Students' Perceptions of Engagement in Online Courses and Its Effect on Academic

Performance and Retention Rates

by

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ABSTRACT

Online learning in higher education has been increasing over the last two decades
(NCES, 2016). Previous research has highlighted the importance of student engagement
for academic achievement and performance (Fuller, Wilson, & Tobin, 2011; Northey et
al., 2018). The current study aims to further understand students' perceptions of peer
interactions, assess the application of the Theory of Involvement in online learning
environments, and identify factors of student engagement. Data were collected from
1,514 undergraduate students enrolled in online courses at Arizona State University (M_{age}
= 25.96 years old; SD = 7.64; 1,259 female, 232 male, 12 non-binary, and 1 gender
fluid). The results of this dissertation study indicate that the vast majority of students
(94% of the sample) want opportunities for peer interaction in their online courses.
Confirmatory Factor Analyses were conducted to validate three of the primary measures
and these measurement models were used in subsequent analyses. Structural Equation
Modeling (SEM) revealed that students who demonstrated high levels of Academic,
Online Community, Life Application, and Social Engagement were more likely to
perform well on measures of Academic Performance (i.e., doing well on quizzes or tests,
earning higher letter grades). Additional SEM analyses indicated that sense of a
community was related to all four aspects of student engagements. There was evidence
that certain pedagogical factors were also associated with higher rates of student
engagement. For example, students who reported high levels for Instructional Design
(e.g., felt the course objectives were clear) were more likely to be academically engaged
(i.e., demonstrated strong study habits). Lastly, while there were no significant

differences in student engagement by gender, ethnicity, or living arrangements, students

who valued peer interaction were more likely to report higher levels of Online Student

Engagement. The findings of this research emphasize the desire online students have to

interact with their peers, demonstrates the importance of engaging online students, and

serves as a guide for educators in creating online courses that foster student engagement.

DEDICATION

I dedicate my dissertation to my husband, Qa'ed Mai. Thank you for being you.

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INTRODUCTION

The goal of this dissertation is threefold: 1) to increase understanding of the importance online students place on being involved, and included, in online communities, 2) to examine the degree to which Astin's (1984) *Theory of Involvement* can be useful for studying the influence of asynchronous engagement (i.e., involvement is not constrained to a specific time of day or week) on student online learning (examine how students' online engagement relates to their academic performance, and ultimately, to their perseverance in achieving their academic goals), and 3) to identify pedagogical features and inter- and intra-personal factors that influence online students' perceptions of, and satisfaction with, their level of engagement. Towards these aims, I begin by reviewing the context of online education and the experiences of online students that highlight the need for researchers to understand how engagement influences students' performance and retention.

The present study is grounded in Astin's (1984) *Theory of Involvement* which argues that the quality and quantity of students' engagement with their academic environment (e.g., academic-related activities, peer interactions, teacher-student interactions) is directly linked to the likelihood that they will persevere and achieve their educational goals. However, because this theory is largely derived from, and intended to apply to, students attending schools (e.g., elementary, junior high, high school) and colleges and universities *in-person* (as opposed to remotely), a primary aim of the current study is to increase the understanding of the importance and value students place on

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engaging with their classmates and instructors *online*. Specifically, the premise of this

study is that one of the primary challenges online students face, that their in-person

counterparts do not, is developing and maintaining supportive learning communities that

help them stay motivated and successful; thus, participating and interacting with their

instructors and classmates within a safe and supportive online community is important for

them.

Because of the challenges of creating community in asynchronous settings, online

students tend to feel disconnected from instructors and peers, and subsequently, this lack

of perceived community may interfere with their motivation to persevere with their

educational goals in the face of personal, financial, or familial adversity. Support for this

proposition can be culled from findings showing that online students report greater levels

of loneliness and isolation (Rovai & Wighting, 2005; Song & Singleton, 2004) and a

desire for a stronger sense of community (Rovai & Downey, 2010), as well as evidence

showing that retention rates are lower for online students compared to "on ground"

counterparts (Carr, 2000; Jaggars, Edgecombe, & Stacey, 2013; NCES, 2016).

Thus, the first goal of this study was to confirm the importance of the online

community for students attending courses online before moving to the second goal of

validating a model of student involvement linking online community engagement to

academic performance and persistence (i.e., retention and graduation). Lastly, I will

examine factors that contribute to creating and participating in an effective, supportive,

and caring online community of learnings.

The Astin's (1984) *Theory of Involvement* and the community needs of online

students will be elaborated on in the literature review, but briefly, two primary

hypotheses can be generated from this model (see Figure 1). First, online students who report higher levels of academic engagement, such as studying regularly and keeping up on readings, will evidence higher academic performance and be more likely to persist in their educational goals (e.g., retention) compared to those who report spending less time on such academic activities. Second, students who report engaging with their instructors and classmates as part of an online community, including posting in online forums, actively participating in small group discussions, and helping their peers, will evidence stronger academic performance and report being more likely to return the following term.

Additional study goals include identifying potential factors that may influence the degree to which students engage academically and socially (see Figure 2). For example, if students feel their instructors have created a course that makes objectives clear and fair, encourages and helps them make the course relevant to their lives, and provides opportunities to engage with the online community, they would be more likely spend more time engaging with the course content (e.g., studying, reading, making it relevant to their lives). Similarly, viewing the online community (both instructor and classmates) as welcoming and supportive is likely to increase their motivation to learn and desire to actively participate in online discussions and interactions.

Lastly, potential influencers of student engagement are examined, such as student's gender, age, race, and experience with online courses, as well as personal challenges, including family responsibilities, work schedules, and financial or medical concerns. Similarly, students may vary in the importance they place on engaging with their classmates online, as well as their preferences for unstructured peer interactions (i.e., no-instructor-prescribed or directed structured) or structured interactions (e.g., the

instructor provides a prompt, outlines the number of posts required). These factors will be explored in this study and are discussed below.

Statement of the Problem

The Online Education Context

Undergraduate enrollment has been increasing over the last two decades. From 2000 to 2016, the number of full-time undergraduate students enrolled in degree-granting postsecondary institutions grew by 45% (National Center for Education Statistics [NCES], 2016). In 2003, an estimated 15.6% of undergraduate students were taking distance education or online courses, and by 2016, the number grew to 43.1% of undergraduate students (NCES, 2016). Not only are students taking online courses at higher rates than ever before, but approximately 10% of undergraduate students are also completing entire degree programs online.

Higher education, like many other social sectors, has been deeply affected by technological advances in the last few decades (Persichitte, Suparman, & Spector, 2017). These digital technologies have made higher education an accessible reality to learners, especially nontraditional learners, such as adult learners, who have historically been shut out. The convenience of online programs has drawn and continues to draw many students who would typically find higher education inaccessible (Burnette, 2014). Offering online courses to students enrolled in face-to-face programs offers learners flexibility and convenience (Shea & Bidjerano, 2018). Overall, students appreciate the convenience, flexibility, and financial aspects that come with online educational programs (Madoc-Jones & Parrott, 2005).

Retention Rates

Despite high enrollment in online courses and the greater accessibility for nontraditional students to complete degrees in higher education, retention rates for courses and semester-to-semester are lower in online courses than for in-person courses (Carr, 2000; Jaggars, Edgecombe, & Stacey, 2013; NCES, 2016). For example, Jenkins (2011) estimated that while in-person programs tend to have 70-80% retention rates, online rates hover around 50%. The difference in retention rates may be, at least partially, due to a selection bias. That is, students who select online courses and programs may do so because of conflicting or inflexible work schedules, family responsibilities, or illnesses (Burnette, 2014). Unfortunately, these same factors likely contribute to poorer academic performance and withdrawing from degree programs (Jaggars et al., 2013). The role such factors (e.g., work, family, illnesses) play in the choice to pursue a degree online as well as their influence on course performance and retention efforts, will be discussed later as they have implications for efforts to improve performance and degree completion.

Literature Review

Astin's (1984) *Theory of Involvement* is used to guide the following literature review and to generate specific hypotheses to be tested. The *Theory of Involvement* will first be explained, and then the current study and relevant variables will be situated within this framework. "Involvement" in the context of the present study is defined, and will be measured, by the student's academic engagement (e.g., studying regularly, keeping up with readings) and online community engagement (e.g., posting in online discussion boards, actively participating in small group discussion forums). Then, I

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consider potential predictors of students' engagement, such as perceptions of the instructor's classroom presence and facilitation of the course material as well as perceptions of the online learning community as a safe, caring, and supportive context for learning.

Theoretical Framework

The basic elements of the *Theory of Involvement* are quite straightforward; specifically, the tenets of this theory suggest that when students are more engaged and invested both academically and socially, they learn better (Astin, 1984). Involvement refers to how much physical and psychological energy students dedicate to their studies. According to Astin (1984), examples of physical energy include "spends time on campus, participates actively in student organization." Examples of psychological energy include "devotes considerable energy to studying" and "interacts frequently with faculty members and other students." Moreover, it is more than just the *quantity* of energy spent; it is also about the *quality* of the activities the student chooses to engage in. In addition to academic involvement, there are a number of ways university students can be involved, such as participating in honors programs, sports/athletics, fraternities, sororities, and student government. Astin's *Theory of Involvement* has been used to guide a number of studies to better understand in-person students' engagement and academic performance (Fuller, Wilson, & Tobin, 2011; Lancaster & Lundberg, 2019) and examine the mechanisms of student success (Kahu & Nelson, 2018) and student engagement (Paulsen & McCormick, 2020) in higher education. The premise of this study is that this framework can also be applied to online learners, such that students who

dedicate a larger amount of energy working on assignments, interacting with instructors and peers, and so forth will be more successful than those who are not as engaged.

The Online Learning Context

Not surprisingly, students who take classes remotely, or online, may not have the same opportunities to interact with instructors and peers to the same degree as their in-person counterparts. It is important to note that remote learning can take many forms and that students take online courses for various reasons, as will be discussed in greater detail later. Specifically, online learning encompasses a number of different web-based and distance learning programs and can refer to a singular online course, multiple classes taken remotely, or an entire four-year institutional degree program. For the purposes of this study, the definition of "online learning" will be adapted from the ASHE Higher Education Report (2014): "online learning" refers most often to the fully online course that has been designed to be offered over the internet and uses web-based materials and activities (grading, discussions) made possible by various course management systems or other software packages.

Online learning is not exclusive to fully online programs as some in-person programs allow their face-to-face students to complete online courses toward their degree requirements. For example, at Arizona State University (ASU), where this study was conducted, students completing an in-person four-year degree may take online courses (referred to as iCourses) for some of their classes whereas those enrolled in online degrees take their classes exclusively online (referred to as ASU Online). ASU Online courses are evaluated to ensure they meet the Quality Matters rubric; thus, all courses have a solid instructional design and organization (Arizona State University, n.d.).

Quality Matters ensures that courses are systemically meeting standards designed to encourage student engagement and equip students with the tools and information needed to succeed. ASU Online requires course designers to ensure faculty teaching ASU Online courses in accordance with the Quality Matters rubric. For this study, students will be sampled from both iCourses and ASU Online classes, but all courses must fill the requirements of 1) adhering to the Quality Maters rubric, 2) being designed specifically to be implemented over the internet, and 3) using web-based materials and activities exclusively via the internet. In other words, in-person courses that were modified for remote learning due to the Coronavirus pandemic (summer or fall 2020 terms) are not assumed to meet such criteria, and thus, will not be utilized in this study.

