue for or against a topic. Each member must research, post evidence, and provide rebuttals, encouraging deeper content exploration and critical thinking through well-supported arguments. 2. Use threaded discussions by asking students to explain their reasoning for their answers to, for example, math problems. 3. Provide students with reflective questions for their readings to foster critical and reflective information processing. Require students to share their individual thoughts. 4. Ask students to play some educational games, for example, AI for Oceans. Students play it to learn about AI and reflect on how to use the game for instructional design.	Sophia shared about the asynchronous debate: <i>You have to go research and then you have to provide evidence of that. Somebody else has to provide a rebuttal. So it really is this even though it's happening asynchronously, It's forcing students to go look for information, wherever that comes from, maybe their textbook or other materials that you provide for them or even outside of that, and then having to present that case. So that way you can measure sort of effectiveness of learning the content. [...]</i> <i>They're having to go to the literature and provide citations of why that is, and they may not be assigned to a side of the debate that they agree with. So they're really using sometimes those critical thinking skills and thinking a little bit deeper.</i>

Table 4.5 Continued

Scaffolding and Buildable Assignments	Break assignments into sequential parts that students need to complete in order. Require students to demonstrate understanding at each stage before advancing to the next, promoting accountability and preventing procrastination. Set deadlines for practice activities and incorporate early feedback to help students stay on track and address any issues promptly.	Emma stated: <i>A lot of their assignments are scaffolding in which they can't really proceed until they finish one part of it. Like an essay, they have to finish one part in order to do the next part. I think that one alone makes them accountable because they can't really progress without doing them in order because they're linear.</i>
Personal Passion Assignment	Allow students to personalize their assignments by choosing topics aligned with their passions. Predefine the format of the assignment but give students the freedom to select the specific content area for their work.	Emily shared: <i>We happen to be learning about web quests. They have to use the web quest format. But they choose the content area of the actual lesson. They're exploring resources. [...] They get really excited and engaged about finding these resources that will make their classes exciting. So, it's not necessarily the assignment itself. It's that they get to personalize it.</i>
Assessments		
Formative Assessments and Revision Opportunities	Foster a learning environment where mistakes are seen as part of the learning process. Encourage students to revise and resubmit quizzes or assignments for higher grades and deeper understanding by allowing multiple attempts and providing detailed feedback. Allow for dropped scores on the lowest-performing assessments to motivate continuous improvement.	Alice explained: <i>I always do revise and resubmit. I asked them if they want a higher grade, they can always resubmit. In the feedback, I tell them, hey, if you work on this, this and this, I can give you another grade. [...] I think that really helps students. Honestly, in the end, I think I want all my students to do well, and learning is more important than just a random assignment grade.</i>

Table 4.5 Continued

Pretest and Posttest	Use pretests and posttests to gauge student learning and progress effectively. Administer pretests at the beginning of courses to help students identify their baseline knowledge and areas for improvement. Conduct posttests at the end of the course to allow students to see their progress and reflect on their learning.	Grace said: <i>I love the pretest and posttest where the students can recognize, oh, there's something I don't have. [...] Having those pre and post assessments can help them assess their work or their progress in eLearning.</i>
Low-Stakes Quizzes	Design low-stakes quizzes to be short and focused on essential topics for knowledge checks, with some being optional practice quizzes on specific skills.	Ava shared: <i>I have quizzes. Those are mainly knowledge check quizzes. They can do them twice. They're not super challenging. They're not like high level Bloom's Taxonomy.</i>
Evaluation Rubrics and Detailed Assignment Descriptions	Provide clear descriptions and evaluation rubrics for major assignments before students begin their work to help students understand expectations and grading criteria and enhance the quality of their work.	Sarah shared: <i>I create a detailed description for every major assignment and an evaluation rubric. There's a file that holds assignment description and evaluation rubric. I use that rubric when I grade students work and make this file available before students start to work on the assignments.</i>
Substantive Feedback from Instructors		
Detailed and Constructive Feedback	Provide detailed and constructive feedback by identifying specific areas for enhancement, offering clear guidance on how to make improvements, or reinforcing their understanding of key concepts. It could be a combination of narrative comments, bullet points, and rubrics to convey evaluations, making it easier for students to understand and apply the feedback to improve the quality of their work.	Mia explained: <i>I give feedback, like just in a paragraph form, as well as some bullet points. I write it out. I give line by line. If it's a writing assignment, I give narrative feedback with rubric. Like here's kind of where you went and your level of achievement.</i>

Table 4.5 Continued

Students Post Questions in Assignments for Additional Feedback	Encourage students to post questions directly within their ongoing coursework. For example, students can type questions into their data analysis homework assignments as they arise during the learning process.	John shared: <i>But I also encouraged people to post a question on it because I'll read through it. [...] while you're working on it and thinking about it and something comes in your mind, just type it up in the data analysis homework that you're doing, and I'll respond to it there, too.</i>
Video Responses to Address Common Questions and Clarify Key Concepts	Create feedback videos to address common questions and clarify critical concepts. First, identify recurring student inquiries that indicate areas of confusion or lack of clarity. Second, develop targeted videos to provide detailed explanations and examples in response. Then continuously seek and incorporate student feedback to expand and refine video content, ensuring comprehensive coverage of all challenging topics.	John said: <i>I'm getting a lot of the same question. I might post a video or response.</i> Sarah shared: <i>Students had a lot of questions about those important concepts, and they needed to use those concepts when they worked on their project. So, I started to create videos for the first two activities.</i>
Guided Learning Path		
Consistent and Structured Module Design	Ensure a clear and structured learning experience by organizing weekly modules around specific topics, maintaining consistency in course design. Start new modules on a specific day each week to establish a predictable routine. For each module, include a consistent set of activities in each module, such as introductory videos, assigned readings, discussions, quizzes, and assignments. Or use a step-by-step approach with a checklist to guide students through the module, ensuring they know what tasks to complete and can easily track their progress.	John highlighted: <i>Each module we should have like an introductory video, some assigned readings, or information about the topic we're covering, and then we should always have a Canvas quiz. [...] I tried to follow a specific pattern. So, each week when you open a module, the organization is not completely different.</i>

Table 4.5 Continued

Phased Module Release and Locked Tasks	Lock modules releasing them sequentially and gradually, providing only a few weeks' worth of content at a time to prevent students from feeling overwhelmed and to maintain focus on current topics. Use locked tasks, requiring students to complete each step, such as watching lectures and answering questions, before moving on to the next. Ensure students fully grasp foundational material by scaffolding content to build on previous knowledge.	Grace said: <i>In the first week of the course, I really want the students to focus on the orientation information. And the first module, I generally would only allow to maybe two weeks of content. When a course opens, I want them to have a little bit of room to bounce around. [...] Then by the second week, I can open two weeks early or three weeks early.</i>
Open Access Modules and Flexible Pacing	Open all modules at the beginning of the course to accommodate diverse student needs and schedules in asynchronous courses, allowing students to work ahead at their own pace. This approach allows students to plan their work around personal commitments, such as jobs and family responsibilities, ensuring they have enough time for their learning.	Alice stated: <i>I have had some students work ahead. The one student who worked ahead last time [...] she was in a nine to five job, so I think it was easier for her to work ahead. I open all the modules, so that they can work at their own pace.</i>
Tracking and Ensuring Student Learning Progress		
Incorporating a Self-Regulation Orientation Module at the Beginning	Implement a self-regulation orientation module at the beginning of the asynchronous course about self-regulated learning students. The content of the module could focus on time management, goal setting, and maintaining motivation. Students learn strategies for planning, monitoring progress, and reflecting on their learning. Instructors can also ask students to practice using various technology tools.	Emily shared: <i>We have an orientation module before we start on the content for this semester. It's all about self-regulated learning and manage your own time and mind and organization. Then let's explore a bunch of technology tools before we get to content of the course. [...] They learned a lot about forethought and planning, and motivation and setting goals. I teach them about all of that in the beginning. Then I sprinkle that stuff throughout the rest of the semester.</i>

Table 4.5 Continued

Using Consistent Weekly Due Dates to Maintain Student Progress	Establish consistent and predictable due dates, often on the same day each week. This consistency helps students manage their time and stay on track.	Ava shared: <i>I do think that locking tasks and the regular due dates have really helped the students stay on track without me having to be in there a lot.</i>
Maintaining Timely Submissions with Clear Deadlines	Establish well-defined policies in the syllabus, specifying due dates and the consequences of late submissions, such as a 10% grade reduction for each day an assignment is late, to ensure timely submissions in asynchronous courses.	Sarah stated: <i>Any work that is submitted late by more than four days will not be accepted. If an assignment is late, their grades will be lowered by 10% each day.</i>
Balancing Diverse Student Needs Through Flexibility	Adopt flexible strategies to address the diverse needs of students in asynchronous courses. Recognize the varying backgrounds and preparedness levels of students. Allow advanced students to work ahead while dedicating more time to those needing extra help. Accommodate students with special circumstances, such as military commitments, through adjusted due dates and grace periods.	Mike shared: <i>I would like to accept the flexibility. I had some students who were the core serving the military. [...] I let them know the due dates for everything. Because they have to be aware this to complete this course with accepted grades. [...] If they let me know in advance, I will make accommodations based on their needs.</i>
Using Monitor System in LMS	Leverage LMS monitoring systems to facilitate learning in asynchronous courses by regularly checking logins and assignment completion to identify inactive students and send check-in emails to prompt engagement.	Liam said: <i>I can go check in D to L. You know what the logins are? If somebody takes three or four days without logging in? I need to be aware of that. I need to send a check in email.</i>
Care and Support Students by Personalized Communication and Reminders	Instructors personally contact students who miss assignments or stay inactive for a while to offer support, understand their circumstances, and provide extensions if needed.	Emma said: <i>I observe certain gaps that they're missing. I will email students and let them know moving forward with our next assignments that they need to keep an eye on certain things.</i>

Table 4.5 Continued

Using Color-Coded Calendar to Visualize and Organize Task Completion	Instructors present the task lists in a visually accessible calendar format by using color-coding to differentiate between recommended and optional tasks and provide clear deadlines for completing the tasks.	Emily said: <i>I just created a little template and color coded. These are the recommended things. These are optional things you should get this thing done in the first whatever four days of the module.</i>
Using Weekly Exit Ticket for Reflective Learning and Progress Monitoring	Two instructors shared two kinds of Exit Ticket. 1. Create a Table in a Google Document. In the table, four columns include the four questions about their learning experiences, emotional and behavioral aspects, and the course's structural context, and the rows are for week numbers, as shown in Figure 4.1 . Each Google Document is only for one student and the instructor for private conversation. Students access it every week and spend several minutes reflecting. Instructors check it regularly and make comments. 2. Create a Google Form survey which includes several questions about students learning and suggestion for the lesson as shown in Figure 4.2 . Instructors share the link with students and encourage them to fill in.	Emily shared the first one: <i>I have a weekly exit ticket, where they're reflecting on their learning experiences every week, and they tell me how their group work is going and what things are going well what things they're frustrated by and that lets me intervene.</i> Robert shared the second type of Exit Ticket: <i>The first question is always about at what point of this week did you feel most engaged in? [...] At what point did they feel distanced? [...] I also asked another question like, what surprised you this week? [...] They don't have to fill out my surveys each week, but when they do that, it helps me see like, oh, I noticed a problem here. Let's try to address it and fix it.</i>
Timely Grading to Encourage On-Time Submissions	Grading timely is a great way to encourage students to submit on time in asynchronous courses. Instructors emphasize that promptly grading assignments and providing immediate feedback signals to students that the instructor is actively engaged and monitoring their progress.	Alice stated: <i>What I found that grading on time is the best way to make sure they submit on time. Because they know the instructor is actively grading and giving immediate feedback. If they delay, they are worried they may get some consequences. If you delay grading, they will definitely delay submitting.</i>

	What was something important I learned this week? Where do I still have questions or need to learn more?	How do I feel about my experiences this week? Why is learning this important to me?	How did my actions help with meeting my learning goals? What should I do differently?	What was helpful about the structure of the course and the way I interacted with others?
Week 1				
Week 2				
Week 3				
Week 4				

Figure 4.1 Google Document Exit Ticket

Exit Ticket

Questions Responses Settings

Email

Short answer text

What's one important thing you learned in class today?

Long answer text

...

Did you feel prepared for today's lesson? Why or why not?

Long answer text

What would help make today's lesson more effective?

Long answer text

Figure 4.2 Google Form Exit Ticket

Strategies for Learner-Instructor Interaction

The data analysis resulted in six themes for learner-instructor interaction: instructors' self-introductory videos, weekly announcements, optional meetings with instructors, responses from instructors, feedback from instructors, and proactive outreach to students.

Instructors' self-introductory videos help establish rapport through personal information and icebreaker activities. Weekly announcements maintain regular communication and set clear expectations. Optional meetings with instructors, such as synchronous sessions and virtual office hours, provide real-time assistance and personalized support. Furthermore, proactive responses from instructors and feedback from instructors play crucial roles. "Responses" here refer to real-time or near-immediate interactions, such as individualized replies to students' introductions, discussion forum participation, and timely email replies. "Feedback" involves detailed evaluations of student work, providing constructive comments and individual video feedback for assignments. Also, Instructors use respectful language in feedback to ensure it is constructive and supportive. Lastly, instructors proactively reach out to students through personalized communication and reminders to demonstrate care and support. These strategies help students feel connected and supported by instructors in asynchronous courses. Detailed information for each strategy is presented in **Table 4.6** Strategies for Learner-Instructor Interaction

Table 4.6 Strategies for Learner-Instructor Interaction

Strategy	Description	Example Evidence
Instructors' Self-Introductory Videos		
Using Introductory Videos and Icebreakers to Connect with Students	Instructors use self-introductory videos to foster personal connections with students and establish an early rapport with students. In the introduction video, include personal anecdotes to appear more relatable and approachable, or incorporate icebreaker activities in the videos to capture students' interest. For example, use activities like "two truths and a lie" as a fun and interactive introduction.	Liam noted: <i>I liked to do a video at the very beginning of the year because I wanted them to have a voice and a face. [...] You've got to have that personal connection.</i> Sophia described: <i>Sometimes we did two truths and a lie. My truths were always just really weird and kept them guessing.</i>
Weekly Announcements		
Maintaining Regular Communication Through Weekly Announcements	Weekly announcements are a way for instructors to communicate with students. These announcements should be sent at the beginning of each module to provide updates on course activities, deadlines, and important information. To set clear expectations, include the announcement schedule in the syllabus. This approach keeps students informed and engaged throughout the course.	Mike said: <i>I will let them know clearly in the syllabus, when I will enact and where I will enact. For example, I usually have prerecorded module introduction. [...] Every Monday I will release my recording in this structure, so they have something they can expect. They will be able to see me talking to them on a constant basis.</i>
Optional Meetings with Instructors		
Optional Synchronous Sessions	Instructors provide optional synchronous sessions with a group of students to address specific concerns among students. Using the optional Zoom meetings help maintain human connection and provide real-time assistance.	Grace stated: <i>I'm going to hold optional meeting. We discuss storyboards and building your design plan. And I had 50% of the class show up. I got to meet the students on Zoom. They were really appreciated. They have really good questions.</i>

Table 4.6 Continued

Appointed Virtual Office Hours	Meet online with individual students for personalized support. Make virtual office hours available by appointment, allowing students to reach out via email or text to set up a time. Provide various ways for students to know when and where the instructors are available, such as posting schedules, using QR codes for calendar access, etc.	Mia shared: <i>I also post up varying levels of office hours, ways to meet with me knowing where I am and when I'm available. I have a QR code that I stick in my class, so at any time, they can jump into my calendar Outlook calendar, and see if I'm available, because I have office hours.</i>
Responses from Instructors		
Individual Responses to Students' Self-Introductions	At the beginning of the course, for student's self-introduction, instructors respond to each student's introduction with personalized comments, expressing enthusiasm about their aspirations and backgrounds to foster a sense of community and individual connection.	Ava stated: <i>In the icebreaker one and the first one where everybody's introducing themselves. I do respond to each one.</i>
Responses to Discussion Forums	Participate in weekly discussions by interacting with students and asking follow-up questions to stimulate deeper thinking and encourage an organic back-and-forth among students.	Laura stated: <i>I try to make sure with the threaded discussions that I have a strong online presence.</i>
Timely Email Responses	Reply to students' email promptly, for example, within 24 to 48 hours, ensuring they felt supported and received necessary assistance without long delays. maintaining timely communication with students. Set expectations for response times from the beginning of the course, helping to build trust and reliability. Also, instructors also communicate any potential delays in advance, such as when they were traveling.	Sarah said: <i>I'll always let students know that whenever they have questions, they can email me and I try to get back to them, I think, within whether it's 24 hours or 48 hours.</i>

Table 4.6 Continued

Responses for the Google Document Weekly Exit Ticket	The Google Document Weekly Exit Ticket presented in Table 4.5 is also for learner-instructor interaction. Instructors check the document weekly and provide comments for each student's reflection throughout the semester.	Emily shared: <i>Students share a lot with me in those exit tickets, and they really enjoy how responsive I am to them, because you know, things can get lost in an email, but I'm going into that exit ticket every week. [...] There's one document that they go to every week, and they can see our conversation happening throughout the whole semester. So, it really that speaks a lot to the teacher immediacy behaviors, and teacher interactions. I really develop a very close relationship with every single one student in the class.</i>
Feedback from Instructors		
Timely Assignment Feedback	Providing quick feedback on assignments helps students feel heard. Most instructors strive to return grades and feedback within a week, and some aim for an even shorter turnaround, such as five days.	Ava said: <i>I do give timely feedback on major assignments and small things like discussion boards. [...] I've responded, and they can see that I'm active in the course and can read sort of my comments, but I also try on the major assignments to give feedback pretty quickly within a week. So that they have that feedback to help them for the next one. It's individualized feedback on their assignments.</i>
Using Respectful Language for Feedback	When writing feedback, especially for the constructive feedback, ensure instructors' feedback is constructive and supportive, avoiding any tone that might be perceived as condescending, using the word such as "we".	Mia stated: <i>Language is language. It is so important to kind of building your learner efficacy. [...] These are the feedback that I'm giving them is so that they can improve. I never want to like to assassinate their character or make them feel bad about themselves or their abilities.</i>

Table 4.6 Continued

Individual Video Feedback	Use tools like ScreenPal and Panopto to create screencasts to provide detailed comments and explanations on each student's assignments, offering both praise and constructive feedback. This method offers students more customized and personal responses, making them feel a closer connection to their instructors. Additionally, instructors allow students to submit reflective pieces in video format and then instructors reciprocate with video responses, often using integrated tools within LMS to streamline the feedback process and provide immediate and personalized responses.	Liam shared: <i>What I do is a screencast, and I'll have my comments on the Microsoft Word. I will go and explain those comments, rather than just leaving a comment. I'll give as much positive praise as I give constructive feedback. [...] In that way. They have that. It's me. It's my voice. It's my sense of humor. So, they get a sense of who I am as a human being.</i> Mike also shared: <i>I'm going to use personal review response, really feedback for their assignments and projects. I'm going to record my feedback. We're using Panopto. [...] I record it and I think it's going to be in the cloud. I don't have to save it, upload it and share. It's very quick and easy way. [...] For students, it is very customized experience so they can get feedback directly from their professor right away. They can hear me. It feels like I am there.</i>
Proactive Outreach to Students		
Care and Support Students by Personalized Communication and Reminders	Care and Support Students by Personalized Communication and Reminders presented in Table 4.5 is also for learner-instructor interaction. Instructors proactively reach out to students when notifying unusual performance changes, by sending emails to create personal and individual communication with students to offer help and show care.	Mia shared: <i>I also spend a lot of time reaching out to students outside of the class. So maybe I've noticed that the student isn't logging in, or maybe I've noticed that the student's work seems different. [...] I immediately reached out. [...] We ended up working it out, but I feel very passionate that my students know that the teacher care about them and their success.</i>

Strategies for Learner-Interface Interaction

Data analysis resulted seven key themes for learner-interface interaction, including streamlining LMS design, strategies for choosing suitable technology tools, tutorials for LMS and new technology tools, trials for new technology tools, interactive platforms and tools, strategies for regulating AI usage, and methods of using AI as an assistant tool.

Streamlining LMS design involves creating a clean, consistent layout, organizing content sequentially, clearly labeling tasks, centralizing resources, and providing overviews and roadmaps. Strategies for choosing suitable technology tools include giving students flexibility in software choice, ensuring accessibility and cost-effectiveness, and choosing user-friendly software. Tutorials for LMS and new technology tools feature video walkthroughs, annotated screenshots, visual guides, optional live sessions, and multiple tutorial formats. Trials for new technology tools focus on hands-on experience with new tools used in asynchronous courses. Instructor also shared several interactive platforms and tools include Nearpod, Genially, Articulate, and Pearson products to enhance engagement. Strategies for regulating AI usage involve establishing AI policies, exploring AI's capabilities through assignments, detecting AI-generated content, and leveraging instructor intuition. Lastly, methods of using AI as an assistant tool encompass brainstorming, debating with AI, critiquing AI-generated work, and using AI as a writing tutor. Detailed information of each strategy for learner-interface interaction is presented in **Table 4.7** Strategies for Learner-Interface Interaction.

Table 4.7 Strategies for Learner-Interface Interaction

Strategy	Description	Example Evidence
Streamlining LMS Design		
Streamlining LMS for Easy Navigation and Accessibility	1. Design a clean, consistent design across all modules. Hide unnecessary features in LMS for the specific course. 2. Design weekly or topic-based modules in a sequential order, allowing students to progress logically from start to finish. 3. Within each module, create clear labels for separation of tasks (e.g., readings, assignments, videos, discussions). 4. Centralize the module resources within each module linking quizzes, assignments, readings, and other resources directly within each module to ensure students do not need to navigate outside. 5. Provide an overview and roadmap for each module to help students understand the structure and requirements.	John said: I try to make it like as easy and streamlined as I can. [...] This is the main page. There's a syllabus and link all the assignments. [...] I did everything in the modules you should not have to go anywhere out on Canvas. Alice said: <i>I try to make it as clean as possible. Because I think it's very overwhelming when there are too many things there. They just go in the roadmap. [...] I try to keep it very structured. So, every week it's the same structure so they know what to look for.</i>
Strategies for Choosing Suitable Technology Tools		
Aligning with Learning Goals with Student-Preferred Software	Give students the flexibility to choose the software and tools they use for assignments, allowing them to align these choices with their professional and academic goals. By offering multiple options for demonstrating knowledge—such as creating videos, writing stories, building models, or designing infographics—students can select methods that best suit their skills and comfort levels. This approach ensures that tools are tailored to specific learning outcomes.	Grace said: The students have the choice in the software that they're going to use. So I think that that's important because then they can align it with their goals and learning their professional goals and their academic goals.

Table 4.7 Continued

Ensuring Accessibility and Cost-Effectiveness	Instructors need to ensure all students can access and use the required software comfortably and without additional costs, using free technologies whenever possible, especially the university-provided resources.	Robert said: <i>Number one, how are they going to be able to access this? And then thinking about what services are available for them. [...] And does it cost money?</i>
User-Friendly Software to Balance Student Stress	Choose user-friendly software that minimizes student stress and avoids tools with a high learning curve unless mastering the software is a course objective. For example, Pearson products are favored as they simplify the learning process with built-in features, reducing the need for extensive setup and navigation. This approach ensures that students can focus on learning without being overwhelmed by difficult software.	Laura said: <i>Make sure that the software or product is ease of use. [...] In the Pearson products, because everything is already built in, I'm having to do is that I'm gonna click and click.</i> Ava said: <i>If it's high learning curve, I try not to use it unless that's a goal of the class.</i>
Tutorials for LMS and New Technology Tools		
Using Video Walkthroughs for Course Navigation and New Software	Use orientation videos at the course's start familiarize students with the LMS. These videos provide step-by-step walkthroughs for course navigation. Similarly, ongoing support videos help with various technologies throughout the semester. For example, use the videos with detailed demonstrations for new software like SPSS. The videos make course navigation and software use more accessible and less stressful for students.	Liam said: <i>I do my syllabus at the beginning of the semester. I do that as a screencast video, and I take them through the course and show them exactly where everything is and where to find it and how to do it.</i> Sarah said: <i>Throughout the semester, they need to explore two or three types of technologies and then I create a video to demonstrate how that technology can be used.</i>

Table 4.7 Continued

Using Screenshots and Annotates	Use tools like Snagit to capture screenshots and add annotations such as circles, arrows, and text to highlight key areas and steps. These annotated screenshots are included in documents that provide step-by-step instructions, making complex processes easier to understand. Additionally, these visual guides are integrated with video demos and tutorials to offer comprehensive support, walking students through the design and navigation of course site and tools to ensure students can access and use course resources with clarity.	Robert shared: <i>I use Snagit a lot. That's a TechSmith tool, which allows you to add, circles and arrows [...] like showing them screenshots of Canvas and how to access something can be incredibly helpful. If you're going to teach, especially software, any kind of class where you have to navigate somewhere. You might have to create some screenshots with annotations on it.</i>
Using Course Site Page for LMS Navigation	Create a "Navigating the Course Site" page to guide users, particularly those unfamiliar with the learning management system (LMS). The page includes large icons and detailed instructions to help students and faculty understand how to use the LMS features. It offers guidance on signing up for groups, tracking progress through indicators of task completion, and using sorting options for organizing course content by due date, alphabetical order, or completion status.	Grace shared: <i>There is a navigating the course site page [...] There are large icons showing what we're talking about. There are some indications where they can assess their completion and then they can see that they have completed two of seven things. If they click that sortable icon that they can change it by due dates or alphabetical order or what they've done or not done.</i>
Providing Optional Live Sessions for Real-Time Support and Software Updates	Offer optional live sessions to provide real-time guidance to students for technology issues. In these sessions, students can share their screens for personalized assistance and address issues that arise from software interface updates, which are challenging to cover in pre-recorded videos. This approach ensures timely support and adaptability to interface changes.	Robert said: <i>This is optional live sessions where they can come and say I'm having a really hard time accessing this remote server. I can share my screen and walk them through it. [...] It's incredibly hard to do a video of a software when it constantly updates because the interface changes.</i>

Table 4.7 Continued

Providing Multiple Formats for Diverse Preferences	Provide multiple tutorial resources in both video and document formats for different student preferences. Videos offer visual and auditory explanations for those who learn best through watching demonstrations, while detailed documents, such as PDFs, provide step-by-step written instructions for those who prefer reading. By offering both formats, the strategy ensures clarity and inclusivity for all students.	Olivia said: <i>It will allow them to go into handouts, videos, anything like that help guide.</i> John said: <i>Some students rather not watch a video and just rather have a document. They'd rather learn it from a video. So, I try to have multiple things there.</i>
Trials for New Technology Tools		
Providing Trials for Practicing New Technology Tools	Providing students with trials of software tools and incorporating low-stakes activities to practice using them. By offering hands-on training and interactive simulations, students can explore and become comfortable with tools like Camtasia and Articulate Storyline before they are used in graded assignments. Practicing to using the necessary technology helps students gain proficiency without pressure.	Mike shared: <i>For all the tools I'm going to use, I'll either give them a chance to try it, or test it. For example, if I want to play to use a Flipgrid, [...] Give them a chance to try it out and get a sense of this tool.</i>
Interactive Platforms and Tools		
Nearpod	Nearpod is an interactive educational platform that offers a versatile range of features, including the ability to embed slides, videos, PDFs, and interactive quizzes within lessons. Students can participate in these activities at their own pace, allowing for self-paced study while still engaging with the same content as their peers. This platform provides an interactive and enjoyable learning experience to students and also allows instructors to assess student participation and understanding.	Emma said: <i>They can do self-paced Nearpod and then they submit it and then I grade their participation through there. [...] I think it's just a combination of a lot of things. Instead of just reading. There's also built in videos in there. And then there's a lot of ways you can interact with that interface. And then at the end, I even announced who's number one in that game for that week.</i>

Table 4.7 Continued

Genially	Genially is a platform for interactive animated content, which can be used to create still, animated, or interactive visuals, such as posters, infographics, quizzes, and presentations. It allows for interactive elements like drag-and-drop activities, which can make the learning experience more dynamic and engaging.	Robert shared: <i>Genially. It's a great tool. It's a tool like Canva, but it can be very interactive. Like you can do a lot of drag and dropping. [...]</i> You've read an edge research textbook, it's dry, right? So, you got to make it come to life.
Articulate	1. Articulate Rise is a web-based authoring tool that enables users to create responsive, interactive e-learning courses which can include multimedia elements like videos, quizzes, and interactive scenarios (Hooley et al., 2021). For example, instructor used Articulate Rise to present content by incorporating audio clips that narrate examples as students scroll through the material and including activities like matching exercises and quizzes. 2. Articulate Storyline is also an e-learning authoring tool that allows users to create interactive, multimedia-rich courses and simulations with customizable features and flexible design options (Donnellan, 2021). For example, instructors use Articulate Storyline to develop scenario-based questions and case studies to make the learning process more enjoyable by presenting it as a fun, mystery-solving activity.	Mia said: <i>In Rise, you can post like a little video and instead of videos, I actually post audios so that they're listening to it as they're scrolling down because I'll post examples. And then in the audio clip, I narrate the examples. And there's opportunities for matching activities and quizzes.</i> Mike said: <i>I just use Articulate Story to create a learning process. So that feels like it's fun for them to learn and solve a mystery.</i>