Differences Between Online Programs and In-person Programs that Offer Online Courses

The *Theory of Involvement* makes assumptions regarding students' ability to choose the degree of involvement they desire (Astin, 1984). In other words, the strength of this theory is the assumption that students can increase their involvement, thereby increasing their abilities and personal confidence, and consequently, successfully complete their degrees. Thus, as Astin (1984) argues, the theory's greatest advantage is that the focus is less on the content of the course the student is taking and more on the behaviors of students in their learning environment.

However, a potential weakness of this theory is it does not explicitly consider that the opportunities for involvement for students pursuing online degrees (i.e., enrolled in ASU online) are much more limited than for those enrolled in face-to-face degree programs (e.g., take some iCourses, but most classes are taken on campus).

Nevertheless, the *Theory of Involvement* can still be applied to online learning and has implications for how online courses are designed and implemented (see Rovai, 2002), such that it could be expected that, similar to on-campus students, online learners who feel a sense of community and emotional connectedness (e.g., feel supported) would be more likely to persist in their pursuit of higher education. Moreover, given the lack of opportunities for interaction with classmates on campus, it could be expected that online students would value, or place greater importance on, participating in online learning communities (e.g., post more often to discussion boards, pose and answer more questions).

Aim 1: Importance (Value) of Peer Interaction

Students value opportunities to engage with their peers informally, such as in introductory-style discussions, and formally through collaborative work assignments (Martin & Bolliger, 2018). There is evidence to suggest that certain online activities and various educational tools, such as discussion boards, were found to relate to higher rates of emotional engagement for online students (Sun & Rueda, 2012). Unsurprisingly, students need to utilize the system to experience higher rates of engagement (Chen, Lambert, & Guidry, 2010). Chen, Lambert, and Guidry (2010) found that the integration of technology into online courses had a positive effect on student engagement, such that the more students were engaged with the learning technology, the more they were able to demonstrate higher-level thinking and learning in their course materials.

Moreover, Reilly, Gallagher-Lepake, and Killion (2012) argue that students crave increased interactions and report wanting both formal and informal methods to foster interactions, such as chat features or social networking websites. Yet, the most common

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form of discussion has been found to be asynchronous discussion board forums (Weil, McGuigan, Kern, & Hu, 2013). In these discussions, students do not have any time constraints and rarely have limitations on posts allowing students to participate as much as they would like. Students were interacting with their peers reciprocally as active participants in their learning experience whether they were incentivized through points or not (Delaney, Kummer, & Singh, 2019).

Still, is important to note that not all students enjoy interacting with their peers or traditional discussion boards. Some online students are not interested in engaging with their peers because their primary aim is to earn their degree (Hughes, 2007; O'Shea, Stone, & Delahunty, 2015). Researchers posit this may be because being a student is not their primary identity as online students are more likely to additional and competing identities at work and in their family (Hughes, 2007). In a study with 123 participants, the online student reported online discussions as the "least valuable strategy to engage [them] as an online learner" (Martin & Bolliger, 2018). In a different study with 107 undergraduate students, less than 8% of the students reported agreeing with the statement, "online discussions should be part of college courses" (Hurt, Moss, Bradley, Larson, & Lovelace, 2012). These students also reported that traditional discussions on discussion board forums did not enhance their learning.

Some instructors have even begun to integrate social media, such as Facebook, into their courses. Camus, Hurt, Larson, and Prevost (2016) found that Facebook was a better system to create the peer dynamics needed to encourage students to participate in discussions with their peers, whereas the traditional discussion board forum embedded in the learning management system would be a better method to encourage students to craft

solid arguments. Others have tried to improve traditional online discussion boards with social learning analytics to allow the students to see statistics and visualizations of how they interacted with their peers in the forums (Chen et al., 2018). In the small experimental study, they found that there was no significant difference in the number of posts, but the quality of the posts was better as assessed by social learning analytics. Despite the innovative approaches to enhance online learning, some evidence suggest that instructors value engagement strategies more than students (Bolliger & Martin, 2018).

As valuable as peer interaction is, simply providing students with peers does not guarantee student engagement. The interactions amongst the peers should also encourage the students to engage and reflect critically with the concepts and topics of the course (ASHE, 2014). However, a missing piece from this literature on peer interaction is students' perspectives on required peer interaction in online learning. This study aims to fill that gap by better understanding students' views on required and structured peer interaction and the various methods of peer interaction. By including the student perspective, educators can be more selective in providing meaningful and valuable opportunities for peer interactions.

Aim 2: Indicators of Online Student Engagement and Academic Performance

For this study, "engagement" will be synonymous with "involvement" as student engagement has long been an interest of educational researchers. The term "engagement" will be adapted from the Kuh (2009) and ASHE Higher Education Report (2014) and emphasizes the importance of students' active participation in the learning process, such as by way of discussion or collaboration with instructors as well as classmates. It has been argued that how a student engages in their learning experience is a stronger

predictor of learning outcomes than the demographics of the student or where they are pursuing their college education (Chen, Lambert, & Guidry, 2010).

The first section of this literature review will discuss broad support for the *Theory of Involvement* in previous research on engagement and academic performance. Although student engagement is a substantial literature on its own, the next section of this literature review will focus on specific aspects of engagement most relevant to the current project. Specifically, I consider four distinct ways student engagement can be manifested: 1) Independent engagement with the course materials, such as by studying regularly, keeping up readings, putting forth effort; 2) Collaborative or cooperative engagement such as by discussing the course material with classmates by posting to online discussion boards, actively participating in small group discussion boards, collaborating on course projects, and helping fellow students in the online community; 3) Personal engagement which involves making the course material applicable and relevant to their own lives; and 4) Social engagement, which is more relationship focused than course content focused, such as getting to know one's classmates and forming bonds that extend beyond a specific course. Figure 1 showing the *Theory of Involvement* illustrates these types of engagement and their link to academic outcomes.

Student Engagement, GPA, & Course Performance

Consistent with the *Theory of Involvement*, student engagement and academic achievement has been found to be positively related for students in various grade levels, such as middle school (Reyes et al., 2012) and high school (Christenson, Reschly, & Wylie, 2012; Lee, 2014). Student engagement has also been found to be significantly related to GPA for in-person college students (Fuller, Wilson, & Tobin, 2011) and

through various modalities (including hybrid in-person and online settings; see Northey et al., 2018). Robinson and Hullinger (2008), unsurprisingly found, based on NSSE data, students with higher grades were also more engaged in their courses. Similarly, Liu, Gomez, and Yen (2009) found that community college online students' final letter grades were related to their experience with social presence as "defined as the degree of one's feeling, perception, and reaction to another intellectual entity in the online environment" (p. 166).

The reason why engagement and presence have been linked to positive learning outcomes is that when students are exposed to social presence and social interaction, they develop a community that fosters learning (see similar argument made by Hostetter & Busch, 2006). In contrast to most of the literature on engagement and online courses, in their small sample of 112 traditional online students, a link between social presence and learning outcomes was not found. There was an explanation that there was minimal variation in the graded assignment (i.e., the dependent variable).

Academic outcomes will be measured by reports of GPA, expected grade in the course, and students' perceptions of their performance in the course. Students' perceptions of their performance in the course will be measured using one of the subscales of Dixson's (2010) Online Student Engagement Scale: *Performance*. The Performance subscale assesses whether students perceive that they are doing well in the course, and they are earning a good grade. This subscale will be used as one of the outcome variables. It is hypothesized that students who demonstrate high academic engagement and are engaged with their online community are more likely to have

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positive academic outcomes (e.g., student reports of higher GPA, higher grade in the course, higher self-reports of doing well in the course).

Student Engagement & Retention

While research has yet to explore the *Theory of Involvement* with online students, the idea that there may be a link between students' connection to their learning environment and retention is not new. Many researchers have attempted to draw attention to this link. Social connectedness and engagement are not only important for the learning experience but also a valuable predictor of retention. Retention can be influenced by a number of factors. Meyer (2014) found "a range of external factors (such as family support, finances, work responsibilities, and life crises), academic factors (such as student ability and course demands), social factors (such as peer or teacher interaction and involvement in campus groups or events), and other factors (such as transfer credit policies and changes in major)" (p. 23) that may affect retention rates.

Social presence is significantly related to retention. In a study with 28,877 associate's and bachelor's students, social presence in online programs was linked to student re-enrollment (Boston et al., 2009). The findings from another study with 353 community college online students also found a direct link between social presence as defined by feeling comfortable interacting with other members of the class and course retention (Liu, Gomez, & Yen, 2009). The researchers recommended establishing social and learning communities to encourage effective learning. The value on engagement could also come from evidence that students who are disengaged are more likely to fail out of school or withdraw (Finn, 1989). Thus, it is expected that students who demonstrate higher rates of academic engagement, and higher rates of engagement with

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the online community are more likely to continue with their academic program or graduate and less likely to withdraw.

Independent Engagement

Theory of Involvement originally emerged from the study of in-person learning environments, and studies conducted within such contexts have been consistent with the theory's premise that the more students are engaged, the greater their academic performance (Chen, Lambert, & Guidry, 2010; Lei, Cui, & Zhou, 2018; Northey et al., 2018; Reyes et al., 2012; Schlenker, Schlenker, & Schlenker, 2013). Although the link between online student engagement and academic performance has not been as clearly or thoroughly examined, there is evidence to support this link can be expected.

Students can demonstrate independent academic engagement in many ways, such as by putting forth the effort to complete assignments, keeping up on readings, and studying regularly. In a study with 137 Australian students, the distance-learner students stated that being a distance learner requires more motivation than in-person (Lyall & McNarma, 2000). The students also commented on the need to have high levels of motivation to persevere through their programs. For example, in a small study with 23 online students, intrinsic motivation was identified as a critical factor for students completing assignments, specifically assignments that demonstrated knowledge of concepts (Xie & Ke, 2011). Moreover, students with lower rates of motivation were less engaged (i.e., participated less) in discussions than highly motivated students. Although the current study does not tap into motivation per se, the behaviors indicative of academic engagement reflects students' level of motivation, such that engaging in such behaviors requires motivation (and low engagement is suggestive of low motivation). Furthermore,

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it is reasonable to expect that actual behaviors would be more predictive of academic success than being motivated, but not necessarily putting forth effort. Thus, I focus on behavioral indicators of academic engagement rather than psychological or emotional factors.

The engagement literature often defines self-regulation by how well students regulate themselves to complete assignments and learning activities. Self-regulation is another student trait that has been linked to engagement (Sun & Rueda, 2012). Sun and Rueda's (2012) study with 203 online students examined self-regulation, and the three types of engagement measures were behavioral, emotional, and cognitive (see Fredricks et al., 2004 for definitions). The findings of the study were that self-regulation was a significant predictive of all three forms of engagement. Another study with similar measures also found that self-regulation was positively related to cognitive and emotional engagement and negatively associated with behavioral engagement (Pellas, 2014). In other words, students who had self-regulation skills were more engaged in the course materials.