Table 4.7 Continued

Pearson	Pearson is an educational platform offering a range of digital learning tools, textbooks, and resources for students and educators to enhance their learning experience across various subjects and levels. For example, instructors use one of the Pearson products, such as MyLab to facilitate learner-content interaction. The instructors utilize digital textbooks and integrated software for simulations, computer-based exercises, and assessments. These platforms provide automated feedback and allow multiple attempts for students to improve their work.	Olivia said: <i>We use MyLab which is a Pearson product. It has computer simulations in it and hands on assessments. For the simulations, they watch a video on how to do it. They can practice and use it. Once they've done all of the steps in the simulation, there's a take home project, where they apply their learning by doing the hands-on assignment. Then it's uploaded to the system. The system provides the feedback. It shows them exactly where they have struggled and where to improve on that assignment.</i>
Strategies for Regulating AI Usage		
Establishing AI Usage Policies in Syllabus	Include AI usage statements in syllabi to set upfront expectations. For example: 1. Require students to show their AI prompts, outputs, and indicate where AI-generated content has been used to ensure transparency. 2. Allow AI for brainstorming purposes but prohibit its use for creating final content. 3. Ensuring AI aids in time-saving tasks without compromising essential learning objectives, such as problem-solving skills. 4. Encourage students to think about their own value to avoid over-reliance on AI.	Mia stated: <i>They're transparent about what they did. And that transparency can look like they can screenshot me what their prompt was. They can screenshot me what their output was, they can highlight in the sections of their writing where they kind of copied and paste or used the AI responses as a product. I am very transparent that AI is not all knowing or omniscient, that it can be wrong, it can hallucinate. [...] I encourage them to understand that they have their value and that they should not sell their value to AI.</i>

Table 4.7 Continued

Learning AI's Capabilities and Limitations Through Hands-on Assignments	Task students to complete an entire assignment using AI and compare AI-generated work with their own. The assignment is followed by a discussion, fostering debates about this experience and AI's capabilities and limitations. By engaging in this process, students develop a critical understanding of how to use AI effectively and recognize its shortcomings. This hands-on experience could also be used to prepare future teachers to integrate AI in ways that enhance their students' educational outcomes.	Liam shared: <i>I have my students complete an entire assignment only using AI. The reason I have them do this is I want them to see the capabilities of AI and limitations of it. And I also want them to see how different that is than what they would have done so that they're able to spot it. They're also able to know how to use it effectively.</i>
Instructor's Detection	Instructors can detect if students use AI. 1. Instructors begin by familiarizing themselves with each student's writing style through introductory icebreaker activities. This allows them to recognize discrepancies in later submissions. 2. Relying on instructors' years of teaching experience and intuition, they are able to sense when a piece is not written by students. 3. Experiment with generative AI themselves, instructors gain insights into the typical output, helping them identify AI-generated content.	Emma said: <i>When they introduce each other, [...] they're writing paragraphs are so different style. Then they submit to me a paper that's written by AI, I can tell right away.</i> Mia said: <i>I'll say, listen, guys, I have taught writing for over a decade. There are just certain things that I cannot explain that fill in my soul when I read something that you have turned in. [...] I see that you've used an exaggeratedly high amount of adjectives.</i>
Methods of Using AI as an Assistant Tool		
Brainstorming	Use of AI as a brainstorming tool to help students overcome initial challenges, generate ideas, and get motivation. Instructors can teach students the art of prompting, ensuring they make specific and relevant queries to get useful results.	Robert shared: <i>You got to be very specific. I require that they find articles published within five years. When they're prompting, they need to make sure they tell the AI find articles related to these variables published within five years.</i>

Table 4.7 Continued

Debating with ChatGPT	Using generative AI for debate activities to address the challenges of coordinating schedules, especially across different time zones. By having students debate with AI, such as ChatGPT, the activity becomes more flexible and accessible which ensures all students can participate.	Mike said: <i>There's no time they can work synchronously. So, I asked them to debate with ChatGPT in this case, it's very fun activity.</i>
Critique AI-Generated Work	There are two ways of critiquing AI work. 1. Compare and Critique: Assign students to complete a task both independently and using ChatGPT or another AI tool, then compare and critique the two versions. For example, students write a lesson plan and then ask AI to write a lesson plan used on the same requirements. 2. Critique: Assign students to complete a task using an AI tool like ChatGPT and then critically evaluate the AI-generated output. For example, in lesson planning, students assess the AI-generated plan for its adherence to teaching standards, relevance of activities, and clarity of objectives.	Alice said: <i>I'm planning for them to do a lesson plan by themselves and then use ChatGPT and then compare the two and talk about it. I think I give them assignments in which they literally cannot use ChatGPT.</i> Emily shared: <i>They don't write the lesson plan. They have to have AI generate the lesson plan. And then they have to critique the lesson plan and tell how it means that the teaching standards and how it meets the content standards.</i>
Using AI as a Writing Tutor	Encourage students to use AI tools as writing tutors. For example, students can use AI like ChatGPT and Grammarly to improve grammar and refine writing while maintaining original content. Students can use AI to rewrite survey questions for clarity and suitability for the target audience. In instructional design courses, AI is used to enhance the provided content, making it more interactive and presentable.	Emma said: <i>I tell them to copy and paste that to GPT and prompt it to improve the grammar.</i> Grace said: <i>Sometimes I would suggest in my feedback. You might be able to brief up the incorrect responses with AI, it might help you. [...]</i> <i>We do a lot of use as a coach writing coach.</i>

Strategies for Learner-Learner Interaction

The data analysis resulted in seven themes for learner-learner interaction, which include students' self-introductions, building an online community, group discussions, interactive group work, peer feedback, group formation strategy, and balancing shared responsibilities in group work.

Students' self-introductions help establish rapport through fun topics, video introductions, creative slide introductions, and diverse multimedia submission options. Building an online community involves using collaborative online virtual bulletin boards like Padlet and discussion platforms such as Inscribe, Yellowdig, Microsoft Teams, and GroupMe. Group discussions include structured discussion prompts to enhance peer interaction, using video responses, and helping each other in Q&A forums. Interactive group work encompasses group projects and structured asynchronous group debates. Peer feedback strategies include providing feedback for each other's work and whole-class assignments in open discussion forums. Group formation strategy focuses on forming groups based on shared interests or study habits to ensure effective collaboration as well as using small and consistent groups for focused discussions. Balancing shared responsibilities in group work involves assigning specific group roles, establishing group norms at the beginning, implementing peer evaluation, and monitoring group work through Google Drive. These comprehensive strategies foster a supportive and interactive online learning environment, helping students feel connected with peers in asynchronous learning settings. The detailed information for each strategy is presented in **Table 4.8** Strategies for Learner-Learner Interaction.

Table 4.8 Strategies for Learner-Learner Interaction

Strategy	Description	Example Evidence
Students Self-Introductions		
Establishing Rapport Through Fun Topics	Instructors encourage students to share pictures of their pets, discuss their hobbies, or talk about favorite places and memories. For example, students might share their favorite instructional design book or take a quiz to determine their Harry Potter house. Additionally, encourage international students to introduce the correct pronunciation of students' names and their meanings, promoting inclusivity and personal connection. These prompts help break the ice and create a comfortable environment for students to interact.	Alice said: <i>I usually give them a few prompts like share a picture of your pet or talk about some of your hobbies. That's really helpful. The best thing is especially useful in the US because people love animals here. People like to share their pets and cat. It helps bond with each other.</i>
Using Video Introduction	Encourage students to upload videos for self-introduction, often using tools like Flipgrid, to share their backgrounds or expectations for the class. Despite the time commitment required to watch videos, the visual element enhances the sense of connection by putting faces to names, creating a more personable learning environment.	Sarah shared: <i>For self-introduction, I ask students to post in a discussion forum by using Flipgrid to record the video.</i> Alice said: <i>But I think it's nice to have the video element to it because it's nice to put a face to a name.</i>
Using Creative Slide Introductions	Setting up a shared document where each student creates a slide to introduce themselves. Students share their professional background, their place in the program, goals for the course, and personal interests. Students can design their own slides by choosing different background colors, patterns, styles, and fonts. This visual approach provides insight into each student's personality and design preferences.	Grace shared: I set up a shared document with slides and have each student build a slide to introduce themselves. [...] But when they build a slide, I see immediately that they all see some of the aesthetic design sensibilities, [...] and now I get a feeling of whom I'm working with.

Table 4.8 Continued

Offering Diverse Multimedia Submission Options	Students can choose to submit written text, infographics, videos, or pictures, allowing them to express themselves creatively and comfortably. For example, students can use Padlet which allows for location sharing, Canva for infographics, and LMS integrated video tools for video submissions, to foster an inclusive and dynamic environment.	Robert stated: <i>I give them an option of submission options. They can do a written text; they can create what's called an infographic. They can also create a video for their posts. And I adopt an incentivization model where if they do certain things like that, they can get rewards.</i>
Building Online Community		
Using Collaborative Discussion and Message Platforms	There are various platforms that students could use to communicate online collaboratively. 1. Inscribe is a platform that could be utilized at the program level to facilitate communication among all students within a program, rather than being limited to a single class. It allows students to create their own questions and respond others' questions. It is accessible only to enrolled students to ensure secure data. 2. Yellowdig functions as an online discussion tool that integrates with LMS. It encourages student interaction through features similar to social media platforms, such as upvoting, tagging, and multimedia sharing. It is for facilitating discussions, peer-to-peer learning, and community building among students. 3. Microsoft Teams is another collaborative platform that can be integrated into LMS. Use Microsoft Teams for creating dedicated channels for various purposes. Instructors can be the moderator in some channels. Student can create their own channels to share experiences and build community.	Mike shared: <i>I have Inscribe for the whole program. So maybe for any students in the program will be able to communicate. Therefore, the benefit of Inscribe is that you can ask them to create their own question. You can, you can still moderate, but you don't have to, and the data is very secure. It is only going to be internal for the students enrolled in the program. I feel like that is very beneficial for students who are creating a building community. [...] Yellowdig is a discussion board. It's very interactive. So it's very like fun activity you can do. But it is still a discussion board type. [...] The example I love to do is I've made everyone access Microsoft products. I create a team's channel for each of us. So, then for some of the channels. I'll be the moderator. If they have a question, which is for learner-learner interaction, I asked them to create a channel in which they can share and get kind of sense of community.</i>

Table 4.8 Continued

	4. Use GroupMe for facilitating group interactions and project coordination among students. Although not required, many students use GroupMe to connect and share updates.	Laura said: <i>GroupMe is also a big one because folks have a the group where they get together.</i>
Using Collaborative Online Virtual Bulletin Board	Padlet is a versatile and collaborative platform that allows students to express themselves through various formats such as memes, GIFs, videos, and text. Its collaborative features enable students to post and interact on a shared digital canvas, fostering a sense of community and encouraging peer-to-peer interaction. The use of Padlet's grid or wall layout makes it easy to view and respond to posts, enhancing the flow of discussion.	Alice shared: <i>You can have a meme or a GIF or just something that kind of adds personality to what you're thinking. I think that helps students express themselves. And I think that makes it more interesting for the peers to get to know each other. I have seen better engagement. [...] You can have them as widgets. You can add one screen. You can see different posts. So, you don't have to scroll too much and that also makes the interaction more consistent.</i>
Group Discussions		
Structured Discussion Prompts to Enhance Peer Interaction and Learning	Give students clear and focused prompts to discuss, such as. Require students to review and comment on each other's work, but also create opportunities for students to relate course content to their own contexts and experiences, which can lead to more natural and organic discussions. For example, ask students analyze bad data visualization and suggest improvements; and ask students to discuss their reflections on their experiences and the choices they made in their projects, encouraging them to share insights and learn from each other.	John said: <i>I give you a prompt and everybody responds to it, and you have to respond to somebody else's. [...] I give an example of a bad data visualization, and I have everybody tell me why this is bad. Can you make a better one and then everybody kind of has a big discussion. Everybody has lots of things to say about it. And then people try to post a better way of presenting it.</i>

Table 4.8 Continued

Using Video Responses in Discussions	Instructors provide clear instructions on using the video hosting platform, such as Panopto, to record and upload responses directly to the cloud, ensuring simplicity and integration into course artifacts. Establishing this expectation at the beginning of the course, with instructors leading by example through video responses for introductory posts, sets a norm that encourages student participation.	Grace said: <i>Every discussion, they are encouraged to use a video response. [...] I will say that it tends to be a norm that set at the beginning of the class. If the instructor responds with video to like, intro post quickly, it kind of sets a norm and more students will use it. The students do default as much as they see.</i>
Students Help Each Other in the Q&A Discussion Forums	Have an open Q&A discussion forum in LMS and encourage students to ask questions and help each other there.	Ava mentioned: <i>I also do have Q&A discussion boards for each module. But they have a record of it and they can go back to it and they're all responsible.</i>
Interactive Group Work		
Group Projects	Integrate group projects that require students to collaborate on advanced topics or real-world scenarios, such as presenting on a specialized subject or conducting a statistical consulting project. When doing group projects, students can use shared group study notes to help prepare their projects.	Sophia said: <i>I'd like to pull up more engagement. So sometimes you're given a case study and you're actually working with a partner or a small group. [...] They each take a different case study and then they're presenting back to other peers about whatever they found in that case study.</i>
Structured Asynchronous Group Debate	The structured asynchronous group debate presented in the row of critical thinking assignment in Table 4.5 also facilitates learner-learner interaction. Students first need to actively interact with their group members to prepare for the debate. Then, in the discussion debate forum, the students have a real argument conversation for exchanging ideas and evidence to support their positions. This interactive process promotes meaningful communication among students.	Alice shared: <i>It's basically in debate format, but it's enough if they have like two weeks or 10 days of preparation. [...] So, they start working with their teammates and the structure of the debate is that each person has to speak or has to prepare something. I usually have four or five people per team. And the debate is structured. It goes back and forth between a topic.</i>

Table 4.8 Continued

Peer Feedback		
Students Provide Peer Feedback for Each Other's Work	Students provide peer feedback on each other's work by first completing initial drafts of their assignments. They then submit drafts to a peer, who uses a rubric to evaluate and give feedback. This process can be conducted asynchronously or synchronously, depending on students' preferences. After receiving constructive feedback, students revise their drafts before submitting the final version to the instructor.	Emily said: <i>Before they submit anything to me, they have to submit it to their peer who uses the rubric to give them feedback on their work, and they have asynchronous or synchronous. They can choose to meet together discussing about their work and critique each other before they submit, make revisions and submit to me.</i>
Students Provide Peer Feedback on Whole Class Assignments in Open Discussion Forums	Students post various parts of their essays or projects, such as research topics, sources, literature reviews, and essay components, on an open discussion forum instead of submitting them directly to the instructor. Peers then review and critique each other's work, providing constructive feedback and learning from one another's approaches. Students then revise their work and gain insights from their peers' progress by continuous interactions.	Emma stated: <i>I have them put it in the discussion board so that they can see each other's research paper and how they're progressing. For instance, the first assignment is the research topic. They share with each other their research topic [...] and then a literature review. [...] Instead of submitting those, they put it in the discussion board. They critique each other and see how others' research papers are evolving.</i>
Group Formation Strategy		
Forming Groups Based on Shared Interests for Effective Collaboration	Students form groups organically based on their interests by signing up for topics on a Google shared document. Once the groups are formed, students are notified of their teammates and encouraged to reach out to them. The group projects are designed to be relevant to the students' passions, ensuring that the projects align with individual interests.	Alice said: <i>The groups are made organically based on their interest in a certain topic, so they just have to sign up for what they are interested in on a Google spreadsheet.</i> Emily said: <i>I think that's a really important component of effective group work is that we all have a passion for this thing.</i>