Online students enjoy the ability to be flexible and work on their assignments as it best fits their ever-busy schedule. This has been a theme in this literature with studies that date back 30 years (Murphy & Collins, 1997). This flexibility of online learning requires that students possess excellent time management skills if they are to be successful (Blackmon & Major, 2012). For example, online students are more likely to be juggling family and work, in addition to their responsibilities as a student, compared to in-person students. Thus, their ability to organize the demands of their lives (manage their roles and balance their time) and ensure they set aside sufficient time to study is

expected to influence their success in online classes as well as their ability to continue in their studies.

Research on online students' academic engagement often refers to these behaviors as "skills" (Dixson, 2010). However, it seems more appropriate to consider studying on a regular basis, being organized, taking good notes, etc. as engaging *behaviors*. This study will focus on academic engagement as behaviors including studying, being organized, and putting forth effort. While these may seem like basic skills to be successful in any learning environment, online students report actually engaging in such behaviors as challenging (Baxter, 2012).

It is expected that perceptions of instructor engagement and perceptions of the learning community will predict students' academic engagement because when students feel their instructors are engaged and feel encouraged and connected to their peers, they will report studying more, taking better notes, being more organized, apply the course to their lives, etc. Additionally, it is hypothesized that students who report greater levels of academic engagement will have stronger academic performance (e.g., higher GPAs, higher rates of retention). In other words, students who are able to study regularly, stay organized, keep up with readings, etc. are expected to have stronger academic performance (e.g., higher GPAs, higher rates of retention).

Collaborative Engagement

Collaborative learning has been identified as a key component to students' academic performance. In a study comparing undergraduate students' behaviors in in-person discussions and a blend of asynchronous discussions in a Facebook group, the findings showed that despite the groups, both groups' student participation in discussions

was positively related to the students' final grade in the course (Northey et al., 2018). Students in fully online courses also find success in online discussions. In specific, online students report that they find participating discussions to be engaging and a way to connect with other members of the class and the course material (Buelow, Barry, & Rich, 2018).

Despite a number of studies demonstrating the importance of developing a connected community through social interactions, not all students like social talk (Conrad, 2002). Some students find their peers' personal stories or supportive comments are best left to personal conversations rather than in the online classroom, whereas others find such disclosures encouraging and give them a sense of belonging and connectedness. Although students' sociability is not assessed using measures of temperament, it is tapped via the extent to which online students report participating in discussion boards, chatting online, and trying to get to know the other students within the online classroom context. Moreover, students' active participation in small-group discussions and posting regularly in classroom discussions is indicative of their engagement with the course as an online learner (Dixson, 2010). It is hypothesized that the more students engage with their online classmates, the more likely they are feeling a sense of community and shared goals that encourage them to persevere with the educational goals; thus, online community engagement would predict retention as defined by enrolling in future courses or degree completion (graduation).

In this current study, collaborative engagement will be measured as students' reports of actively participating and posting in discussion group forums, helping online fellow students, and similar behaviors to demonstrate engaging with classmates. It is

hypothesized that students who report greater levels of online community engagement will have stronger academic performance (e.g., higher GPAs, higher rates of retention).

Personal Engagement

In addition to studying and participating in online discussions, students can be engaged by finding ways to make course material relevant to their lives, has been shown to be an important form of engagement. Research has found students prefer labs or hands-on activities that encourage them to complete less traditional classroom assignments as these activities are more engaging (Buelow, Barry, & Rich, 2018). Online students also report wanting to be able to learn the course material in a way that would be relevant and relatable to their lives outside of the classroom (Bolliger & Halupa, 2018). Researchers have found that online students who are able to integrate their personal experience to course material allows student to engage in deeper and more meaningful discussion board posts (Fear & Erikson-Brown, 2014; York & Richardson, 2012). This is consistent with recommendations made by Buelow, Barry, and Rich (2018), who suggested that developing discussion prompts that encourage students to make clear connections between the course material and "real-world" experiences would help students' engagement.

The behaviors of applying course material or finding relevance in course material to their own lives is sometimes referred to as "emotional" engagement (Dixson, 2010). However, "emotional" engagement seems misleading and does not capture the active behaviors required to find relevance and apply course material to real life. Thus, this study will refer to applying course material or finding relevance in course material as

personal engagement and, it is hypothesized that students who find meaningful connections to the course material have stronger academic performance.

Social Engagement

As outlined by the *Theory of Involvement*, students enjoy socializing with their instructors and classmates. Socializing is another form of engagement but also serves as a way to help students be academically successful. Social connection among in-person college students was found to be positively related to first-year GPA (Allen, Robbins, Casillas, & Oh, 2008). Social connection was also found to be related to third-year retention. Specifically, students who were socially connected were more likely to report staying in their third year and less likely to transfer or drop out. Bolliger and Halupa (2018) argued that to help students engage with their online courses, the cognitive and emotional distance between the student, instructor, and classmates must be reduced. By reducing the cognitive and emotional distance between members of the class, learning opportunities can foster. Developing relationships with class members and getting to know one another can help students feel more connected to the learning classroom. Online students have a strong desire to be connected and developing connections help students be successful in online courses (Buelow, Barry, & Rich, 2018). Similar findings have been found with graduate students as well. In particular, Gasevic, Zouaq, and Janzen (2013) used social networking analyses with a sample of 505 online master's students and found that online social interactions was positively linked to academic performance.

Thus, the last form of online student engagement is social engagement and involves students' attempts to get to know their instructors and fellow online students in

more personal ways. It is hypothesized that students who get to know members of the class are more likely to perform better academically.

Aim 3: Predictors of Online Students' Engagement

Given the importance of student engagement in academic performance and perseverance, it is critical that educators understand the factors that influence their students' motivation to engage in their courses. In fact, researchers have suggested that future studies identify the factors that influence student engagement in online courses (see future direction suggestions in O'Shea, Stone, & Delahunty, 2015). For this study, I consider two pedagogical aspects of the online context and community that previous research has identified as potential predictors of students' desire to engage with the course: instructor presence and student perceptions of the online learning community (see Figure 2).

The extent to which online students are engaged with a course is likely influenced, at least in part, by the instructors' online presence as well as the opportunities the instructor creates for interaction with fellow classmate. Interestingly, students often value instructor-to-student interactions higher than interacting with either the content or other peers (Martin & Bolliger, 2018). Thus, instructors have a unique ability to help students before they even enter the online classroom. The following section will focus on how first focus on instructor presence and student engagement and then shift to understanding how online learning community relates to student engagement.

Instructor Presence

This first section will describe the three ways that instructors can make their presence known to their students—both directly and indirectly: (1) direct instruction, (2) instructional design and course design, and (3) instructor facilitation.

Instructor's Direct Instruction. Online teaching skills may reduce the dropout rate for online courses (Nash, 2005). Nash (2005) argues that the single, most important factor in reducing the high dropout rates of online courses is dependent on the teaching skills and ability of the online instructor. One of the main suggestions was to set up interactions for students and instructors, such as supplemental tutoring. Similarly, Burnette (2014) argues the key to reduce the high dropout rates of online courses is the teaching styles and demonstration of instruction skills in the classroom. Direct instruction allows students to feel that their instructor is part of the course (ASHE, 2014). Stavredes (2011) wrote a book titled "Effective Online Teaching: Foundations and Strategies for Student Success" that lays out various ways to help instructors develop key skills to be successful in an online classroom. This book is an excellent tool for online instructors to develop their teaching skills and helps instructors set up an online classroom that students find engaging. A couple of the key concepts for instructors to illustrate good direct instruction is to consider cognition, learning, and motivation and to encourage students' thinking and discusses methods of scaffolding the students' learning (Stavredes, 2011).

In the present study, direct instruction will be measured in how well instructors (1) present concepts in a way that helps students learn, (2) focus discussions on relevant topics, (3) provide guidance to understanding, and (4) provide relevant information from

different sources. Instructors who demonstrate these key skills have strong direct instruction skills as they can present content or questions in a way to help students learn, focus discussions to assist students' learning, provide helpful feedback to assist in scaffolding, utilize a number of sources to encourage students thinking (see Shea and colleague's (2006) scale on Teaching Presence). It is hypothesized students who report their instructors are effectively instructing the course are more likely to report engaging independently, collaboratively, personally and socially.

Instructional Design and Course Design. While it is the students' responsibility to take part in their course and be active in their online courses and learning, it is also the instructors' responsibility to design courses that are intentionally encouraging interaction and developing a community that communicates throughout the online learning environment (Robinson & Hullinger, 2008). It is clear that students want more than to simply read the textbook (Boling, Hough, Krinskey, Saleem, & Stevens, 2012; Schilling, 2009). A common suggestion is to make sure to design the curriculum with the purpose of delivering the concepts online (Rovai & Downey, 2010). Copying course materials designed for in-person material to an online course is inadequate and a disserve to the students' learning (O'Shea, Stone, & Delahunty, 2015).

The course design is extremely important to prepare students for success in online courses. To develop a successful course design that will prepare students for success in online courses requires time and thoughtful design. Instructors are often encouraged to complete their course websites before the start of the course to allow for better student-instructor engagement (Arbaugh, 2010). Some of the methods for creating an engaging course design is by having a clear week to week organization, providing a variety of

tools, offering appropriate evaluation, considering the methods in which course assignments are being submitted, and providing detailed rubrics (Davis, Greenaway, Moore, & Cooper, 2019). Based on self-determination theory and empirical evidence, Lee, Pate, and Cozart (2015) developed a list of three recommendations to utilize autonomy-driven strategies to encourage engagement and positive performance in online courses. The specific recommendations were for instructors "to provide choices, rationale behind why assignments are designed in particular ways, and flexibility in completing more personally meaningful assignments" (p. 55).

Another consideration when developing a course design that is strong in teaching pedagogy is to make sure the assignments are appropriate for the course goals. The emphasis on student engagement must make sense and align with the learning objectives outline (ASHE, 2014). Bloom's taxonomy is instrumental for many educators in developing course objectives and corresponding course assignments. Online discussions are often utilized in online courses to encourage students to interact with not only their peers but also their instructor and the course material. Meyer (2005) utilized Bloom's taxonomy to analyze 17 online discussions. There is evidence to suggest that for discussions to reach higher-level knowledge, instructors will need to craft prompts that encourage students to respond with posts that reach higher levels of Bloom's taxonomy. Thus, allowing students to engage more with the course material.

The level of engagement in discussions can vary by a number of factors. One such factor is the type of assignment assigned. Students rate projects that apply directly to real-world issues and structured discussions highest in being beneficial to their learning experience (Martin & Bolliger, 2018). Empirical evidence suggests that project-based

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learning is more beneficial and produces higher-level thinking than non-project-based learning. For example, Koh, Herring, and Hew (2010) found that when students were asked to problem-solve in their own courses, they demonstrated more advanced levels of knowledge construction, such as "evaluation of ideas and crafting solutions." Relatedly, Williams and Chinn (2009) found that active learning type assignments produced similar advanced thinking from the students. Active learning does not need to be restricted to the online classroom. Instructors can ask students to problem solve problems that are occurring in the "real world" or go out and have the experience to reflect on, such as interviewing an individual with their ideal career. These active learning experiences can be crucial to student engagement in their online courses.