Table 4.8 Continued

Forming Groups Based on Study Habits for Balanced Collaboration	Instructors distribute a survey in the first week of class to understand students' study habits and working styles, such as starting tasks immediately, working steadily over time, or completing work last-minute. Students are then grouped based on these preferences to ensure similar working habits within groups, reducing conflicts and anxiety. For last-minute workers, additional instructor support is provided through regular check-ins and nudges to ensure timely progress.	Emily explained: <i>That really clears up a lot of conflict within groups because a lot of times the group conflict arises from one person who is so anxious that they've started and they're not hearing from anyone. On the flip side, that person who hasn't responded to their group is just feeling so guilty of everything they should have been committing.</i> Robert explained: <i>I have early birds and weekend warriors. Early birds are people who like to work on the course a little bit earlier in the week. Then we have the ones that drudge through the weekend to get the work done. I think that helps incredibly for balancing groups.</i>
Using Small and Consistent Groups for Focused Discussions	Divide the class into small groups, ensuring they interact weekly throughout the semester. Groups can be reorganized mid-semester to provide fresh perspectives. Small groups aim to make the discussions more manageable and prevent students from feeling overwhelmed by numerous posts.	Alice said: <i>Let's say you're a graduate student, and there is a discussion every single week. Then based groups are helpful because they don't have to get overwhelmed by all the posts. They'll just be interacting with a close group of five students. And you can change the group in the middle of the semester.</i>
Balancing Shared Responsibilities in Group Work		
Assigning Specific Group Roles	Instructors could provide clear examples and guidelines for dividing tasks or assign specific roles like project manager, note-taker, script reviewer, and tech coordinator, allowing students to choose or define their roles. Then require group members updates on	Mia stated: <i>Within each group, I want them to tell me explicitly what it is that they're going to contribute or how maybe they're the project manager, maybe they're the recorder like note</i>

Table 4.8 Continued

	progress weekly through shared documents or discussion boards. Allow groups to elect a leader to coordinate tasks, set deadlines, and manage final submissions. Instructors can monitor progress, provide feedback, and offer support to keep groups on track.	<i>taker, maybe they're the tech person that's going to set up everything. I've required them to tell me how they're going to operate in that group. And I give them a list of roles and also the option to pick their own role if it's not covered in my list of roles.</i>
Establishing Group Norms at the Beginning	At the start of a project or the semester, students create and submit a group contract or memorandum of understanding, detailing task assignments, deadlines, roles, and contact methods. Students commit to their responsibilities by signing the contract. The instructor keeps a copy of the contract for reference and monitors progress, providing guidance as needed while encouraging independent conflict resolution.	Ava said: <i>At the beginning of the group project, I do have them submit a memorandum of understanding and they all have to do by typing their names on it and the date. They go through it together as a group and fill out who's doing what tasks.</i>
Implementing Peer Evaluation	At the project's end, each member of the group fills out a feedback form rating themselves and their peers, providing reflections on contributions. Or throughout the project, iterative peer evaluations are conducted to help identify issues early, encouraging students to report problems promptly. Honest peer evaluation promotes effective collaboration and accountability in group projects.	John shared: <i>Then at the end of the project, they always have a group member feedback form where I ask each person in the group individually fills out this form. [...] You give everybody a score out of 100 and give yourself a score. Then tell me about what each person did on the project.</i>
Monitoring Group Work through Google Drive	Instructors create work templates in Google Drive and place them in shared folders, allowing instructors to maintain ownership and monitor contributions and participation through revision history to ensure organized, transparent, and efficient group work.	Alice said: <i>I create all of the templates in Google Drive, so that I'm the owner of the documents, and then I put it in a shared folder for each group. And that way, any work that they do, [...] I can go in and comment, and I could see revision history, I can see who's contributing what.</i>

More Strategies for Designing Asynchronous Courses

In addition to inquiring about strategies for facilitating the four types of interactions in asynchronous courses, instructors were asked at the end of the interview to share any other strategies for designing these courses based on their experience. The strategies highlighted by the instructors can be categorized as follows: fostering learner-self interaction and metacognition, ensuring instructor commitment, utilizing the ADDIE model, and collaborating on instructional design, understanding student needs, adapting, and updating courses, and ensuring quality. These strategies are elaborated below.

Fostering Learner-Self Interaction and Metacognition

Laura and Grace recommended considering learner-self interaction when designing asynchronous courses. Laura expressed:

I have kind of put interaction with self. [...] I would let them know that, particularly with these online courses, you are really going to be teaching yourself and it takes a lot of discipline.

Grace said:

I'd like the learner-self interaction which include that metacognition in design work. It's critical because we want to focus on the process. So it's important to bring those reflections in the self.

For learner-self interaction, Grace highlighted the importance of encouraging students to engage in self-reflection and metacognitive practices. She incorporated opportunities for reflection throughout the course to help students process their learning experiences. She said:

I make sure every course has an opportunity for it. Hopefully at multiple stages, but particularly at the end for a reflection. My favorite reflection is Ed utopias, 40 reflection questions, because it asks students to look inward, outward, backward, and forward. I tend to pick two or three questions from each category and ask them to choose one and respond to that. They're looking: how did I do compared to others? How do others look at this work? What do I want to do next time? What surprised me or What didn't I have when I started that kind of thing? I think it's important for them to process it for themselves.

These reflections foster learner-self interaction and enhance metacognition by helping students develop critical thinking skills, improve self-awareness, and build greater independence and confidence for successful self-directed learning in an asynchronous environment.

Ensuring Instructor Commitment

Mia emphasized the importance of instructors' commitment to teaching asynchronous courses. She stated:

I should say is to make sure the instructor wants to teach the asynchronous course. Because if the instructor is not on board and a believer and supporter of asynchronous learning, then that's going to filter into each of these interaction points. [...] So, I think having people teach asynchronous classes have made an intentional decision to teach class in that modality is essential.

This intentionality ensures that the instructor's positive attitude towards the modality permeates the learning experience. Instructors' dedication is evident in the content,

assignments, and engagement opportunities they provide, which significantly impacts students' learning experiences and outcomes.

Using ADDIE Model and Instructional Design Collaboration

Mike suggested designing courses using the ADDIE model and also embracing collaboration with instructional designers for help. He said:

Make sure you design your courses to match the ADDIE model criteria. [...]

Don't be afraid of working with instructional designer and because they're good.

This approach ensures that courses are systematically planned and developed with a focus on effective learning outcomes. By working with instructional designers, instructors can leverage specialized expertise to create well-structured and engaging course content, enhancing the instructional quality.

Understanding Student Needs

Robert highlighted the importance of knowing your students when designing asynchronous courses. He emphasized that understanding whether students are adult learners or traditional undergraduates impacts course design. Adult learners need flexibility and sensitivity due to their multiple responsibilities. In contrast, traditional undergraduates, especially those new to asynchronous learning, require more guidance and support. He said:

I would say number one is know your audience teaching asynchronous. [...] I think it's just knowing your audience and considering those factors and how you design really kind of depends on where they're coming from.

The insights underscore that the design of an asynchronous course should be tailored to the specific needs and backgrounds of the learners to ensure effective engagement and learning outcomes.

Adapting and Updating Courses

Mike emphasized that adapting course content based on student feedback and staying current with new developments are essential practices. He said:

Learn from your students and modify content if necessary and try to keep up to date. And that means if something's new, you better change. You're not going to use the courses you taught five years ago to teach the current students because they're different.

Thus, instructors should be open to modifying their courses to better suit the evolving needs of their students, thereby enhancing the learning experience.

Ensuring Quality

Olivia suggested using the Quality Matters rubric to ensure that the designed asynchronous courses meet established standards of quality. She shared:

Quality Matters is a peer reviewed, internationally recognized peer review rubric that assesses the effective designer online courses.

This approach provides a reliable framework for evaluating and enhancing the quality of course content and delivery, helping instructors design high-quality asynchronous courses that support student learning outcome.

In conclusion, this chapter summarizes the key findings from the pilot and dissertation surveys, along with insights from interviews with experienced instructors. The survey results showed that interactions with course content have the strongest impact

on student satisfaction. Additionally, students' qualitative feedback highlighted both the strengths and challenges of asynchronous learning, emphasizing the importance of content quality, instructor support, and peer interactions. The interview results further enriched the understanding of effective strategies for facilitating these interactions, offering practical insights for designing and implementing successful asynchronous courses. Overall, these results contribute to a deeper understanding of how to enhance student engagement and satisfaction in asynchronous learning environments, providing valuable guidance for educators in higher education.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

This chapter discusses the interpretations of the results regarding students' perspectives on interactions in asynchronous courses and the strategies instructors use to facilitate each type of interaction. Following this, the chapter addresses implication, the limitations of the research, offers suggestions for future studies, and conclusion.

Students' Perspectives

The survey part for this dissertation research aimed to explore students' satisfaction with asynchronous courses. Specifically, the survey addressed the first two research questions:

RQ1: What is the relationship between students' general satisfaction and four types of interactions: learner-learner, learner-content, learner-instructor, and learner-interface interactions?

RQ2: How do students rank the importance of the four types of interactions?

The pilot study provided valuable insights but was limited by a small sample size, which may affect the generalizability of the findings (Yang & Romero-Hall, 2024). In contrast, the dissertation survey involved a total of 378 participants, which was determined to be an appropriate sample size. According to the survey data collection section, using Cochran's formula with a 95% confidence level and a 5% margin of error (Cochran, 1977), the required sample size for a population of 11,402 was approximately 372. Therefore, having 378 participants ensures that the results are generalizable to the broader population. Consequently, the interpretation of the results relies more heavily on

the dissertation survey findings, as they provide a more robust and reliable data set compared to the pilot study.

This section presents the interpretations of the key findings which include relationship between students' satisfaction and interaction types, rank of importance of interactions and students' qualitative insights.

Relationship Between Students' Satisfaction and Interaction Types

Learner-Content interaction emerged as the most influential factor in determining General Satisfaction, as evidenced by its highest correlation coefficient of .75 and the strongest standardized coefficient (β) of .39 in the multiple regression analysis. With a significant t -value of 8.72, this interaction type had a substantial impact on student satisfaction. This is also evidenced in the results of correlation in the pilot study for learner-content interaction was $r = .66$ (Yang & Romero-Hall, 2024). This indicates that students' engagement with the course content, through access to clear, organized, and relevant materials, plays a critical role in their overall satisfaction. This finding aligns with existing literature that emphasizes the importance of intentionally designing and implementing learner-content interactions to enhance the overall effectiveness of online instruction and meet students' needs (Lanier et al., 2022). Additionally, studies have shown that interactive and multimedia-rich content can significantly improve the learning experience and satisfaction in online education (Davis & Frederick, 2020).

Learner-Interface interaction, with a correlation of $r = .68$ and a standardized coefficient $\beta = .21$, was another important predictor of General Satisfaction. The t -value of 4.77 indicates a strong, significant relationship between this interaction type and student satisfaction. The results of the pilot study partially support it with a correlation of

$r = .48$ and a standardized coefficient $\beta = .22$. This suggests that the usability and quality of the technological interface are important factors influencing students' overall satisfaction. This finding aligns with previous studies, which have noted that a well-designed and reliable technological infrastructure is crucial for the success of online courses (Liu et al., 2020; Sofi-Karim et al., 2023). A well-designed, intuitive interface facilitates ease of navigation, accessibility, and interaction with course materials and activities (Tang et al., 2022), thereby enhancing the learning experience and contributing positively to students' satisfaction levels.

Although Learner-Learner interaction had a lower correlation with General Satisfaction at .63, it still played a notable role in influencing satisfaction, as shown by a standardized coefficient (β) of .22 and a significant t -value of 5.66 in the regression analysis. The results in the pilot study with a strong positive correlation ($r = .75, p < .01$) also evidence its importance. These findings suggest that peer interactions may not be as crucial as content interaction in determining overall satisfaction. However, the peer interactions, such as discussions, collaborations, and group activities which are important for fostering a supportive and engaging learning environment (Liu et al., 2022), contributing positively to their overall satisfaction with asynchronous courses. Positive interactions among peers contribute to a sense of community, which is crucial for student satisfaction. When students feel connected to their peers, they are more likely to report higher levels of satisfaction with their online learning experience (Katsarou & Chatzipanagiotou, 2021; Landrum et al., 2021).

Learner-instructor interaction showed a positive but relatively weaker correlation with general satisfaction with $r = .64$. The smallest standardized coefficient $\beta = .16$ in the

regression analysis, with a t -value of 4.02, indicated it may not be a major predictor of general satisfaction. Also, in the pilot study, this interaction was not significantly correlated with general satisfaction with $r = .36, p > 0.05$. These findings indicate that while fostering positive learner-instructor interactions is beneficial, it may not be the primary driver of satisfaction in asynchronous courses. The nature of asynchronous communication, which may involve delayed responses, and reduce the immediacy and spontaneity of interactions, potentially limiting their impact on student satisfaction (O'Neill, 2021). Furthermore, other elements, such as course content quality, interface and the overall learning environment, might play a more significant role in shaping student experiences.

Rank of Importance of Interactions

The ranking of interaction types in asynchronous courses reveals key priorities for students. First, Learner-Content interaction emerges as the most critical, which aligns the results of correlation and multiple regression analysis. This underscores the fundamental role that course materials play in the learning experience. Students primarily seek valuable learning content that can facilitate their understanding and knowledge acquisition. Second, Learner-Instructor interaction follows closely, highlighting the value of instructor guidance and feedback. The significant number of responses rating this interaction as “very important” underscores its role. This suggests that students appreciate interactions with instructors, including essential guidance, feedback, motivation, clarification of concepts, and personalized support, which contribute to creating a supportive learning environment that fosters student participation and engagement (Getzlaf et al., 2009; O'Neill, 2021). Third, Learner-Interface interaction, though ranked

third, is still considered important. While students do not consider it as vital as content or instructor interaction, a user-friendly interface contributes to a more accessible and seamless learning experience, as a clear organization within the course platform and tutorials for new technological tools can reduce cognitive load and allow students to focus more on learning rather than on technical challenges (Clark & Mayer, 2023; Skulmowski & Xu, 2022). Fourth, Learner-Learner interaction is rated the least important, suggesting that peer interactions are less prioritized in the context of asynchronous learning. One possible explanation for this could be the inherent nature of asynchronous courses, where flexibility and individual learning pace are key features. As such, students may prioritize content and instructor interactions over peer interactions, which might not be as easily coordinated in an asynchronous format. The flexibility inherent in asynchronous courses allows students to focus more independently on their studies, potentially reducing the reliance on collaborative activities with peers (Fabriz et al., 2021; Nguyen et al., 2021).

In sum, the results from the correlation and regression analyses, along with the ranking of the four types of interactions in asynchronous courses, indicate that Learner-Content interaction is the most critical factor in determining student satisfaction. It consistently emerges as the strongest predictor of overall satisfaction. This finding emphasizes the need for well-structured, interactive materials to optimize the asynchronous learning experience. Furthermore, interactions with the instructor, interface and peers also play important roles in shaping the overall asynchronous learning experience.

Students' Qualitative Insights

The qualitative comments provided nuanced insights into the students' experiences. Positive comments highlighted the flexibility and convenience of asynchronous learning, high-quality content, and supportive instructors. These aspects resonate with the quantitative findings, particularly regarding the importance of content and instructor support. Conversely, negative comments pointed to challenges such as poor communication with instructors, lack of peer interaction, and technical issues. These comments suggest that, despite quantitative results indicating that interaction with instructors, peers, and the interface is not as important as content, students still value effective communication with instructor and peers and a reliable technology infrastructure in asynchronous courses. The neutral comments reflect a more nuanced view, indicating that the success of asynchronous learning heavily depends on various factors, such as the quality of instructors' instruction, the nature of subjects, and personal preferences.

Based on the qualitative insights, it is clear that students appreciate the flexibility of asynchronous courses. They value high-quality and well-organized course content, effective communication with instructors and peers, and reliable technology. These elements significantly influence their overall learning experience and satisfaction.

Instructors' Design Strategies

The interview part for this dissertation research aimed to explore the design and teaching strategies of experienced asynchronous course instructors for facilitating the four types of interactions in asynchronous courses. Specifically, the interview addressed the third research question for this dissertation:

RQ3: What strategies do instructors use to facilitate student-student interactions, student-instructor interactions, student-content interactions, and student-technology interactions in asynchronous course?

This section discusses the strategies for each type of interaction identified through the interviews and contextualizes them within the framework of existing literature.

Strategies for Learner-Content Interaction

Based on the strategies identified for enhancing learner-content interaction, six key themes emerged: Instructional Videos, Assignments, Assessments, Feedback from Instructors, Guided Learning Paths, and Tracking and Ensuring Student Learning Progress. These themes represent a diverse range of approaches designed to improve learner engagement with the content, support varied learning needs, and enhance educational outcomes in asynchronous courses.

Instructional Videos

Instructional recorded videos served as a primary means of content delivery, aligning with the need for flexibility and accessibility in asynchronous learning environments. These videos provide learners with the opportunity to engage with course material at their own pace, accommodating different learning styles and schedules (Amiti, 2020; Choe et al., 2019; Perveen, 2016). The use of interactive elements within videos, such as embedded questions and reflective prompts, aligns with the instructional approach of active learning. These interactive elements encourage learners to actively participate in the learning process, facilitating deeper understanding and retention of the material by prompting students to reflect and respond (Bodily et al., 2017; Hung & Chen, 2018). Analytical and explanatory videos are also crucial in asynchronous courses,

especially for students' nuanced understanding, as they allow instructors to break down complex concepts into more manageable parts. These videos can provide detailed explanations, demonstrations, or illustrate intricate processes, thereby enhancing students' comprehension of the course content (Belt & Lowenthal, 2021). The preference for short, direct instructional videos aligns with cognitive load theory, which posits that the human brain has a limited capacity for processing new information (Sweller, 2010). By keeping videos concise and focused, educators can reduce extraneous cognitive load, allowing learners to allocate more cognitive resources to understanding the core content (Sweller, 2010). Also, it aligns with the Redundancy Principle and the Modality Principle of Mayer's Principles of Multimedia Learning which focus on reducing cognitive overload and enhancing retention by presenting information in a way that aligns with how the human mind processes information (Mayer, 2002).

Assignments

The assignments designed by the instructors in asynchronous higher education courses are to promote practical application, critical thinking, and personal engagement. The application-based and problem-solving assignments encourage students to engage with real-world scenarios, requiring them to apply theoretical knowledge to practical situations. Such experiential learning aligns with experiential learning theories, which stress the importance of authentic tasks in education (Kolb et al., 2014). Another critical aspect highlighted is the emphasis on developing critical thinking skills through various assignment types. Structured debates, reflective questions, and analytical exercises are employed to encourage students to delve deeper into the content. These activities not only foster cognitive engagement but also promote the development of essential skills such as

reasoning, analysis, and evaluation, which align with the higher level of Bloom's Taxonomy (Krathwohl, 2002). These activities also align with the Community of Inquiry framework, which emphasizes cognitive presence as vital for meaningful online learning (Garrison et al., 2010). The inclusion of personal passion assignments allows students to explore topics of interest within a structured homework, enhancing intrinsic motivation and encouraging students to take ownership of their learning, thereby increasing their motivation to engage with the material (Williams & Williams, 2011). The careful design of assignments to be inclusive and reflective of diverse student backgrounds is essential as it ensures that all students feel represented and become more relevant and relatable, so as to increase students' motivation to engage with the content.

Assessments

There were various assessment strategies employed by the instructors to enhance learning and support student growth in asynchronous courses. Low-stakes quizzes serve as frequent knowledge checks, reducing the pressure of high-stakes assessments and supporting ongoing engagement (Kenney & Bailey, 2021; Sotola & Crede, 2021). The use of formative assessments, coupled with opportunities for revision, encourages a growth mindset among students and fosters an environment where mistakes are viewed as part of the learning process. By allowing multiple attempts on quizzes and assignments and offering detailed feedback, instructors encourage continuous improvement and deeper understanding. This approach not only motivates students to engage actively with the material but also emphasizes the importance of learning and understanding, rather than focusing solely on grades (McMorran et al., 2017). The combination of pretest and posttest is crucial for self-directed learning and helps students take ownership of their

educational development. Pretests enable students to identify their strengths and areas for improvement at the course's outset so as to increase students' attentional processing during the learning process (Soderstrom & Bjork, 2023) and posttests help students reflect on their learning journey at its conclusion. Overall, these assessment strategies collectively enhance student engagement, promote a growth mindset, and emphasize learning and understanding, thereby supporting continuous improvement and self-directed learning in asynchronous courses.

Substantive Feedback from Instructors

Feedback is an important strategy that most instructors use to promote students' learning of content in asynchronous courses, specifically, as Mike underscored the importance of providing responsive and substantive feedback in asynchronous courses. The provision of detailed and constructive feedback, whether through written comments, bullet points, or rubrics, is crucial in helping students understand their strengths and areas for improvement (Chowdhury, 2019; Stevens & Levi, 2023). Encouraging students to post questions within their assignments facilitates ongoing dialogue and supports continuous learning. This practice not only addresses immediate student concerns but also fosters more interaction between learners and instructors in asynchronous courses. The use of video responses to address common questions and clarify key concepts aligns with the findings of Borup et al. (2012), who found that video feedback supports student comprehension and enhances the sense of instructor presence. Overall, instructors emphasized the necessity for instructors to be adaptable, responsive, and thorough in their feedback methods to support student learning and engagement effectively in asynchronous courses.

Guided Learning Paths

Instructional videos, assignments, assessments, and instructors' feedback directly address course content, while guided learning paths help organize this content in a logical and structured manner. These paths provide students with a clear roadmap to navigate through the material in asynchronous courses, ensuring they can effectively understand and engage with the content.

Instructors agreed to design a consistent and structured module, which involves organizing weekly modules around specific topics with a consistent set of activities such as introductory videos, assigned readings, discussions, quizzes, and assignments. This method ensures a predictable routine and helps students easily track their progress, aligning with the findings of Lee et al. (2012) on the importance of structure in online learning environments. When asked whether to open all modules at once, instructors provided two different approaches. On the one hand, some instructors preferred phased module release and locked tasks, which involve releasing content sequentially and gradually. This method is helpful for students to manage cognitive load and prevent students from feeling overwhelmed (Kalyuga, 2015). On the other hand, some instructors preferred the open access modules approach to provide flexibility by allowing all modules to be available from the beginning of the course. This flexibility is particularly beneficial in asynchronous courses, as it allows students to manage their time effectively and ensures they have sufficient time for their learning (Amiti, 2020; Fabriz et al., 2021). Even though there were differences in their preferences for phased module release versus open access modules, the choice of method could depend on the specific context of the

course and the needs of the students to balance cognitive load management and flexibility and then optimize student learning in asynchronous courses.

Tracking and Ensuring Student Learning Progress

Since asynchronous courses rely on students self-regulated learning, it is crucial for instructors to track and ensure student learning progress for identifying learning gaps and offering timely feedback to support students effective learning. First, implementing a self-regulation orientation module at the beginning of the course equips students with essential skills like time management and goal setting (Yen et al., 2018). Second, consistent weekly due dates, clear deadlines and penalties provide structure and help students manage their time effectively. Even though there were due dates, instructors provided flexibility in accommodating diverse student needs. Third, leveraging monitoring systems in LMS to track student engagement and progress is another key strategy. Regularly checking logins and assignment completion allows instructors to identify inactive students and intervene proactively. This practice aligns with the Hawthorne effect, where students are more likely to stay engaged when they know their activity is being monitored (Sedgwick & Greenwood, 2015). Personalized communication and reminders from instructors' further support student engagement by providing individualized attention and addressing specific needs. Fourth, the use of color-coded calendars to visualize and organize tasks helps students keep track of their responsibilities in a visually accessible manner and makes it easier for students to manage their workload. Fifth, the implementation of weekly exit tickets for reflective learning and progress monitoring encourages students to reflect on their learning experiences, identify areas for improvement, and provide feedback to instructors. This practice not

only promotes a reflective and iterative learning process but also fosters a continuous dialogue between students and instructors (Danley et al., 2016). Finally, timely grading and feedback are emphasized as critical components for encouraging on-time submissions and maintaining student motivation and improving learning outcomes (Obilor, 2019; Shute, 2008).

Sum up, the strategies identified for facilitating learner-content interaction are diverse and tailored to the unique demands of asynchronous courses in higher education. By employing a combination of interactive instructional videos, practical assignments, formative assessments, detailed feedback, structured learning paths, and diligent monitoring of student progress, instructors could create a rich and supportive learning environment.

Strategies for Learner-Instructor Interaction

Instructors shared several key strategies to foster interactions between them and the students in asynchronous courses to maintain engagement with students. These strategies are diverse yet interconnected, emphasizing the importance of communication, and personalization in creating a supportive learning environment so as to foster students' learning.

Instructors' Self-Introductory Videos

The use of instructors' self-introductory videos emerged as a significant strategy for fostering personal connections and establishing early rapport with students in asynchronous courses (McCurry & Lampe, 2019; Singh & Robbins, 2020). These videos serve as an essential tool for humanizing the asynchronous learning experience, making

instructors appear more relatable and approachable through the inclusion of personal communication.

Weekly Announcements

Weekly announcements are crucial for maintaining regular communication between instructors and students in asynchronous courses. By providing updates on course activities, deadlines, and important information at the beginning of each module, these announcements help set clear expectations and keep students informed and engaged (Hilton, 2022; Jabeen, 2015). This regular interaction helps to mitigate feelings of isolation in asynchronous learning, thereby facilitating interaction between instructors and learners.

Optional Meetings with Instructors

Optional synchronous sessions and virtual office hours provide students with additional opportunities for real-time interaction and personalized support. The optional synchronous meetings provide real-time assistance and foster direct interaction between instructors and students, which is crucial for enhancing student engagement and satisfaction (Lowenthal et al., 2017; McKeithan et al., 2021). The experiences shared by instructors indicate that such meetings are well-received by students, with substantial attendance and active participation, demonstrating their appreciation for the opportunity to discuss course materials and receive immediate feedback. Additionally, offering virtual office hours by appointment allows for more personalized support, catering to individual student needs, which contributes to building closer interactions between learners and instructors (Li & Pitts, 2009).

Responses from Instructors

In asynchronous courses, instructors have various ways to respond to their students. In this dissertation, responses and feedback are discussed separately. For the interactions between instructors and students in this dissertation, feedback specifically refers to instructors' feedback on major assignments, while responses refer to casual replies to students which include instructors' individualized replies to students' self-introductions, participation in weekly discussions, timely email responses, and replies to the Google Document weekly exit tickets.

Individualized replies to self-introductions help to establish a sense of community and connection from the outset, making students feel acknowledged and valued. Participation in weekly discussions by instructors stimulates deeper thinking and promotes an organic exchange of ideas among students and instructors (An et al., 2009; Mazzolini & Maddison, 2007). Timely email responses are crucial in ensuring that students feel supported and receive the necessary assistance promptly, which helps build trust and reliability in the instructor-student relationship (Zhang et al., 2016). Replies to the Google Document weekly exit tickets provide continuous and personalized interaction, allowing instructors to offer targeted feedback on students' reflections and progress. The ongoing response and dialogue not only support students' learning but also enhance teacher immediacy behaviors, contributing to the development of close, supportive relationships with students.

Feedback from Instructors

In the learner-content interaction section, substantive feedback from instructors focuses on providing constructive and detailed feedback to improve students' learning

and understanding of the content. In contrast, feedback from instructors in this learner-instructor interaction section emphasizes forms of feedback that facilitate interaction with students, such as timely feedback, individual video feedback, and the use of respectful language.

Providing quick feedback on assignments helps students feel heard and supported. This timely communication demonstrates instructor engagement and commitment to student progress. Individual video feedback using tools like Panopto offers a more customized and personal response. This method allows instructors to provide detailed comments and explanations, both praising and giving constructive feedback, which makes students feel more connected to their instructors and their teaching styles, enhancing the connection between students and instructors (Bahula & Kay, 2022; Hall et al., 2016; Thomas et al., 2007). Additionally, respectful language in feedback is crucial for maintaining student confidence and motivation. These feedback strategies help students feel the instructors' presence, fostering a sense of immediacy and engagement in asynchronous courses.

Proactive Outreach to Students

Apart from the essential responses and feedback, instructors can also reach out to students when necessary. When instructors detect any unusual patterns of students' learning, they can send personalized emails to students to address issues promptly, offering help and support tailored to individual needs. This type of personalized communication and reminders demonstrate instructors' high level of care and commitment to their students' success. Moreover, it reinforces the instructor's presence

and attentiveness, making students feel valued and supported, ultimately leading to a more effective and empathetic asynchronous learning experience.