All of the suggestions discussed in this section are ideal for fostering student engagement through the instructional design and course design. Students' perceptions or experience of a course as organized, easy to navigate, and consists of clear instructions and expectations motivate them to engage with the course material and assignments. Furthermore, effective instructional design is positively related to students' feelings of the students' self-reported levels of learning (Shea et al., 2006). Therefore, this study will focus on direct instruction to mean instructors are (1) setting a strong curriculum (i.e., clear course goals, course topics, and instructions), (2) thoughtfully organized deadlines (i.e., clear deadlines that allow learners to learn at a reasonable pace), (3) effectively utilizing online classroom tools, and (4) setting a tone for acceptable behaviors in the online learning environment (i.e., netiquette). It is hypothesized students who report their instructors are effectively designing the course are more likely to report engaging independently, collaboratively, personally and socially.

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Instructor Presence and Facilitation. Instructor presence can be seen as the structure or instructional design and the way the instructor facilitates learning in their online classroom. Both are key to the learning process and relate to the perception that the instructor is an active member of the course (ASHE, 2014). Instructor presence in the classroom can strongly influence the way students learn. There is evidence to suggest that the teaching and social presence relates to cognitive presence over and above the students' own readiness, their previous experience in online classrooms, and any prior experience with collaboration (Archibald, 2010). In other words, the design of the course assignments, the way the instructor communicates with the students, and constant presence throughout the course help students meet the cognitive presence required to be successful in the course.

One of the ways instructor presence has been found to influence students' learning is through cognitive measures. Researchers have proposed that teaching presence is linked to engagement when students recognize their own thinking and assess the changes as the course progresses and students engage in discussions and complete assignments (Garrison & Arbaugh, 2007). Teaching presence is more than just creating a decent set of instructions. It is directly related to students' social and cognitive presence in courses. For example, Garrison, Cleveland-Innes, and Fung (2010) found that students perceived their own learning and cognitive presence to be affected by their teachers' presence. This study was guided by the Community of Inquiry (CoI) framework that links teaching presence to students' presence (i.e., engagement).

The way instructors engage with their students does matter. One of the ways instructors can show a social presence is by posting a video of them in real-time.

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Researchers argue that this demonstration of personality increases familiarity and benefits classroom discussions (Borup, West, & Graham, 2012). The social presence this creates in the classroom encourages students to be more willing to engage in course discussions. Interestingly, there is a debate about how many online instructors should participate in online discussions. Although instructor engagement is a critical part of the learning experience, there is evidence to suggest that too much involvement from an instructor is not productive (Arbaugh, 2010). Arbaugh (2010) argued that instructors who were too involved in online discussions reduced their students' positive learning outcomes. Specifically, instructors' comments and posts in a discussion board type of interactions can deter students from engaging in discussions with their peers (Arbaugh, 2010; Vaughn, 2004). To improve engagement, instructors should aim to encourage interactions among peers rather than just between instructor and student. However, there may be some factors that may determine how much an instructor should participate in discussions, such as the age of the students and maturity level.

Another method for teachers to demonstrate teaching presence is through directed facilitation. Shea and colleagues (2006) identified direct facilitation of discourse as a vital task to make sure learners remain engaged in their learning material. Directed facilitation of discourse to "include the identification of areas of agreement and disagreement, seeking to reach consensus and understanding; encouraging, acknowledging, and reinforcing student contributions; setting the climate for learning, drawing in participants, prompting discussion, and assessing the efficacy of the process" (p. 177).

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This study will focus on the direct facilitation of instructor presence to demonstrate instructors' activeness because of the important role it plays in creating a learning community and maintaining student engagement. Specifically, instructors who demonstrate a strong ability to facilitate are likely to (1) identify areas of agreement or disagreement within course topics, (2) acknowledge the student's participation to reinforce their contributions, (3) set a climate that encourages learners to think, and (4) provides thoughtful and engaging prompts to keep students engaged. It is hypothesized students who report their instructors are effectively facilitating the course are more likely to report engaging independently, collaboratively, personally and socially

Online Learning Community

Students want to feel connected to the members of their class (Buelow, Barry, & Rich, 2018). Being connected to their learning community has been found to be a related to students' engagements (Shea & Bidjerano, 2009). While there are a number of valuable parts of learning communities, the following section on the online learning community will focus on the aspects most relevant to the current study: (1) students' perceptions of instructor support, (2) sense of community, and (3) safe and welcoming learning environments.

Instructor Support. Research has shown that feeling supported by their instructors helps students engage in the course and course material. Jaggars and Xu (2016) argue that the student-instructor relationship is more important to student success than how well the course is designed. Several other studies have found feeling supported and connected to one's instructor is key to students' success. For example, in a study with 601 in-person community college students, students who felt that their instructors

were helpful and sympathetic was a strong predictor of learning (Lancaster & Lundberg, 2019). Unsurprisingly, similar sentiments are held by online students. In responses to open-ended questions on engagement, online learners reported that they value accessible and responsive instructors as it helps them feel engaged and connected to the learning community (O'Shea, Stone, & Delahunty, 2015).

An indicator of a classroom community is the connection between the instructor and student (Rovai, 2002). This study will use items such as "I feel the instructor in this course cares about me" and "I feel that it is easy to get help from my instructor when I have a question" from Rovai's (2002) Classroom Community Scale to tap into instructor support. It is hypothesized students who report high levels of instructor support are more likely to report behaviors of online student engagement.

Sense of Community. Throughout this literature review, a common theme has been for instructors to encourage interactions to encourage student engagement. For example, Chatham-Carpenter (2017) wrote a brief essay specifically calling for fellow scholars to study the association between communication and outcomes in online courses. They argued that while progress has been made to identify strategies for instructors to facilitate positive and engaging classroom climates in online courses, there is still a lot to learn in how instructors can use the technologies in an online classroom to better students' success in the online courses and provide opportunities for personal growth. Instructors are essential to creating an online classroom that encourages growth and allows students to engage with their peers. The social climate is more than just socialization (Oren, Mioduser, & Nachmias, 2002). The sense of community needs to

also be built from having a community-wide educational goal. The community instructors can create in their online courses can foster student engagement.

A connected community can help online students feel engaged, such as through classroom interactions. Students' perceptions of their online classroom communities are associated with their sense of community and cognitive enhancement (Reilly, Gallagher-Lepake, & Killion, 2012). Online students' reports of sense of community have been significantly and positively related to learner engagement, such that the more positively the students perceived their online learning community, the more engaged they were in their studies (Lear, Ansorge, Steckelberg, 2010; Young & Bruce, 2011). Similarly, the link between relatedness (i.e., "the need to be related to others" p. 919) and peer interactions has been examined (Xie & Ke, 2011). In a study with 23 online courses examining students' motivations in online discussions moderated by peers, relatedness was found to be the critical factor that influenced the collaborative elaboration interactions. While many may assume that developing a community needs to build on personal relationships, a social presence can actually be achieved through less personal socialization and an increase of interacting with peers with an educational focus (Garrison, 2011).

The research on student involvement and online courses has been studied, but there are various areas of research yet to be explored. Astin (1984) identified several research possibilities, such as assessing the various types of student involvement. Additionally, Astin (1984) questioned the importance and role of peer groups, stating that it is valuable to understand the different ways student peer groups could improve a student's learning process. Peer interactions in online courses can vary, but a common

theme to the success of positive peer interactions and positive learning outcomes is the learning community. Song, Singleton, Hill, and Hwa Koh (2004) argued that the learning community (specifically a lack of sense of community) is a strong indicator of many aspects of online learning experiences. Rovai's (2002) study with 314 students in online courses found that when students reported a sense of community, they were likely to report experiencing cognitive learning.

An indicator of a strong classroom community is the ability to have immediate communication to reduce the perceived distance between the learners (Rovai, 2002). The Classroom Community Scale used in Rovai's (2002) study has been adapted for this study to measure students' feelings of community in the classroom as a predictor of student engagement behaviors. Rovai (2002) described students who had a high sense of community were more likely to agree with statements such as feeling "I feel connected to other students in this course" and "I feel a spirit of community in this course." It is hypothesized students who report a strong sense of community are more likely to report behaviors of online student engagement.

Safe Learning Environments. An indicator of a safe and welcoming classroom community is the ability to "trust and help each other" (Rovai, 2002, p. 322). Students' comfort, or lack of comfort, with members of their class impacts their engagement in the course. Meyers (2008) suggested that creating a safe and welcoming community in online courses allows students to feel more connected and better engage with the course. Instructors can create this space by "validating students' contributions and opinions, remaining attentive to students' reactions and emotions" (p. 220). While the literature is limited in examining the specific link between students being comfortable expressing

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vulnerability (e.g., sharing with others that they do not understand certain concepts or that they are having difficulty with the material) and online student engagement, there is evidence of this link in various in-person settings. For example, in a study with adolescent students, those who were anxious were less likely to socially engage with their peers (Scanlon, Del Toro, & Wang, 2020). In specific, social engagement was found to mediate the link between the teens' social anxiety as measured by the students' willingness to share ideas or expose vulnerability and final course grade and test scores in their science classes. In another study with middle-school students, the link between the classroom's emotional climate, as measured by the observed "warmth" in the classroom, and letter grades was mediated by engagement as measured by the students' effort and interest in completing the class assignments (Reyes et al., 2012).

This study will use items such as "I feel reluctant to speak openly to other students (reversed)" and "I feel uneasy exposing gaps in my understanding to my instructor (reversed)" from Rovai's (2002) Classroom Community Scale to tap into students feeling psychologically and emotionally safe comfortable with their online learning environment. It is hypothesized students who feel comfortable being vulnerable with the members of their class are more likely to report behaviors of online student engagement, such as being academically and personally engaged, active in the learning community, and socially engaged.

Aim 4: Potential Correlates of Online Student Engagement

In addition to the constructs shown in Figures 1 and 2, research suggests several factors at the student-level may play a role in the varying experiences with student engagement in online learning. Although some researchers believe that personal

characteristics (i.e., gender, age, minority status, enrollment status) influence students'

experience in online courses and retention rates, these variables are often not controlled

for or measured, such as in the Berge and Huang (2004) and Swan and colleagues' (2008)

studies. Meyer (2014) argue that demographic variables need to be considered in future

studies examining online learning environments as the available data on how personal

student characteristics impact online learning processes is inconsistent. This study aims

to address this inconsistency in the literature by measuring the following variables as it

relates to *Online Student Engagement* behaviors: (1) age, (2) gender, (3) ethnicity, (4)

ethnicity, (5) fully or partially online students, (6) first-generation status, (7) living

arrangements, (8) reason for taking online courses, and (9) importance of peer

interaction.

Age

Online learning has expanded the definition of a traditional online college student,

including age. Unsurprisingly, online college students tend to be older (James, Swan, &

Daston, 2016). For example, online students at Arizona State University are, on average,

30 years old (range from 22-60 years old; ASU Now, 2019). Moreover, studies have

found age as a factor in how students experience their online college experience. For

example, one study found that younger students wanted more engagement in the form of

information from their instructors, such as announcements or reminders, than the older

students (Martin & Bolliger, 2018). However, Robinson and Hullinger (2008) used the

National Survey of Student Engagement (NSSE) data and found older students were

typically more engaged than their younger peers. One of the rationales behind this

finding is that older students are more experienced and select programs that are more

related to their interests (Meyer, 2014). Similarly, their college experience allows the students to have a better understanding of the commitment it takes to complete a college education (Meyer, 2014). However, not all studies found differences in online learning based on age. For instance, Shea and Bidjerano (2009) found that there were no significant differences in student satisfaction or reports of community in their online classroom based on age. The lack of differences may have been because the majority of their sample was under 25 years old. This current study sample consists of a larger age range. Thus, it is expected that there will be a difference in engagement based on age. Despite the contradictory findings in previous studies, it is expected that older students will display more engagement because they have more experience and better understand the commitment needed to be successful.

Gender

Gender is one of the most commonly assessed demographic variables. There have been significant differences found in how female and male students engage with their online courses (Martin & Bolliger, 2018). Female students have been found to perform better in online courses than their male classmates (Simpson, 2004). Rovai (2002) found that "female online students tend to have a greater sense of connectedness and perceived cognitive learning than their male counterparts, suggesting that gender-related differences, such as communication patterns may be involved" (p. 330). On the other hand, some studies found that male students were more likely to interact with members of the course and engage in the course material (Robinson & Hullinger, 2008), while others found no differences (Garrison, Cleveland-Innes, & Fung, 2009).

Another reason why it is important to account for differences by gender is that students may perceive their online learning experience differently based on whether they associate with non-binary gender. In a study designed to help instructors develop strategies to increase engagement in online courses, one of the important rationales discussed is the assumption by many that gender is binary (Lee, Pate, & Cozart, 2015). This gender binary perspective may make students who do not feel comfortable feel isolated.

Ethnicity

While minorities were more likely to be enrolled in online courses than their White/Caucasian peers (Chen et al., 2010), there have been inconsistent findings in whether there were differences in the online learner experienced based on ethnicity. Some studies did not find any differences between ethnic groups in reported levels of student engagement (Pike, Smart, Kuh, & Hayek, 2006). Yet in another study, African American students reported a "lower sense of social community and learning community than their White/Caucasian classmates" (Rovai & Wighting, 2005, p. 107). This may due to lack of representation in faculty and often the lack of inclusive curriculum. Both of these studies were not representative of the higher-education population (e.g., 1.7% Latino); a more diverse sample would be necessary to understand if there are any ethnic differences in engagement.

Full-time Online Students vs. Partially Online Students

An additional potential factor is whether the student is enrolled in their degree program as a full-time or part-time online student. There is some evidence that suggests part-time students are more likely to be enrolled in online courses than their peers

enrolled as full-time students (Chen et al., 2010). Fisher (2010) found that part-time status amongst online students was related to engagement. It was argued that students who had to enroll in college as a part-time student, probably had additional obligations (professional and/or personal) that prevented the students from fully engaging in their courses. Online learners are often compared to in-person students and evidence typically suggests that in-person students are more engaged than online students (Cooper, 2018). A study comparing student engagement of online-only learners, in-person learners, and dual-mode learners, found that online learners had lower levels of engagement (Paulsen & McCormick, 2020). The students who were dual-mode learners exhibited rates of engagements more similar to face-to-face students. Consider that the dual-model learners are comparable to the iCourse students in this study, it was hypothesized that students who are part-time online (iCourse) students are more likely to be engaged than full-time online (ASU Online) students.

First Generation Status

Students with in-person college students have revealed that first-generation undergraduate students have lower rates of student engagement (Pike & Kuh, 2005; Soria & Stebleton, 2012). The pattern in lower engagement amongst first-generation student is often explained by first-generation students coming from families of lower socioeconomic status and lower levels of engagement as high school students. Although minimal research has been conducted to examine first generation status as it relates to student engagement in the specific context of online education, it is expected that similar patterns would emerge. Consequently, it is hypothesized that students who are first

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generation students are less likely to be engaged than students who are not first-generation students.

Living Arrangements

Most of the literature on living arrangements of college students and student learning experiences focuses on whether the students lived on or off campus. In general, students who live on campus and enrolled in in-person programs seem to have higher levels of engagement compared to fellow in-person classmates who live off campus (Burlison, 2015). Student employment and living arrangements has been found to be predictive of level of engagement and disengagement for in-person students (Bozick, 2007). Traditional in-person students who are from low-income families tend to have financial pressure and live at home and researchers believe the lack of support puts them at risk for poorer performance. These results suggest that living arrangements may also impact engagement for online students. However, given that online students are "non-traditional" and are more likely to be married or have full-time employment (Burnette, 2014), their living arrangements are more involved than typical comparisons of on-campus versus off-campus housing. This study aims to address this gap in the literature by examining various potential living as it relates to levels of engagement in online courses. The previous studies on in-person students' living arrangements and engagement suggest that living on campus is beneficial for students due to the connections and support provided. Thus, it is expected that online students who live with support systems (such as a spouse, committed partner) are more engaged in their courses than those who are do not live with support systems (i.e., roommates, alone).

Reasons for Taking Online Courses

Students are multifaceted and unsurprisingly these personal characteristics are often related. For example, students who are living at home are also likely to be in a financial position that requires they work (Bozick, 2007). Students often seek online courses due to the flexibility required because of their work situation (Burnette, 2014). Students who need to work are not necessarily at risk for disengagement. For example, Bozick (2007) found that students who have to work to support their education are not more likely to be disengaged. First year in-person and Pell grant eligible students were more likely to be engaged in their education than their classmates who were not in financial need (Pike, Smart, Kuh, & Hayek, 2006). While financial need and work demands are common reasons for taking online courses, there are other reasons why students may choose to take online courses, such as health concerns, family responsibilities (Jaggars et al., 2013). It would be valuable to understand if the reasons guiding students to take online courses relates to their levels of engagement in these other areas as well. Despite the lack of data on online students' reasons for taking online courses and how it relates to the student engagement in online courses, there seems to be a pattern that students who have competing roles and responsibilities may be distracted and less likely to be engaged. Thus, it is hypothesized that students who are taking online courses due to financial, families, work demands are less likely to be engaged than their peers who do not identify these reasons for taking online courses.

Importance of Peer Interaction

Expectedly, students who find meaning and value in their assignments are more likely to be engaged. In a literature review on in-person student engagement, Groccia

(2018) stresses the importance for students to value their course assignments and tasks in order to encourage deeper levels of engagement. While there is evidence to suggest online students value opportunities peer interaction, it is unclear how this appreciation relates to student engagement (Martin & Bolliger, 2018). However, given that in-person research suggests that students are more engaged with activities they find meaningful, it is expected that students who find peer interaction important will be more engaged than their classmates who do not value peer interaction.

Summary of Aims and Hypotheses

In summary, the goal of this dissertation is: 1) to further understand online students' desire for a sense of community with fellow classmates; 2) validate the *Theory of Involvement* for online learning, and 3) to explore potential factors that may influence student engagement. The study is grounded in Astin's (1984) *Theory of Involvement* (see Figure 1) and based on the premise that online students are more likely to feel disconnected and isolated from the learning environment; thus, the development of a supportive and encouraging online learning community is important and valuable to them. Specifically, I propose that online students appreciate opportunities to connect with their classmates and value a supportive community that helps them stay motivated and shares information and knowledge to help them be successful. The main hypotheses are: (1) online students who are more engaged will have higher rates of retention and demonstrate stronger academic performance (see Figure 1), (2) perceptions of their instructor engagement, the perceived value of peer interaction, and sense of community are factors for online student engagement (see Figure 2), and (3) online students' engagement is influenced by differences in their personal characteristics (such as age,

gender, academic year, whether they are full-time or part-time online students), the challenges they face, and how important having opportunities to engage with fellow online students is to them.

METHODS

Participants

During the first quarter of the fall semester (September 2020), 25 online instructors of the Sanford School of Social and Family Dynamics unit at Arizona State University (ASU) were contacted to email their students about an opportunity to participate in an online survey about peer interaction in online courses. Nine of the 25 instructors replied stating that they would share the information with their students. Four of the nine participating instructors offered their students extra credit. During the second quarter of the fall semester (October 2020), 20 online instructors were contacted. Four of the 20 instructors replied stating they would share the information with their students and three of the four participating instructors offered extra credit for completing the survey.

The instructors who participated in this study were all female and had been teaching online for five to eighteen years at ASU. The online instructors of the Sanford School of Social and Family Dynamics unit tend to have high student evaluations, such that it is unusual for an instructor to score below four in a five-point scale on student evaluations (where one indicates low levels of satisfaction and five indicates high levels of satisfaction). As part of teaching ASU Online courses, all the instructors had completed the Master Class training through ASU's EdPlus prior to teaching online. Although completing the Quality Matters Rubric training is not required, ASU's EdPlus

assigns course designers to each ASU Online course to ensure that the course is compliant with the Online Quality Matters Rubric.

The total number of students invited to participate in the survey during the first and second quarter of the fall semester were 2,249 and 1,275 respectively. Only unique participant responses were retained. Repeated or incomplete surveys were removed, these included students who completed the survey multiple times for different courses (identified by Qualtrics as duplicate IDs using the last 5 digits of their cell phone number), as well as students who started the surveys but never completed them, such cases were removed so only unique participants' first set of responses were retained. In addition, participants who were indicated that they had never participated in Yellow Dig or in Discussion Boards (n = 8) were removed. Lastly, 15 cases were removed because the responses were identified as "spam" by Qualtrics, and no responses were recorded. The final sample consisted of 1,514 unique students who reached the end of the survey.

Tables 3 to 6 present demographic data (descriptive statistics) for the sample. Participating students ranged from 18 to 64 years old (M_{age} = 25.96; SD = 7.64) and were primarily female (n = 1,259), with 232 identifying as male, 12 as non-binary, 1 gender fluid and 1 having preferred to not reply. The sample was 53.6% White, 21.4% Hispanic or Latino, 7.8% biracial or multiracial, 6.8% Black or African American, 6.2% Asian, 1.5% American Indian or Alaska Native, .4% Native Hawaiian or Other Pacific Islander, and 2.3% reported as other.

Although students were recruited from SSFD courses, they reported diverse majors, such that less than half (N = 487; 32.4%) listed their major as either Family & Human Development (FHD) or Sociology. Other majors included psychology (12.6%),

health-related (18% composed of nursing, global health, and kinesiology majors), and Communication (6.3%). The sample consisted of 89 freshman, 282 sophomore, 521 junior, and 565 senior students. There were some students who stated they were transfers and unsure ($N = 8$), working on a second undergraduate degree ($N = 4$), taking courses as a post baccalaureate or nondegree seeking student ($N = 6$), or reported "other" ($N = 14$).

ASU students are diverse, and a majority of online students are considered "non-traditional". About 45% of the sample were first-generation student ($N = 679$) as defined as being the first person in their family to attend a four-year college/university to obtain a bachelor's degree. Although a majority of the sample did not have children (77.4%), 131 students reported having 1 dependent child, 114 students reported having 2 dependent children, and 85 students reported having 3 or more children.