Overall, by emphasizing communication, personalization, and timely support, instructors can effectively nurture meaningful connections with their students, thereby enhancing the overall quality of the asynchronous learning experience. These strategies bridge the physical gap inherent in asynchronous education and create a supportive and interactive atmosphere that promotes student engagement, satisfaction, and success.

Strategies for Learner-Interface Interaction

Even though learner-interface interaction was ranked by students as the least important interaction in asynchronous courses, instructors employed various strategies to enhance students' interaction with LMS and technology tools to create a user-friendly, engaging, and supportive learning environment.

Streamlining LMS Design

Instructors emphasized streamlining the LMS design to make the interface more user-friendly, thereby fostering better learner-interface interaction. The strategy for streamlining LMS design in asynchronous courses emphasizes a consistent and clean interface, sequential module organization, clear task separation, centralized resources, and comprehensive module overviews. The effective organization of learning materials help to reduce cognitive load and improve navigation, making it easier for students to access and engage with course materials (Ji et al., 2022; Mahmud et al., 2021), and ensuring students can focus on learning without unnecessary distractions.

Strategies for Choosing Suitable Technology Tools

When asked about strategies for choosing suitable technology tools in

asynchronous courses to facilitate learner-interface interaction, instructors emphasized aligning tools with learning goals, ensuring accessibility and cost-effectiveness, and prioritizing user-friendly software. By allowing students to select tools that match their preferences, such as creating videos or designing infographics, instructors can cater to individual learning styles and goals. Ensuring that all students have access to these tools without incurring additional costs, preferably using free or university-provided resources, promotes equity and accessibility. Additionally, choosing intuitive and easy-to-use software and avoiding tools with a high learning curve help to minimize student stress. These strategies ensure that the technology tools chosen for asynchronous courses effectively support learning objectives, enhance student engagement, and create a more inclusive and stress-free learning environment.

Tutorials for LMS and New Technology Tools

Tutorials for LMS and any new technology tools are crucial in asynchronous courses to ensure students can navigate the LMS and utilize necessary tools effectively. Using video walkthroughs at the start of the course helps familiarize students with the LMS and new technology. Research shows that video tutorials can significantly enhance student comprehension and retention in online learning environments (Bondoc & Malawit, 2020). Annotated screenshots provide visual guides. Studies indicate that visual annotations can enhance learning by providing clear, step-by-step instructions that simplify complex processes and reduce cognitive load (Huang & Huang, 2017). Offering optional live sessions provides real-time guidance for students facing technology issues. These sessions allow students to share their screens and receive personalized assistance, addressing challenges that arise from software updates or other technical difficulties.

Providing tutorial resources in both video and document formats caters to different student learning preferences. Research supports the need for multimodal resources to accommodate diverse learning styles, enhancing accessibility and comprehension for all students (Dahlström, 2022). These multiple forms of guidance and support facilitate easier navigation and use of LMS and technology tools, reduce student stress and effectively enhance learner-interface interaction in asynchronous courses.

Trials for New Technology Tools

Apart from providing tutorials for new technology tools, instructors also indicated that they allow students to practice using necessary software before graded assignments. This approach includes hands-on training, interactive simulations, and low-stakes activities, enabling students to explore and become comfortable with tools. By offering opportunities for ungraded practice, students can familiarize themselves with the tools' features without pressure, reducing anxiety and increasing confidence. This preparatory phase ensures students are well-prepared to use these tools in graded assignments, leading to a more effective learner-interface interaction.

Interactive Platforms and Tools

In asynchronous courses, instructors also leveraged interactive platforms such as Nearpod, Genially, Articulate, and Pearson to foster learner-interface interaction and enhance learning outcomes. Nearpod, for instance, supports self-paced learning through its versatile range of multimedia features, allowing students to interact with content at their own pace. This platform facilitates active student participation and engagement by integrating interactive quizzes and gamified elements, which have been shown to increase motivation and learning efficacy (Sanmugam et al., 2019). Genially facilitates content

gamification and interactive communicative experiences, which enhances learner engagement and comprehension through its interactive features (Castillo-Cuesta, 2022). Articulate Storyline 360 is a user-friendly e-learning authoring tool that enables the creation of interactive, responsive courses with features like triggers, layers, and a content library, enhancing student engagement and allowing for customized, trackable learning experiences across various subjects (Donnellan, 2021); and Articulate Rise allows educators to create quizzes, card sorting activities, and flashcards, promoting active learning (Hooley et al., 2021). Pearson's MyLab integrates digital textbooks, simulations, and computer-based exercises, offering automated feedback and multiple attempts for students to refine their work so as to improve their performance.

It is important to note that integrating these platforms into asynchronous courses enhances learner-interface interaction, while the primary aim is to improve learning outcomes by providing a dynamic and supportive learning environment.

Strategies for Regulating AI Usage

As AI tools become increasingly sophisticated and accessible, the integration of AI in asynchronous courses presents both significant opportunities and challenges. The necessity of developing effective strategies for regulating AI usage is important to ensure that these technologies enhance students' learning.

Establishing clear AI usage policies within course syllabi is a foundational step. These policies should explicitly state expectations, such as requiring students to disclose AI usage by sharing their prompts and outputs. This transparency ensures students use AI ethically and are aware of its limitations. Allowing AI for brainstorming but prohibiting its use for final content creation emphasizes the importance of human roles in the creative

process (Boussieux et al., 2023). While AI can assist in generating novel ideas, the unique value that humans contribute to creativity and problem-solving should not be overlooked (Boussieux et al., 2023). Hands-on assignments that task students with completing work using AI and then comparing it with their own efforts are effective in building a critical understanding of AI's capabilities and limitations. This inspires the need for universities or educators to experiment with different forms of human-AI collaboration to enhance problem-solving quality (Boussieux et al., 2023). Instructors' ability to detect AI usage is another crucial aspect. Instructors' experience and intuition, combined with their own experimentation with AI tools, enable them to recognize AI-generated content. Based on the strategies outlined for regulating AI usage in asynchronous courses, it can be inferred that instructors generally embrace the innovative benefits of AI while diligently safeguard the educational values of originality, critical thinking, and ethical usage.

Methods of Using AI as an Assistant Tool

Instructors embraced AI by leveraging AI's capabilities to support various aspects of the learning process, ensuring that students can overcome challenges, participate flexibly, and improve their work quality.

Instructors shared that AI can be used to aid in brainstorming by helping students overcome initial idea generation barriers and refining their research skills through specific prompting (Bouschery et al., 2024; Boussieux et al., 2023). Generative AI, such as ChatGPT, can be used for debate activities to address the challenge of coordinating schedules across different time zones, allowing students to engage in debate exercises asynchronously and enhance critical thinking and argumentation skills in a flexible and

accessible manner. Critiquing AI-generated work encourages students to evaluate AI's strengths and weaknesses by comparing it to their own outputs, promoting a deeper understanding of content standards. AI tools such as Grammarly and ChatGPT can act as writing tutors, improving grammar, and refining writing while maintaining original content, and enhancing the quality of research instruments and instructional content (Raheem et al., 2023). Collectively, these strategies illustrate how AI can be used as an assistant tool, which provides personalized support, flexible participation, and critical engagement with learning materials, ultimately preparing students to use AI effectively and responsibly in their academic and professional lives.

To sum up, the integration of various technologies and strategic approaches in asynchronous courses enhances learner-interface interaction by facilitating better navigation and engagement with course materials, while also ensuring that students develop essential skills and maintain academic integrity.

Strategies for Learner-Learner Interaction

Enhancing learner-learner interaction is a critical component of effective asynchronous courses. Various strategies have been developed and implemented to facilitate this interaction. From self-introductions and building online communities to structured group discussions and interactive group work, these approaches aim to promote active engagement, critical thinking, and a sense of community.

Students' Self-Introduction

In asynchronous courses, self-introduction activities are pivotal for fostering student engagement and building a sense of community. These activities often start with fun, engaging topics to help students establish initial connections and rapport (McGuire,

2016). Incorporating video elements in self-introductions is particularly effective in establishing a stronger sense of community, as it allows students to convey their personalities and emotions more vividly than text-based formats alone (Swartzwelder et al., 2019). Additionally, allowing students to create personalized slides in a shared document supports creative expression and provides insights into individual design preferences, which fosters a deeper understanding among classmates. The use of diverse self-introduction formats, such as video presentations, creative slide decks, written texts, and photographs, has been shown to enhance interpersonal connections and create a more personalized learning environment. These strategies collectively contribute to building rapport and enhancing student interaction at the beginning of asynchronous courses.

Building Online Community

Instructors highlighted the effectiveness of various collaborative online platforms in fostering a sense of community and enhancing learner-learner interaction among students in asynchronous courses. One notable platform is Padlet, which allows students to express themselves creatively through memes, GIFs, videos, and text. Padlet enhances educational experiences by promoting collaboration, increasing student engagement, and supporting multimedia use (Oyaid & Aldayel, 2022). Moreover, several collaborative discussion and messaging platforms, such as Inscribe, Yellowdig, Microsoft Teams, and GroupMe, have been identified as valuable tools for building online communities. Inscribe stands out for its program-level application, enabling secure and moderated student communication across an entire program. Yellowdig, with its social media-like features such as upvoting and tagging, encourages dynamic and interactive discussions, making the learning experience more engaging for students (Alfoldi, 2024; Ji & Lin,

2024). Similarly, Microsoft Teams provides a versatile platform for creating dedicated channels for different purposes, enabling both instructor-moderated and student-initiated interactions (Martin & Tapp, 2019). Lastly, GroupMe is recognized for its informal group interactions and project coordination. This platform, though not required, is frequently used by students to connect, share updates, and collaborate, thereby strengthening the sense of community. Overall, these platforms collectively contribute to building robust online communities by promoting active engagement, secure communication, and a sense of belonging among students in asynchronous courses.

Group Discussions

Group discussion is a common method for fostering communication among students in online courses. In asynchronous courses, instructors shared specific methods to employ group discussions among students. First, the structured discussion prompts engage students in meaningful exchanges by providing clear and focused tasks (Howell et al., 2014), such as analyzing poor data visualizations and suggesting improvements. This method encourages students to critically engage with course content and contribute constructively to discussions. Also, the organic discussions tied to students' experiences foster genuine and engaging conversations. Second, the use of video responses in discussions creates a more dynamic environment and personalizes the learning experience and helps create a sense of presence and community among students (Xiu & Thompson, 2020), despite the asynchronous nature of the course. Additionally, having a dedicated Q&A discussion forum within the LMS provides a space for students to seek help and support from their peers. These strategies contribute to more interactive and supportive group discussions in asynchronous courses.

Interactive Group Work

Interactive group work, such as group projects and structured asynchronous debates also enhances learner-learner interaction in asynchronous courses. Group projects require students to collaborate, communicate, and engage with their peers through shared efforts and study notes, despite the lack of real-time interaction in asynchronous learning settings. This collaborative effort not only deepens their understanding of the subject matter but also promotes peer-to-peer learning (Brindley et al., 2009; Flaherty, 2022). Structured debates further promote engagement by necessitating active preparation and meaningful exchange of ideas in debate forums, thus enhancing learner-learner interaction, and developing critical thinking and communication skills (Mitchell, 2019). The interactive group work ensures that each student is actively involved during the learning process and contributes to group work, creating a dynamic and engaging learning experience.

Peer Feedback

Instructors shared two types of peer feedback strategies that significantly enhance learner-learner interaction in asynchronous courses. The first strategy involves students exchanging their assignments with each other for evaluation using a rubric. This allows students to receive detailed, constructive feedback on their work and refine it before final submission. The second strategy utilizes open discussion forums where students can post their assignments and receive feedback from the entire class. In these forums, peers review and critique classmates' work, providing diverse perspectives and constructive suggestions. Both peer feedback strategies encourage critical thinking and foster a collaborative learning environment. The act of giving and receiving feedback is integral

to deepening students' understanding of the material, as it allows them to engage in reflective practice and refine their comprehension (Ertmer et al., 2010; Lumabi & Tabajen, 2021). Also, observing and engaging with their peers' evolving projects promotes a sense of community and mutual learning (Ertmer et al., 2010; Lumabi & Tabajen, 2021).

Group Formation Strategy

As discussed above, instructors employed group work in asynchronous courses. Instructors also shared three effective group formation strategies that enhance learner-learner interaction in asynchronous courses. The first strategy involves forming groups based on shared interests, allowing students to sign up for topics they are passionate about via a Google shared document. This organic grouping ensures that group projects align with individual interests. When students work on projects related to their personal interests, they are more likely to be enthusiastic and actively contribute to group activities (Pillai, 2022). The second strategy focuses on grouping students based on their study habits and working styles, identified through a survey distributed in the first week of class. This approach reduces conflicts and anxiety within groups by ensuring that members have similar working habits, whether they are early starters, steady workers, or last-minute finishers. For those who tend to procrastinate, additional instructor support through regular check-ins helps maintain timely progress. This balanced grouping method promotes smoother collaboration and minimizes the stress associated with conflicting work styles. The third strategy involves dividing the class into small, consistent groups for weekly interactions throughout the semester. Small groups prevent students from feeling overwhelmed by the volume of posts in larger discussions, allowing

for more focused and meaningful interactions (Brindley et al., 2009). Regularly interacting with a close-knit group of peers fosters a sense of community and continuous engagement (Brindley et al., 2009). By aligning groups based on shared interests, study habits, and maintaining small, consistent interactions, instructors can enhance the quality of student collaboration.

Balancing Shared Responsibilities in Group Work

Instructors implemented several strategies to balance shared responsibilities in group work so as to make a better group learning experience for students in asynchronous group work. Having defined roles can clarify responsibilities and foster active participation (Luo et al., 2023). Establishing group norms through contracts detailing task assignments and deadlines promotes accountability and reduces conflicts. Peer evaluations can provide valuable insights into individual contributions, which may not be visible to educators; and peer evaluations can help reduce free riding among group members, as students are more likely to engage if their contributions are considered in grading (Sprague et al., 2019). Monitoring group work via Google Drive provides transparency and allows instructors to track contributions and offer timely support. These strategies create structured opportunities for meaningful interaction, making asynchronous group work more organized, transparent, and collaborative.

Sum up, fostering learner-learner interaction in asynchronous courses involves employing various strategies that enhance student engagement and collaboration. By integrating these diverse approaches, instructors can create a dynamic and supportive asynchronous learning environment, enriching the educational experience for students.