ASU offers online courses to students via Online courses and iCourses. ASU Online courses are for students whose entire program is online courses, whereas iCourses are online courses offered to students enrolled in in-person programs. For this study, 60% of the student participants were enrolled as ASU Online students, and 40% of the student participants were enrolled as iCourse students. The participants of the study took an average of 25 courses ($SD = 15$) with responses ranging from 1 to 60 courses.

Given that the study was conducted during the COVID-19 pandemic when in-person classes were cancelled and thus technically all students took courses online, some iCourse students may not have been enrolled in this format by choice. *T*-tests of students' preferences for online courses supported this concern ($t(1478) = 10.40, p \leq .001$). Specifically, students enrolled in iCourses ($M = 3.25, SD = 1.13$) indicated a lower preference than ASU online ($M = 3.87, SD = 1.12$) for this type of learning format.

Procedures

  The 21 online instructors were contacted via email (see Appendix A for exact email used). The instructors were asked to forward information regarding the study to students through their email or as an announcement on their course site (i.e., Canvas) if they required peer interactions as part of their course. Instructors were not instructed to offer extra credit for participation in the study. However, some did offer students extra credit for participating in the study.

  In the message sent to the students, students were provided a link to a secure online survey via Qualtrics. Per IRB, the students were aware of their optional and voluntary participation in the survey and their ability to leave the survey at any time. The survey consisted of 109 total questions, which tapped into a number of important variables. The online questionnaire took an average of 20-25 minutes to complete. Students who completed the survey were entered into a raffle to win one of four $25 gift cards to incentivize participation in the study.

Pilot Data

  In Summer 2019, the measures listed below were piloted tests with students from two courses (FAS301: Intro to Parenting and FAS332: Human Sexuality). Two hundred students were invited to complete the pilot survey for extra credit. Out of the 200 students, 150 completed the surveys, suggesting that it would not be unreasonable to expect a participation rate near 75%. The participants' age ranged from 19 to 60 years old, and the mean age was 27.63 years old ($SD = 7.82$). There were 114 females, 35 males, and one nonbinary. The racial breakdown of the pilot sample was 85 White, 35 Hispanic or Latino, 9 Black or African American, 9 Asian, 9 Biracial, and 2 American

Indian or Alaska Native. A majority of the students were ASU Online students (80%) and had taken three or more online courses (88%). Given that these were 300-level courses, it is not surprising that the majority of the students were juniors (47 students) or seniors (82 students). Using the data pilot, I computed descriptive statistics and preliminary analyses provided in Table 1, which offer support for the validity and reliability of the proposed measures. Additionally, based on the results from the pilot study, some items were edited, while others were added to increase internal reliability, or to provide additional insights into the associations between study variables.

Measures

Demographics

Twenty-two questions in the survey ask participants to provide demographic information, such as gender, age, ethnicity, and rank/status (e.g., freshman, sophomore) in school. Participants were also asked to report on whether they were a first-generation student, if they are registered in ASU Online or taking an iCourse as a part of their face-to-face program, and ratings to best describe why they are taking an online course. Students were also asked to self-report their current GPA (one of the outcome variables). Means, standard errors, and ranges for ratio-level variables (age, number of dependents and number of online courses taken) are reported in Table 2. Frequencies and percentages of nominal-level variables, including gender, ethnicity, relationship status, academic rank, major and first-generation status, are reported in Table 3. Ordinal-level variables, GPA and letter grade in course, are reported in Table 4.

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Current Online Course Context

Students were asked to list the course they were going to report on in the remaining sections of the survey. Additionally, in order to gain a better understanding of the course, students provided context about their current online course. Students reported on the type of online peer interactions being offered, such as traditional discussion boards or Yellowdig (a discussion board forum resembling popular social media platforms), and the frequency of such requirements (see Appendix B).

Indicators of Retention and Academic Performance

Students were asked to report whether they were returning the following term by responding: 1 = *yes*, 2 = *No, I am graduating*, 3 = *No, I am taking a term off, but I will return*, or 4 = *No, I am withdrawing from ASU*. Frequencies and percentages for this measure of retention are presented in Table 5.

Students were also asked to hypothetically consider the reasons why they would withdraw from ASU. Students rated 7 distinct reasons as to why they might hypothetically withdraw on a 3-point scale (1 = *very likely the reason*, 2 = *possibly the reason*, 3 = *not at all the reason*). These reasons included concerns such as financial reasons, family, health issues, work demands, etc. Next, students were asked to rate different factors and how much engagement with these factors would influence their decision to continue pursuing their degree. These factors included engagement with peers, the course instructor, the program unit, and ASU itself. Means and standard deviations are reported in Table 6.

In addition to self-reported overall GPA and current online course GPA (see above), two items from Dixson's (2010) *Online Student Engagement Scale* were also

included to assess student perception of how well they were doing in their online courses. Specifically, students report on a 5-point scale in regard to how characteristic it is of them, in the specific course, to: 1) getting a good grade, and 2) doing well on tests/quizzes (see Appendix B). Finally, students also self-reported their current grade earned in the current course was also reported. Means, standard deviations, and alphas are reported in Table 7.

Online Student Engagement

To assess online students' engagement, Dixson's (2010) *Online Student Engagement Scale* was adapted (see Appendix B). Specifically, two items were added about engagement with the instructors that paralleled items tapping engagement with peers. Eleven items focused on students' academic effort, such as "studying on a regular basis" and "looking over class notes before getting online to make sure I understand the material" and eight items were designed to assess the extent to which they engaged in learning opportunities with their instructor and peers (e.g., "participating actively in small-group discussion forums"; "posting in the discussion forum regularly"; "meeting with the instructor"). Participants responded to these19 items using a 5-point scale to rate how much they felt each descriptor represented their behaviors, perception or experiences: 1 = *not at all characteristic of me*, 2 = *not really characteristic of me*, 3 = *moderately characteristic of me,* 4 = *characteristic of me*, and 5 = *very characteristic of me*.

Although the original Dixon's (2010) scale had three subscales, Confirmatory Factor Analyses (CFAs) revealed a 4-factor solution best fit the data (see Results Section: Table 11 and Figure 3). The first factor reflecting independent engagement was labeled

Academic Engagement and included 7 items specific to learning the course content, such as "making sure to study on a regular basis", "keeping up on the readings" and "putting forth effort." The second factor, tapping collaborative engagement was labeled *Online Community Engagement*, and consisted of five items tapping students' active engagement in the online community, such as "participating actively in small-group discussion forums", "helping fellow students", and "posting in the discussion forum regularly." Four items indicative of personal engagement loaded to together on a scale labeled, *Life Application Engagement* as items tapped students' efforts to apply the course material to their lives. Lastly, the fourth factor comprised three items reflective of, and labeled as, *Social Engagement* due to the inclusion of items focused relationships, rather than academic, engagement (e.g., "getting to know the other students in the course" and "getting to know the course instructor"). Scales were created by averaging relevant items. All subscales evidenced adequate reliability (α's = .80 to .85; see Table 7 for means and standard deviations).

Instructor Presence

Students used a 5-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral,* 4 = *agree*, and 5 = *strongly agree*) to rate how much they agreed with each of 19 statements from Shea and colleagues' (2006) *Teaching Presence Scale* (TPS). Items on the TPS were designed to assess students' perceptions of their online instructors in three distinct domains: (a) *Direct Instruction*, comprising 5 items, such as "the instructor focused discussion on relevant issues in a way that helped me learn" or "the instructor presented content or questions that helped me to learn.*"; (b) *Instructional Design*, 6 items

including "the instructor clearly communicated important course goals (e.g., provided documentation on course learning objectives) or "the instructor helped me take advantage of the online environment to assist my learning (e.g., provided clear instructions on how to participate in online discussion forums)"); and (c) *Instructor Facilitation*, 6 items, such as "The instructor acknowledged student participation in the course (for example, replied in a positive, encouraging manner to student submissions)" or "the instructor helped to keep students engaged and participating in productive dialog."

Two items intended for the latter scale (i.e., *Instructor Facilitation*), "The instructor was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn." and "The instructor was helpful in guiding the class towards understanding course topics in a way that assisted me to learn." did not load well on the CFA and dropping these two items from the measure improved the model fit (see Results Section: Table 12 and Figure 15). Items on their respective scales were averaged, and descriptive statistics for the final three scales, including means, standard deviations, and alphas are reported in Table 7.

Online Learning Community

The 22-item *Learning Community Scale* was adapted from Rovai's (2002) 20-item *Classroom Community Scale* for students to self-report and assess their feelings of community. Specifically, two statements were added to allow distinction between instructor and peers. Students rated how much they agreed with each "sentiment" on a 5-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral,* 4 = *agree*, and 5 = *strongly agree*). Although the measure was designed to tap into students' sense of community with their classmates distinct from their connection with their instructor, a CFA

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conducted revealed a 3-factor solution best fit the data (see Results Section: Table 13 and Figure 16).

In addition to a 3-factor solution, five items had poor loadings and omitting them improved the model fit as well as the interpretability of the remaining scale. For example, one of the items referred to classmates' treatment of each other generally, rather than to the student specifically. Another item referred to academic feedback rather than support and encouragement. A third item referred to feeling isolated and the last two others reflected distrust of classmates.

Of the remaining 17 items, 7 referred specifically to the instructor and the degree to which students felt supported, encouraged and cared about. This scale was labeled "*Instructor Support*" and included items such as "I feel the instructor in this course cares about me," "I trust the instructor in this course", and "I can rely on my instructor in this course." Six items exclusively tapped a sense of community with classmates, labeled as *Sense of Community* and included sentiments such as "I feel connected to others in this course," "I feel that members of this course are like a family," and "I feel confident that other students will support me." The last scale was *Comfort Expressing Vulnerability* and was comprised of 4 reverse-scored items that reflected level of comfort in showing vulnerability with both instructor and classmates, such as by "exposing one's gap in understanding" and "speaking openly": "Reversed: I feel uneasy exposing gaps in my understanding to my instructor" and "Reversed: I feel reluctant to speak only to other students." The 3 resultant subscales evidence adequate reliability (ranges between $\alpha =$ .81 and .90). Means, standard deviations, and alphas are reported in Table 7.

Importance (Value) of Online Peer Interaction

The last set of ten questions asked about what percentage of online course assignments should require student interaction, the optimal number of required peer interaction, and students' preferred platform for peer interaction. Frequencies and percentages for nominal-level variables are listed in Table 8.

The students were also asked to rate on a 5-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral,* 4 = *agree*, and 5 = *strongly agree*) how much they agreed with three statements about peer interaction, such as "I believe engaging with the peers helped increase my interest in the topic" and "I believe engaging with the peers helped me learn the material." The average of these three items was used to compute a scale labeled as *Importance of Online Peer Interaction* (α = .91). The means, standard deviations, and ranges for the *Importance of Online Peer Interaction* scale and the three items are reported in Table 9.

Data Analysis Plan

Data were analyzed using SPSS 26.0 and Mplus 7.3. Prior to conducting statistical analyses to address the study aims, preliminary analyses, including confirmatory factor analyses on the study measures, were conducted. Given the clustered nature of this data, since groups of participants share an instructor and course, a Structural Equation Modeling (SEM) approach was taken to address the goals of this study. This approach allowed for accommodating missing data, thereby reducing bias and standard errors (Schaefer & Grahm, 2002).

When assessing model fits, commonly used fit statistics were used. For example, the null hypothesis of the chi-square goodness of fit test (χ^2) shows that the model is consistent with the covariance matrix; the recommended cut-off is greater than .05 (Cohen, 1988). However, because the model chi-square statistic is influenced by nonnormality, magnitude of correlations, unique variance and sample size, other model fit indices were also examined. Specifically, the root mean square error of approximation (RMSEA, ε) estimates the close fit of the model to the data based on degrees of freedom. In this case, a p value of .05 or lower suggests the model closely fits the data (Browne & Cudeck, 1993). However, a p-value between .05 and .08 indicates a fair fit. Furthermore, Hu and Bentler (1999) suggest evaluating the model fit with the comparative fit index (CFI) in combination with the standardized root mean square residual (SRMR). The recommended cut-off values are greater than or equal to .95 for CFI and less than or equal to .08 for SRMR. Lastly, chi-square difference tests were used to evaluate the nested models. Given that MLR was used, the chi-square difference test used the Satorra-Bentler Scaled chi-square and accounts for the scaling correction factor.

After preliminary analyses were conducted, analyses proceeded in three waves. First, means (including ANOVAs) along with correlational analyses were used to examine the importance online students place on being involved and included in online communities. Importance of engagement was also examined as a function of student characteristics (e.g., gender, ethnicity and living arrangements). To address Aims 2 and 3, a series of SEM using latent variables were evaluated to test the primary hypothesis regarding the *Theory of Involvement* and predictors of engagement. Lastly, ANOVA and

multiple regression analyses were utilized to test hypotheses exploring potential factors

that might influence students' level of online engagement.

Results

Preliminary Analyses

Table 7 summarizes the mean, standard deviation, skewness, kurtosis, and

Cronbach alpha for the main study variables. The skewness and kurtosis statistic were

above ±1 for several variables, such as: current grade in the reported course, getting a

good grade, instructional design, etc. Frequency tables and line graphs were examined

and illustrated that a majority of responses were on the higher end of the possible

responses for the study variables. For example, the means for self-reports of doing well

on tests or quizzes, getting a good grade, current grade in the course, and overall GPA

ranged from 3.97 (SD = .91) to 4.50 (SD = .64). These high means suggest that, on

average, the participants of the study were performing well academically. The means for

Online Student Engagement ranged from 2.59 (SD = .88) to 3.97 (SD = .77), suggesting

that the students in the study were likely to rate items of engagement between

"moderately characteristic of me" and "characteristic of me." The means for *Instructor*

Presence ranged from 4.18 (SD = .74) and 4.55 (SD = .56), indicating that students were

likely to "agree" or "strongly agree" with statements that their instructors demonstrated

strong instructional design, instructor facilitation, and direct instruction.

Correlations Between Variables of Interest for Aims 2 and 3

Correlation coefficients were examined among the scales of engagement and

academic performance indicators (see Table 10). Overall, low-to-moderate correlations

indicated that distinct constructs were being tapped. In addition to correlations with the

indicators of academic performance mentioned below, it is worth noting that students' perceptions of their instructors as caring and supportive were highly (r's = .61 to .69) correlated with all indicators of instructor presence. This indicates the importance of instructional design of courses as well as instructors' involvement in facilitating learning and the need to provide direct instruction.

Academic Performance with Online Student Engagement. The correlations between the four indicators of *Academic Performance* and the four subscales of *Online Student Engagement* (i.e., *Academic Engagement, Online Community Engagement, Life Application Engagement,* and *Social Engagement*) were all significantly and positively related (r ranged from .06 to .40). While these positive correlations suggest that all forms of online engagement are associated with academic performance, the subscale reflecting direct academic engagement behaviors was most strongly correlated with all academic success indicators (r ranged from .24 to .40).

Academic Performance with Instructor Presence. With the exception of *Instructor Facilitation* and overall GPA (r = .04, p = .18), the correlations between the four indicators of *Academic Performance* and the subscales of *Instructor Presence* (i.e., *Instructional Design, Instructor Facilitation, Direct Instruction*) were significantly and positively related (r ranged from .05 to .19). The correlational findings suggest that students who feel like their instructors have strong instructor presence were more likely to perform well in the course.

Academic Performance with Online Learning Community. With the exception of *Sense of Community* and doing well on tests/quizzes (r = .04, p = .12). The correlations between the four indicators of *Academic Performance* and the subscales of

Online Learning Community (i.e., *Instructor Support, Sense of Community, Comfort*

Expressing Vulnerability) were significantly and positively related to each other (*r* ranged

from .06 to .15). These positive correlations suggest that students who feel connected

with their instructors and classroom members had good grades and a higher overall GPA.

Confirmatory Factor Analysis (CFA)

To ensure a set of measures that were the most valid and reliable, confirmatory

factor analysis (CFA) in Mplus was used to examine the factor structure of the three

primary measures: (1) Dixson's (2010) *Online Student Engagement Scale*, (2) Shea's

(2006) *Teaching Presence Scale* (relabeled *Instructor Presence*), and (3) Rovai's (2002)

Classroom Community Scale.

Given that the model fit is greatly affected by normality, the Maximum

Likelihood Robust (MLR) estimator was used. Furthermore, it is expected that the

participants responses were nested within the course they were reporting on. Thus, there

was concern that the standard errors would be underestimated if cluster sampling is not

taken into consideration. Therefore, the "type = complex" command was utilized to

account for the cluster sampling issue.

Online Student Engagement Behaviors

Based on previous empirical evidence (Dixson, 2010), it was expected that four

factors would underlie the 19-item scale. A factor analysis using the Kaiser-Meyer-Olkin

and Barlett's test was used to identify a four-factor model (Dixson, 2010). To determine

the factor structure for the current data, confirmatory factor analyses (CFA) were

conducted comparing 1-, 2-, 3-, and 4-factor structures. Fit indices for all models are

reported in Table 11.

As shown in Table 11, the model building process started with a one-factor model with all 19 items (Model A1) then progressed to a two-factor model (Model A2) with one factor that measured individual's engagement (e.g., "making sure to study on a regular basis", "putting forth effort") and another that measured engagement related to others (e.g., "participating actively in small-group discussions" and "meeting with the instructor"). The third model (Model A3) was a three-factor model that separated the items into individual engagement, engagement with the material (e.g., "find ways to make the course material relevant to my life"), and engagement with others (e.g., "have fun in online chats, discussions, or via email with other students"). The four-factor model separated the items on engaging with others to items that measured desire to get to know others in the course into the fourth factor and evidenced the best fit to the data: $\chi^2(146)$ = 1249.49, $p < .001$; CFI = .91; RMESA = .07; SRMR = .085.

A Satorra-Bentler (2001) scaled chi-square difference test revealed that the four-factor model (Model A4) was a significant improvement over the nested one-factor (Model A1) ($\Delta\chi^2$ (6) = 6821.47, $p < .001$). Thus, it was determined that the four-factor model was the best fit to the data, and was more consistent with empirical evidence and was conceptually clear. Thus, recommended modification indices were examined to determine if items within their respective subscales should be allowed to correlate to improve model fit before proceeding with analyses. Modification indices suggested allowing "finding ways to make the course interesting to me" to covary with "applying course material to my life", "getting to know the course instructor" to covary with "meeting with the instructor", and "making sure to study on a regular basis" covary with

"staying up on the readings." The fit statistics for the four-factor model with these modification indices (Model A5) were: $\chi^2(143) = 799.21$, $p < .001$; CFI = .95; RMESA = .06; SRMR = .042. Further, a Satorra-Bentler (2001) scaled chi-square difference test suggested that Model A5 was a significantly better fitting model than the four-factor model *without* the covariances (Model A4; $\Delta\chi^2(3) = 450.28$, $p < .001$). Model A5 became the final CFA model for *Online Student Engagement* (see Figure 3 and Table 11) with factors labeled: A*cademic Engagement, Online Community Engagement, Life Application Engagement,* and *Social Engagement*.

Instructor Presence

Previous research found support for a two-factor model to underlie the 15-item scale of instructor presence (Shea, 2006). Although Shea (2006) extracted two factors using a principal component method, the measure itself was sectioned into three parts. Similar to the *Online Student Engagement* scale, an SEM framework was used to conduct a CFA on *Instructor Presence*. The model-building process began with a one-factor model with all 15 items (Model B1; see Table 12). The second model was a two-factor model (Model B2) consistent with Shea's (2006) CFA findings: items of instructional design in one factor and those reflecting instructional methods (e.g., facilitating learning and direct instruction) into a second. The third model (Model B3) maintained the instructional design factor but separated the instruction method items into two factors. The fit statistics for the three-factor model were: $\chi^2(87) = 677.99$, $p < .001$; CFI = .92; RMESA = .07; SRMR = .051.   A Satorra-Bentler (2001) scaled chi-square difference test indicated that the three-factor model (Model B3) was a significantly better fit to the

data than the nested one-factor model (Model B1; $\Delta\chi^2$ (3) = 223.45, $p < .001$), and because the three-factor model offered conceptual value, it was determined to be the best fitting model. The resultant factors of *Instructor Presence* were labeled: (1) *Instructional Design*, (2) *Instructor Facilitation*, and (3) *Direct Instruction*.

An examination of the modification indices suggested allowing "The instructor clearly communicated important course goals (for example, provided documentation on course learning objectives)." to covary with "the instructor clearly communicated important course topics (for example, provided a clear and accurate course overview)." And "the instructor provided explanatory feedback that helped me learn (for example, responded helpfully to discussion comments or course assignments)." to covary with "the instructor helped me to revise my thinking (for example, correct misunderstandings) in a way that assisted my learning." The fit statistics for the three-factor model (Model B4) with these modification indices were: χ^2(85) = 446.12, $p < .001$; CFI = .95; RMESA = .05; SRMR = .044. Based on the Satorra-Bentler (2001) scaled chi-square difference test, Model B4 (the three-factor model with the added covariances) was a significantly better fitting model than Model B3 (the three-factor model *without* the covariances; $\Delta\chi^2$(2) = 790.76, $p < .001$). Thus, Model B4 became the final CFA model for *Instructor Presence* (see Figure 4 and Table 12).

Online Learning Community

Previous research found support for a two-factor model to underlie the 17-item scale of *Online Learning Community* using direct oblimin rotation (Rovai, 2002). Similar to the previous measures, an SEM framework was used to conduct a CFA on the *Online*

Learning Community. The fit statistics for the model building process are presented in

Table 13. The first step in the model building process started with the 17 items (Model

C1) then progressed to a two-factor model (Model C2) with items referencing the

instructor in one factor and items referencing classmates or members of the class with the

second factor. The third model (Model C3) separated the items that were reversed coded

and tapped into feelings of unease or reluctance to talk in class or reveal lack of

knowledge into a third factor. The fit statistics for the three-factor model were: $\chi^2(116) =$

1788.98, $p < .001$; CFI = .86; RMESA = .10; SRMR = .068. A Satorra-Bentler (2001)

scaled chi-square difference test suggested the three-factor model (Model C3) was a

significantly better fit than the nested one-factor model (Model C2; $\Delta\chi^2 (3) = 1596.37$, p

$< .001$).