More Strategies for Designing Asynchronous Courses

Apart from the strategies for the four types of interactions, the additional strategies shared by the instructors are also important to consider when designing asynchronous courses. The instructors emphasized the significance of learner-self interaction. Learner-self interaction explores how learners engage with course content by reflecting on their experiences and participating in inner dialogue (Soo & Bonk, 1998). This interaction emphasizes the role of personal reflection and self-guided conversation in the learning process, suggesting that these internal responses are closely connected to how learners understand and integrate new information (Soo & Bonk, 1998). This underscores the need for students to engage in reflective practices that foster deeper learning and critical thinking skills (Zimmerman, 2002). Instructor commitment is crucial for creating an engaging learning environment, as instructors who are genuinely invested in the asynchronous modality tend to create more engaging and effective learning experiences (Dachner & Saxton, 2015). The adoption of the ADDIE model and collaboration with instructional designers highlights the need for systematic course development, ensuring that instructional materials are not only well-structured but also pedagogically sound. Understanding the diverse needs of students was another key insight. This perspective is crucial, as it aligns with the principles of adult learning theory (Knowles, 1978), which advocate for flexibility and learner-centered approaches in online course design to accommodate the varying responsibilities and learning preferences of adult learners. The need for continuous adaptation and updating of courses reflects the dynamic nature of online education, emphasizing the importance of staying current with technological advancements and student feedback. Lastly, employing the

Quality Matters Rubric ensures that courses meet established standards of quality, reinforcing the focus on best practices in online teaching. These strategies collectively highlight the need for a balanced approach to content quality, learner engagement, and continuous improvement in asynchronous learning environments.

Implications

The section includes implications of the survey findings on students' perspectives and the interview findings on instructors' strategies. These implications are crucial for understanding how to enhance student satisfaction in asynchronous learning environments and for identifying effective instructional strategies that educators can implement to foster engagement and interaction in asynchronous courses.

Implications of the Survey Findings

The findings from the survey provide important considerations for educators, instructional designers, and educational institutions engaged in the delivery of asynchronous courses. The strong relationship between learner-content interaction and student satisfaction underscores the critical importance of providing high-quality, well-organized, and relevant course materials. Prior studies have emphasized that well-structured and engaging content is a key determinant of student satisfaction in asynchronous learning environments (Kim & Kim, 2021; Stevenson & Michaud, 2018). Institutions and instructors should therefore prioritize the development of multimedia-rich content that enhances the learning experience. Additionally, while learner-instructor interaction was not the strongest predictor of satisfaction, its ranking as the second most important type of interaction indicates that timely and effective communication from instructors remains essential. This aligns with research showing that clear guidance,

feedback, and instructor presence are vital for student engagement and satisfaction (Getzlaf et al., 2009; Gray & DiLoreto, 2016; Martin et al., 2018). Moreover, the findings highlight the role of a well-designed user interface in supporting student satisfaction, suggesting that instructors should intentionally design the interface to be intuitive and user-friendly, thereby facilitating easier navigation and more effective interaction with course materials (Ji et al., 2022; Mahmud et al., 2021). Lastly, although learner-learner interaction was ranked the least important, it still contributes to creating a sense of community and engagement, which is beneficial for student satisfaction (Katsarou & Chatzipanagiotou, 2021; Polk, 2020). As such, opportunities for peer interaction should not be overlooked but should be integrated in a way that aligns with the flexible nature of asynchronous learning. Overall, these implications suggest that a balanced approach, which prioritizes content quality, instructor support, and technological usability, is key to fostering student satisfaction in asynchronous courses.

Implications of the Interview Findings

The findings from the interviews with instructors reveal several key implications for designing and delivering effective asynchronous courses. The emphasis on instructional videos, assignments, and assessments for learner-content interaction aligns with existing literature on active learning which emphasizes student engagement through hands-on activities that promote higher-order thinking, collaboration, and metacognition, grounded in constructivist learning theory (Felder & Brent, 2009). Moreover, strategies like guided learning paths and consistent feedback highlight the necessity of structured yet flexible course frameworks that support self-regulated learning, a critical component of effective asynchronous education (Edisherashvili et al., 2022). The personalized

approaches to learner-instructor interaction, such as self-introductory videos and proactive outreach, illustrate the pivotal role of instructor presence in mitigating the isolation often experienced in online learning environments, thereby fostering a supportive community (Lehman & Conceição, 2010; Stone & Springer, 2019). Similarly, the use of collaborative platforms and structured group work for learner-learner interaction suggests that fostering a sense of community and active peer engagement is essential for enhancing student satisfaction and learning in asynchronous courses (Soracco, 2023). Lastly, the strategies for improving learner-interface interaction, particularly the streamlining of LMS design and the careful selection of technology tools, emphasize the need for user-friendly and accessible digital environments that minimize cognitive barriers and support diverse learning preferences (Ji et al., 2022; Mahmud et al., 2021). The careful consideration of AI tools, both as a regulated and supportive resource, suggests that while AI can greatly enhance the learning experience, its integration must be managed thoughtfully to preserve the integrity and originality of student work (Boussioux et al., 2023). Collectively, these implications suggest that a balanced, multi-faceted approach that integrates content quality, interactive strategies, technological accessibility, and continuous adaptation is essential for maximizing the effectiveness of asynchronous courses and enhancing students learning experience and success.

Sum up, the implications drawn from these survey findings are crucial for improving the design and delivery of online courses to better meet students' needs. The implications from these interviews highlight best practices and innovative approaches that can be adopted by educators to enhance the effectiveness of asynchronous learning.

Together, these two sections of the dissertation contribute to a holistic understanding of asynchronous education, offering actionable recommendations for both course designers and instructors.

Limitations

While this study provides valuable insights through its survey and interview findings, it is important to acknowledge its limitations. First, the survey participants were drawn from a specific educational context, which may limit the generalizability of the findings to other instructional environments or diverse learner demographics. Second, the qualitative nature of the interview data means that the findings are interpretive, potentially introducing bias or inaccuracies due to the subjective perspectives of the participants. These factors should be considered when applying the results of this study to broader educational contexts.

Suggestions for Future Research

Future research could explore several avenues to further advance the understanding of effective asynchronous learning. First, expanding the scope of survey research to include a more diverse range of educational settings and student populations would help generalize the findings and identify context-specific factors that influence the effectiveness of asynchronous instruction. Additionally, conduct in-depth case studies focused on instructors' design strategies to get detailed insights into how individual instructors implement and adapt their strategies in real-world settings. The case studies would offer rich, contextual information that goes beyond what can be captured through interviews alone. Furthermore, explore the integration and impact of emerging technologies, such as AI-driven educational tools, on learner engagement, satisfaction,

and academic integrity in asynchronous courses. Finally, experimental studies comparing different instructional approaches or technological interventions in asynchronous learning environments could provide more robust evidence on best practices for enhancing student interaction and satisfaction.

Conclusion

This study aimed to investigate students' perspectives and experiences regarding interactions within asynchronous courses and to explore effective instructional design strategies for integrating meaningful interactions to foster student learning. The findings from this research provide valuable insights into the key interaction that contribute to student satisfaction and inform instructional design strategies for facilitating interactions in asynchronous learning environments. The key takeaways are presented in Appendix I Strategies for Facilitating Interactions in Asynchronous Courses. The survey results highlight the critical importance of well-structured, engaging content, and supportive instructor communication, while the interview findings emphasize the need for strategic design, personalized interactions, and the thoughtful integration of technology. Together, these insights offer practical recommendations for educators and instructional designers striving to enhance the quality of asynchronous courses. Although the survey focuses on a specific educational context and the interviews rely on self-reported data present certain limitations, the overall implications suggest that a multifaceted approach to course design is essential for meeting the diverse needs of students. As asynchronous education continues to evolve, these findings provide a foundation for ongoing improvements, ensuring that online learning environments remain effective, engaging, and satisfying for students.

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APPENDIX

Appendix A Asynchronous Course Satisfaction Survey-Dissertation

Purpose of the Study:

You are invited to participate in the research study. The purpose of this study is to collect valuable data on students' experiences and satisfaction with interactions in asynchronous courses in higher education (UTK IRB). The findings from this study aim to enhance the understanding of interactions in asynchronous courses and provide insights for instructors and instructional designers to develop effective design strategies that address the fulfillment of all interactions.

Time:

This survey will take about 10 minutes to complete.

Voluntary Participation:

Your participation in this study is entirely voluntary. You have the right to withdraw at any point during the survey without any penalty.

Data Use and Confidentiality:

Data collected will be used for research purposes and to improve the quality of our asynchronous courses. Your responses are confidential and are **NOT** shared with your instructors.

Criteria:

In order to participate, you must be more than 18 years old and enroll in an asynchronous course(s). If you have taken or are taking several asynchronous courses, please identify **the most impressive or recent one** and then complete this questionnaire relative to that specific course.

Consent:

By proceeding to the questionnaire, you are indicating your consent to participate in this study.

Contact:

If you have questions or concerns about this study, or have experienced a research related problem, please contact the researchers:

- Dr. Wong: rwong2@utk.edu
- Hongyan Yang: hyang49@vols.utk.edu

For questions or concerns about your rights or to speak with someone other than the research team about the study, please contact:

Institutional Review Board

The University of Tennessee, Knoxville

Phone: 865-974-7697

Email: utkirb@utk.edu

Asynchronous Course

1. I am 18 years old or older.

- ☐ Yes
- ☐ No

2. I have completed or am taking at least one asynchronous course.

- ☐ Yes
- ☐ No

3. Why did you take/are you taking this course?

- ☐ required course

- elective course
- personal growth
- other

4. My primary computer access for this course is from:

- Home
- UTK campus
- Work
- Library
- Other

Satisfaction with Learner-Learner Interaction

5. Select the response which most closely represents how much you agree or disagree with the statement about learner-learner interaction. There are no incorrect responses.

Learner-learner interaction: interaction between one learner and other learners, occurring in the settings, such as group projects, peer review activities, or online discussion forums, etc.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
This course created a sense of community among students.					
In this course, I was able to share my viewpoint with fellow students.					
This course provided an opportunity for problem-solving with other students.					
I received timely feedback (within 24 – 48 hours) from other students in the course.					

Although I could not see my classmates in this course, I always felt their presence.					
Classmates had an equal chance to participate in this course.					

Satisfaction with Learner-Content Interaction

6. Select the response which most closely represents how much you agree or disagree with the statement about learner-content interaction. There are no incorrect responses.

Learner-content interaction: interaction between the learner and the instructional materials, such as textbooks, videos, or online resources, etc.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I could easily access the course content.					
The course content I interacted with was engaging and captured my interest.					
The courses readings and notes facilitated my learning.					
The open educational resources that are linked to this course facilitated my learning.					
The assignments and/or projects in this course facilitated my critical thinking skills.					
The assignments and/or projects in this course facilitated my learning.					

Satisfaction with Learner-Instructor Interaction

7. Select the response which most closely represents how much you agree or disagree with the statement about learner-instructor interaction. There are no incorrect responses.

Learner-instructor interaction: interaction between the learner and the instructor, such as emails, video conferencing, or discussion forums, etc.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I received timely feedback (within 24 – 48 hours) from my instructor.					
I got sufficient feedback from my teacher.					
I was able to get individualized attention from my instructor when needed.					
In this course the instructor functioned as the facilitator by offering guidance and directions.					
In this course the instructor was an active member by continuously encouraging communication.					
Although I could not see the instructor in this course, I always felt his/her presence.					

Satisfaction with Learner-interface Interaction

8. Select the response which most closely represents how much you agree or disagree with the statement about learner-interface interaction. There are no incorrect responses.

Learner-interface interaction: interaction between the learner and interface, which is a medium or tool used for accessing and interacting with learning content or activities.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In the course, the technical support from Office of Information Technology Helpdesk, or my instructor was adequate.					

The login instructions given and navigation structure for this course were easy to follow and understand.					
Learning how to use a new computer software package in this course was easy for me.					
Using computer software packages made this course learning more interesting.					
I felt more motivated to learn when using computer software packages.					
The software used in this course made it easier for me to collaborate with my classmates.					
The software used in this course made learning more productive.					

General Satisfaction with this asynchronous course

9. Click on the button which most closely represents how much you agree or disagree with the statements about your general satisfaction with this asynchronous course. There is no incorrect response.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I am very satisfied with this asynchronous course.					
I would recommend this course to others.					
This asynchronous course met my learning needs.					
I feel asynchronous courses are as effective as synchronous courses					
I feel asynchronous courses are as effective as face-to-face courses.					

Rank the Importance of Four Types of Interactions

10. Please rank the importance of the following four types of interactions for a satisfying asynchronous course. (1 = most important, 2= very important, 3 = moderately important, 4 = least important)

Learner-content interaction

()1 ()2 ()3 ()4

Learner-instructor interaction

()1 ()2 ()3 ()4

Learner-learner interaction

()1 ()2 ()3 ()4

Learner-interface interaction

()1 ()2 ()3 ()4

11. Is there anything else that you would like to share with me about your satisfaction with this course? _____

Demographics:

The following five questions are to gather some demographic information about you.

This data is crucial for us to understand the diverse backgrounds and needs of students.

Please note that all information will be treated confidentially and will only be used for educational research purposes.

12. I identify as a:

- ☐ Male
- ☐ Female
- ☐ Non-binary

- Prefer not to say

13. I am:

- White
- Asian
- Black or African American
- American Indian
- Alaska Native
- Native Hawaiian or Other Pacific Islander
- Prefer not to say
- Prefer self-description

14. What is your current level of study:

- Undergraduate (bachelor's degree)
- Graduate (master's degree)
- Graduate (Doctoral degree)
- Professional Degree

15. I am enrolled in:

- On Campus Program
- Distance Online Education Program
- Other

16. I study:

- Full-time (12+ undergrad or 9+ grad credits)
- Part-time (<12 undergrad or < 9 grad credits)

17. I work:

- Full time (32-40 hours in a week)
- Part time work (less than 30 hours in a week)
- Do not work

Thank you for taking the time to complete this survey. Your valuable feedback will contribute to the design and enhancement of asynchronous courses. This not only aids in improving your future learning experiences but also shapes a more effective and engaging asynchronous learning environment for all learners!

Appendix B Interview Protocol

Introduction

- Purpose of the study
- Confidentiality explanation.
- Confirmation of consent

Background Information

- Can you tell me about your experience with teaching asynchronous courses (universities, subjects, years, platforms, etc.)?

Learner-learner Interaction

- What strategies do you use to encourage interaction among students in your asynchronous courses? For example, facilitate students' presence, design group work, and build online community, etc.
- Can you provide an example of a successful learner-learner interaction in your asynchronous course?
- How do you balance the equity and shared responsibilities for students group work in your asynchronous course?

Learner-instructor Interaction

- What strategies do you use to facilitate interaction between students and you to ensure that you are approachable and available in your asynchronous courses? For example, discussion forums, video responses, regular feedback, virtual office hours, etc.

- Can you give an example of a successful learner-instructor interaction in your asynchronous course?

Learner-content Interaction

- What strategies do you use to facilitate students' engagement in learning course content? For example, interactive materials, assignments, activities, etc.
- Can you give an example where you felt students were particularly engaged with course materials?
- How do you monitor and support students' self-regulation and ensure they complete course content on time in an asynchronous learning environment?

Learner-interface Interaction

- What strategies do you implement to ensure that your students are comfortable navigating the online interface and utilizing the software required for your asynchronous course?
- What strategies do you use to choose software which make students' learning more interesting, engaging, and productive?
- Do you incorporate artificial intelligence (AI) tools into your asynchronous course? If so, what are they? What strategies do you use to ensure students use them properly?

Conclusion

- Is there anything else about your strategies for facilitating interactions in asynchronous courses that you think is important to share?
- Explain the next steps and thanks for the participation, time, and contributions

Appendix C IRB Approval Letter



April 15, 2024

Rachel Min Wong
UTK - Coll of Education, Hlth, & Human - Theory & Prac-Teacher Ed

Re: UTK IRB-24-08131-XM

Study Title: Interactions in Asynchronous Courses: Students Perspectives and Instructors Design Strategies

Dear Rachel Min Wong:

The Human Research Protections Program (HRPP) reviewed your application for the above referenced project and determined that your application is eligible for **exempt** review under 45 CFR 46.101. Category 2: Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if the information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

Your application has been determined to comply with proper consideration for the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects.

Therefore, this letter constitutes full approval of your application (Version 1.1) as submitted, including:

Documents Stamped:

- Revised Questionnaire Consent Cover Statement - Version 2.0
- Revised Interview Informed Consent - Version 2.0
- Asynchronous Course Satisfaction Survey - Version 2.0
- Interview Protocol - Version 2.0
- Interview Invitation 3-- Email to Instructors that Identified from Published Papers - Version 1.0
- Interview Invitation 2--Post on AECT Higher Logic Platform - Version 1.0
- Interview Invitation 1--Email to Instructors that Already Known to Hongyan - Version 1.0
- Questionnaire Invitation Email - Version 1.0

That have been dated and stamped IRB approved. You are approved to enroll a maximum of 630 participants. Approval of this study will be valid from 04/15/2024.

Institutional Review Board | Office of Research & Engagement
1534 White Avenue Knoxville, TN 37996-1529
865-974-7697 865-974-7400 fax irb.utk.edu

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Appendix D Survey Invitation Email

Dear Asynchronous Course Student,

To improve the quality of asynchronous courses, we are conducting a UTK IRB approved survey research (Approved Number: UTK IRB-24-08131-XM). This survey is conducted as part of Hongyan Yang's doctoral dissertation for the PhD program in Learning, Design, and Technology at the University of Tennessee, Knoxville, College of Education. This survey is designed to capture students' valuable feedback and experiences regarding interactions in asynchronous courses, which are crucial in helping instructors and instructional designers enhance and tailor future asynchronous course offerings to better meet student needs.

We sincerely invite you to participate in this educational research to contribute to the enhancement of our asynchronous courses. (If you have filled in the survey, please ignore this email.)

Survey Details

- **Duration:** The survey takes about 10 minutes to complete.
- **Course Selection:** If you've taken multiple asynchronous courses, please focus on the **most recent course** that left a significant impression on you.
- **Confidentiality:** Your responses are anonymous and will NOT be shared with course instructors.
- **Voluntary Participation:** Your involvement in this survey is completely voluntary. You are free to withdraw at any point without any repercussions to your current or future studies.

Survey Link:

To participate in the survey, please click on the following link:

https://utk.co1.qualtrics.com/jfe/form/SV_bHmjtR2MbsbIYfQ

If you have any questions, please do not hesitate to contact me at hyang49@vols.utk.edu or committee chair, Dr. Rachel Wong, at rwong2@utk.edu. Thank you so much for your time!

Sincerely,

Hongyan Yang

Appendix E Interview Invitation Email

Dear Dr. X,

I am writing to cordially invite you to participate in an interview for my dissertation that will explore the design and facilitation of interactions in asynchronous courses. This research study has been approved by the Institutional Review Boards (Approved Number: UTK IRB-24-08131-XM). This interview research focuses on exploring strategies to facilitate interactions in asynchronous courses in higher education, with a special emphasis on learner-learner interaction, learner-instructor interaction, learner-content interaction, and learner-interface interaction.

For this interview, I am seeking instructors who have at least **five years of experience teaching asynchronous online courses in higher education**. I know you have been teaching asynchronous courses for a couple of years. I believe your teaching experience and design strategies in asynchronous courses would contribute to this research and future educational experience in this field. So, I am reaching out to see if there is a chance that I can interview you about asynchronous course designing and teaching. The interview will be conducted via the ZOOM video conferencing platform and is expected to last no more than one hour. The interview will be recorded, but all data will be handled with the utmost confidentiality and used solely for academic purposes. Thank you for considering this invitation. Your time and insights are greatly appreciated, and I am looking forward to hearing back from you.

Sincerely,

Hongyan Yang

Appendix F Interview Post on AECT's Higher Logic Platform

Dear Asynchronous Course Instructors,

We are conducting an IRB approved dissertation research study regarding exploring strategies to facilitate interactions in asynchronous courses in higher education. This research study has been approved by the Institutional Review Boards (Approved Number: UTK IRB-24-08131-XM). We are inviting experienced instructors to share their insights.

This interview research focus on exploring strategies to facilitate interactions in asynchronous courses in higher education, with a special emphasis on learner-learner interaction, learner-instructor interaction, learner-content interaction, and learner-interface interaction.

For this interview, we are seeking experienced instructors in higher education who have:

- Over five years of experience teaching asynchronous online courses in higher education.

This study aims to collect insights from a variety of academic disciplines and institutions to enhance the generalizability of the findings. Your contribution would not only enrich this research but could also shed light on best practices in online course design, potentially impacting future educational strategies.

The interview will be conducted via the ZOOM video conferencing platform and is expected to last about one hour. To ensure the integrity of the research, the interview will be recorded; however, all data will be handled with the utmost confidentiality and used solely for academic purposes.

If you are willing to participate or have any questions, please do not hesitate to contact me at hyang49@vols.utk.edu or committee chair, Dr. Rachel Wong, at rwong2@utk.edu. Thank you for considering this invitation. Your time and insights are greatly appreciated, and I am looking forward to the possibility of learning from your experiences.

Sincerely,

Hongyan Yang

Appendix G Interview Invitation Flyer

Interview Invitation

DISSERTATION

This flyer is for recruiting interviewees for a dissertation research study entitled "Interactions in Asynchronous Courses: Students' Perspectives and Instructors' Design Strategies," which has received approval from the Institutional Review Board of the University of Tennessee, Knoxville (Approval Number:UTK IRB-24-08131-XM).



Interview Purpose

Identify and categorize the strategies that instructors employ to design and facilitate interactions in asynchronous courses in higher education, with a special emphasis on learner-learner interaction, learner-instructor interaction, learner-content interaction, and learner-interface interaction.



Ideal Interviewees

- The interviewees should have at least five years of experience teaching asynchronous online courses in higher education.
- The Interviewees could be lecturers, adjunct faculty, assistant professors, associate professors, or full professors



Time and Place

- The interview is expected to last approximately one hour. We can schedule the specific interview time at the interviewees' best convenience.
- It's virtual interview. It will be conducted via the ZOOM video conferencing platform.

CONTACTS

Ph.D. Candidate: Hongyan Yang
Committee Chair: Dr. Rachel Wong

hyang49@vols.utk.edu
rwong2@utk.edu

Appendix H Interview Informed Consent Form

Research Title:

Strategies to Facilitate Interactions in Asynchronous Courses in Higher Education

Researcher(s):

Hongyan Yang, Doctoral Candidate, College of Education, University of Tennessee,
Knoxville

Introduction:

You are invited to participate in a research study. Before agreeing, it is important that you understand the research and what your participation will involve. Please read this information carefully and ask questions if anything is unclear.

Purpose of the Study:

The purpose of the interview is to explore strategies for designing and facilitating interactions in asynchronous courses with a focus on four types of interaction: learner-learner, learner-instructor, learner-content and learner-interface.

Procedure:

The interview will be facilitated using the ZOOM video conferencing platform and is scheduled to last for about an hour. To ensure that all information is accurately captured for research purposes, we will be recording the video of the entire interview session.

Voluntary Participation:

Participation in this study is completely voluntary. You have the right to withdraw at any time without any negative consequences.

Use of Information:

The information you provide will be a vital contribution to my dissertation research, which is entitled “Analyzing Student Perspectives of Interactions and Exploring Design Strategies in Asynchronous Courses in Higher Education”. The insights you offer will help to identify and categorize the strategies that instructors employ to design and facilitate interactions in asynchronous courses. The data and findings derived from this study may be included in my dissertation and could potentially be published upon the completion of my research.

Confidentiality:

All information you provide will be kept strictly confidential. Recordings will be erased following the conclusion of the research. Future potential publication would be handled with the utmost respect for confidentiality; no personal identifiers will be used.

Otter.ai may use participant transcript information for testing, tuning, optimizing, validating, or otherwise enhancing the analytics, models, or algorithms underlying the service.

Risks and Benefits:

There are no known risks associated with participation in this study. The findings from this study may help improve the design of asynchronous courses, which could indirectly benefit you in your course design efforts.

Contact Information:

For any questions about the study or your rights as a participant, please contact Hongyan Yang at hyang49@vols.utk.edu and Dr. Rachel Wong at rwong2@utk.edu

For questions or concerns about your rights or to speak with someone other than the research team about the study, please contact:

Institutional Review Board

The University of Tennessee, Knoxville

Phone: 865-974-7697

Email: utkirb@utk.edu

Consent:

I have read and understood the above information. I consent voluntarily to participate in this study and understand that I can withdraw at any time. Upon signing, I will receive a copy of this consent form.

Participant Name Printed

Signature of Participant

Date

Researcher Name Printed

Signature of Researcher

Date

Appendix I Strategies for Facilitating Interactions in Asynchronous Courses

Design Strategies for Facilitating Interactions in Asynchronous Courses in Higher Education

*This flyer highlights the design and teaching strategies shared by 14 experienced asynchronous instructors in higher education. In addition, a survey of 378 U.K. students ranked Learner-Content interaction as the most important aspect in asynchronous courses, followed by Learner-Instructor, Learner-Interface, and Learner-Learner interactions.




Learner-Content Interaction

Instructional Videos
Embed interactive questions in videos to keep students engaged
Create concise micro-lecture videos to maintain focus
Offer optional workshops on common questions with recordings for flexible access

Assignments
Design application-based assignments with real-world scenarios
Create practical and active hands-on activities
Promote critical thinking through debates, reflections, or educational games
Use scaffolded, sequential and buildable assignments to ensure steady progress

Assessments
Encourage revision, multiple attempts, and dropped low scores for improvement
Use pretests and posttests to measure learning progress and guide reflection
Use low-stakes quizzes for focused knowledge checks and practice
Provide clear evaluation rubrics and guidelines

Feedback from Instructors
Give detailed, constructive feedback with clear guidance
Encourage students to ask questions directly within their assignments
Create feedback videos to address common questions and clarify key concepts

Guided Learning Path
Organize consistent weekly modules with clear routines
Release modules sequentially with locked tasks to maintain focus
Open all modules upfront to support flexible pacing

Ensuring Learning Progress
Implement a self-regulation orientation module at the beginning
Use color-coded calendars to distinguish tasks for students
Use Google Docs or Google Forms for weekly exit tickets to gather student reflections
Use timely grading to motivate on-time submissions

Learner-Instructor Interaction

Instructors' Self-Introductory Videos
Use intro videos with anecdotes or icebreakers to build rapport with students

Weekly Announcement
Send weekly announcements to keep students informed and connected with instructors

Optional Meetings with Instructors
Offer optional Zoom sessions to provide real-time support and maintain connection
Offer virtual office hours by appointment for personalized support

Feedback from Instructors
Provide personalized video feedback using tools like ScreenPal and Panopto
Provide prompt assignment feedback and grades within a week to support students
Use Google Doc exit tickets for ongoing student-instructor interaction
Use respectful and supportive language for feedback

Proactive Outreach to Students
Proactively reach out via email to address performance changes, offering support

Learner-Interface Interaction

Streamlining LMS Design
Consistent modules with clear labels, centralized resources, and sequential roadmaps

Choosing Suitable Technology Tools
Ensure all students have free access to required software and resources
Use easy-to-learn software to reduce stress and keep the focus on learning
Allow students to choose tools that align with their goals and skills

Tutorials for LMS and New Technology Tools
Provide step-by-step orientation videos to simplify LMS navigation and software use
Use Snagit to create annotated screenshots and integrate them with video tutorials
Offer optional live sessions for real-time tech support and updates
Provide multiple tutorial formats (videos, docs) for diverse preferences
Offer software trials and practice activities

Interactive Platforms and Tools
Nearpod: Interactive platform with slides, videos, and quizzes for self-paced learning
Genially: Tool for creating animated visuals, quizzes, and drag-and-drop activities
Articulate Rise: A Web tool for easily building responsive courses
Articulate Storyline: A powerful desktop tool for creating interactive e-learning
Pearson: Platform offering digital textbooks, simulations, and automated assessments

AI Usage
Set clear AI guidelines in syllabi and require disclosure of AI use
Use generative AI for brainstorming, debates or as a writing tutor
Critique and compare AI-generated outputs for quality

Learner-Learner Interaction

Students Self-Introductions
Use icebreaker prompts like sharing hobbies, pets, or name pronunciations
Encourage video introductions via tools like Flipgrid to foster connection
Create a shared slide deck for students to introduce themselves and show personalities
Offer diverse submission options like text, videos, or infographics

Building Online Community
Use Inscribe, Yellowdig, Teams, GroupMe, Padlet to foster community building

Interactive Group Work
Use group projects on advanced topics with shared notes for collaboration
Use structured asynchronous debates to promote collaboration and idea exchange

Peer Feedback
Through draft sharing, rubric-based evaluations, and open forum discussions

Group Formation Strategy
Based on shared interests, study habits, or small consistent teams

Balancing Shared Responsibilities in Group Work
Assign specific group roles and monitor updates weekly
Establish group norms at the beginning to guide collaboration
Use peer evaluations to foster accountability and improvement

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VITA

Hongyan Yang was born and grew up in Sichuan Province, China. She earned a Bachelor of Arts in English from Chengdu University of Technology in June 2011 and later obtained a Master of Education in English Education from Chongqing Normal University in June 2015. Following her graduate studies, Hongyan worked as a high school English teacher at Neijiang No. 6 Middle School in Sichuan for three years. In pursuit of further academic achievement, she began her doctoral studies in Learning, Design, and Technology at the College of Education, Health, and Human Sciences at the University of Tennessee, Knoxville (UTK). During her time at UTK, Hongyan worked as a graduate research assistant. Her research interests include online course design, asynchronous learning environments, and design case studies. Hongyan anticipates earning her PhD in Education, with a concentration in Learning, Design, and Technology, from UTK in December 2024.