Based on the modification indices, eight covariances were added to the model

(see Figure 5) to allow similarly worded items to correlate. The fit statistics for the three-

factor model (Model C4) with these modification indices were: $\chi^2(108) = 746.39$, $p \leq$

.001; CFI = .95; RMESA = .06; SRMR = .050. Based on the Satorra-Bentler (2001)

scaled chi-square difference test, Model C4 with the added covariances was a

significantly better fitting model than Model C3 (the three-factor model *without* the

covariances; $\Delta\chi^2(8) = 570.79$, $p \leq .001$). Thus, Model C4 became the final CFA model

for *Online Learning Community* (see Fig. 5 and Table 13).

Aim 1: Importance of Online Community

To evaluate the hypothesis that online students value an online community, I first

computed descriptive statistics, followed by ANOVA and correlational analyses to

examine if the importance online students place on online community varied as a function of gender, age, year in program, race, nature of the personal challenges they faced, and the nature of the online opportunities (structured/unstructured, how frequently required).

Descriptive Statistics

Almost two-thirds of the students in the study (64%) of the students believe that more than half their courses should require peer interaction (see Table 8). About 15% of the students wanted every single one of their courses to require peer interaction, while 6% of the students would prefer that none of their courses had peer interaction. Overwhelmingly, 94% wanted at least some of their courses to require peer interaction. Almost all the online students in the study reported they wanted some degree of peer interaction throughout the course—and more than just once or twice over the semester. As shown in Table 8, only 5.2% indicated that they would never want peer interaction while another 16.3% reported the optimal frequency to be once or twice per course. Thus, almost 80% of online students reported wanting opportunities for peer interaction, over half felt that 11x or more peer interaction opportunities in a course would be optimal. However, daily interaction was considered too much as only 2.3% thought this was ideal. More than half of the students agreed or strongly agreed with statements that engaging with peers helped them learn the material (55%) and develop an interest in the topic (57%).

The students' overwhelming preference for a peer interaction platform was Traditional Discussion Board (DB) forums (specifically, 74% of the sample). However, while almost 98% of the students had utilized DB forums, 52% of the students had never

used Yellowdig, 15% had never used presentation-style discussions, and 30% had never used peer-review.

Importance of Peer Interaction: ANOVAs

ANOVAs were conducted to assess if the importance online students place on peer interaction varied as a function of gender, age, academic rank, ethnicity/race, nature of the personal challenges they face (e.g., family, health, work), and the nature of the online opportunities (structured, unstructured, how frequently required. Results showed no significant mean differences for (a) gender, $F(4, 1462) = .36$, $p = .84$; (b) age, $F(4, 1404) = 1.17$, $p = .21$; (c) academic rank, $F(4, 1444) = .84$, $p = .55$; (d) personal challenge with family responsibilities, $F(4, 1462) = 1.62$, $p = .17$; (e) personal challenge with health concerns, $F(4, 1464) = 1.04$, $p=.38$; or (f) personal challenge with work demands, $F(4, 1464) = 1.87$, $p = .11$. Moreover, although the omnibus F-tests for (a) ethnicity, $F(4, 1464) = 1.87$, $p = .01$; (b) financial constraints, $F(4, 1464) = 2.44$, $p = .05$; and (c) preferred platform for peer interaction, $F(4, 1442) = 3.57$, $p = .01$ were significant, post-hoc tests failed to detect any significant mean differences. Thus, the value students place on peer interaction does not appear to be related to any of these personal characteristics or circumstances.

Importance of Peer Interaction: Correlations

The *Importance of Peer Interaction* scale was not significantly correlated with gender, age, number of online courses, nor the challenges and barriers students experience. However, it was significantly and positively related to the optimal frequency of peer interaction ($r = .47$, $p \leq .001$) such that, the more that students reported valuing

peer interaction, they more they wanted opportunities for such interactions (i.e., more frequent peer interaction).

Why Students Might Withdraw: RM-ANOVA

Students were asked to rate five possible causes and reasons for withdrawing from ASU, if they were to choose to do so. To determine if some reasons were more possible than others, a Repeated Measures ANOVA (RM-ANOVA) with a Greenhouse-Geisser correction was conducted. The overall RM-ANOVA was significant ($F(5.00, 3279.86) = 86.44$, $p \leq .001$), and post-hoc Bonferroni statistics indicated that financial reasons ($M = 1.96$, $SD = .81$) would be the least likely reason (i.e., differed significantly from all the others). Work demands ($M = 2.39$, $SD = .73$) and changes in career or education goals ($M = 2.36$, $SD = .68$) were, in turn, significantly less likely to be the reason to withdraw than family problems/issues ($M = 2.54$, $SD = .65$), health concerns ($M = 2.54$, $SD = .65$), lack of connection to their degree program ($M = 2.62$, $SD = .63$) and lack of connection to ASU ($M = 2.60$, $SD = .68$).

Summary of Aim 1

The goal of Aim 1 was to evaluate the hypothesis that online students value online community. As detailed above, there is evidence to suggest that students do value interacting with their classmates in an academic setting. There does not seem to be any differences in the value placed on peer interaction based on the students' personal characteristics or circumstances. Lastly, the connection students have with their program and university is more likely to be the reason they withdraw and validates the belief that fostering the student connections to their online education is invaluable.

Aim 2: Validation of Theory of Involvement Model

Structural equal modeling was used to (1) establish a measurement model for online student behavior and (2) validate the theory that online student engagement was related to students' academic performance. Academic performance was measured at the item-level because the reliability measure was lower (α = .72) than the recommended α =.80. Furthermore, given that the academic performance variables are tapping into different aspects of academic success (overall GPA versus reports of how well students feel they perform on assignments), it seemed best to keep the outcome variable at the item-level. The MLR estimator was used and the nested responses of students responding to questions about the same course were accounted for with the cluster/complex command.

Indicators of Retention

Of the 1,514 participants who completed the survey, only 2 students indicated they were withdrawing from ASU. Unfortunately, given the lack of variability in the sample's responses, retention was not included as originally planned.

Online Student Engagement and Academic Performance

The theoretical model of *Online Student Engagement* on *Academic Performance* (see Figure 1) was assessed as a structural equation model. Unfortunately, the model fit was poor: $\chi^2(184)$ = 1,568.40, $p \leq .001$; CFI = .90; RMESA = .07; SRMR = .086. Furthermore, the loadings were not consistent with preliminary analyses and correlations. In this model, only *Academic Engagement* evidenced a positive link to the indicators of *Academic Performance*. The negative loadings of the other subscales of *Online Student*

Engagement suggested that there may be issues of multicollinearity. The pathways of *Academic Performance* once the effects of *Academic Engagement* were accounted for might explain the negative loadings. Thus, the decision was made to look at the individual contribution of each subfactor of online student engagement and its relation to academic performance.

Academic Engagement and Academic Performance

Figure 6 represents Model D1: the relation between *Academic Engagement* and *Academic Performance*. With the exception of χ^2, the model fit well, where $\chi^2(37) = 237.94$, $p \leq .001$; CFI = .96; RMESA = .06; SRMR = .034 (see Table 14). The R^2 statistic was significant for overall GPA ($R^2 = .08$, p < .05), grade in the course ($R^2 = .08$, p < .05), getting a good grade ($R^2 = .20$, p < .05), and doing well on tests ($R^2 = .08$, p < .05). The standardized factor loadings between *Academic Engagement* and the four items of *Academic Performance* ranged from .26 to .45 and were all statistically significant (see Figure 6). These findings suggest that students who demonstrate high levels of academic engagement have higher scores of academic performances as measured by their overall GPA and performance in the current course.

Online Community Engagement and Academic Performance

Figure 7 represents Model D2: the model of *Online Community Engagement* and *Academic Performance*. With the exception of χ^2 the model fit well: $\chi^2(21) = 118.238$, $p \leq .001$; CFI = .97; RMESA = .06; SRMR = .025 (see Table 14). The R^2 was significant for overall GPA ($R^2 = .02$, p < .05), getting a good grade ($R^2 = .04$, p < .05), and doing well on tests ($R^2 = .01$, p < .05). The R^2 was significant for getting a good grade ($R^2 = .04$, p < .05) and doing well on tests ($R^2 = .02$, p < .05). The standardized factor loadings

between *Online Community Engagement* and the four items of *Academic Performance* ranged from .09 to .21 and were all statistically significant (see Figure 7). In summary, students who reported that they were engaging with their online community were more likely to perform well academically as demonstrated by their overall GPA and performance on quizzes, tests, and grades in their current course.

Life Application Engagement and Academic Performance

Figure 8 represents Model D3: the structural model of *Life Application Engagement* and *Academic Performance*. Again, with the exception of the χ^2 the model fit well: $\chi^2(13) = 41.352$, $p \leq .001$; CFI = .99; RMESA = .04; SRMR = .019 (see Table 14). The R^2 was significant for getting a good grade ($R^2 = .04$, p < .05) and doing well on tests ($R^2 = .02$, p < .05). The standardized factor loadings between *Life Application Engagement* and the four items of *Academic Performance* ranged from .05 to .19 and were all statistically significant (see Figure 8). These findings suggest students who were able to engage with course materials in a way that related to their own life were more likely to score well academically based on their overall GPA and performance in the current course.

Social Engagement and Academic Performance

Figure 9 represents the final model of Aim 2, Model D4: the structural model of *Social Engagement* and *Academic Performance*. Based on the model fit indices, the model had good fit: $\chi^2(7) = 13.39$, $p = .06$; CFI = .99; RMESA = .03; SRMR = .007 (see Table 14). The R^2 was significant for grade in the course ($R^2 = .01$, $p \leq .05$). The standardized factor loadings between *Social Engagement* and the three of the four items of *Academic Performance* ranged from .07 to .18 and were all statistically significant (see

Figure 9). The path between *Social Engagement* and overall GPA was not significant. In

summary, students who were socially engaged demonstrated strong academic

performance in their course as measured by their self-reported success on quizzes, tests,

and grade, but not their overall GPA.

Summary of Aim 2

In sum, results from the SEM analyses validated that how students engage with

the online environment is related to their academic performance. Although the original

goal was to assess all four subscales of *Online Student Engagement* in one model, the

model fit statistics indicated poor fit and there was evidence of multicollinearity. This

may suggest that while academic engagement (i.e., students' study habits and putting

effort into their classes) is critical for academic performance, the other aspects of *Online*

Student Engagement are still important to academic outcomes when assessed

individually. In particular, significant pathways between the subscales of *Online Student*

Engagement and the four items of *Academic Performance* were positive. These findings

suggest that students who demonstrated high levels of *Academic, Online Community, Life*

Application, and Social Engagement were more likely to perform well on measures of

Academic Performance.

Aim 3: Predictors of Online Student Engagement

The goal of Aim 3 was to identify pedagogical features as well as inter- and intra-

personal factors that were associated with online students' engagement in online courses.

Figure 2 represents the theoretical model representing factors that influence student

engagement. SEM was also used to estimate the effects of *Instructor Presence* and

perceptions of *Online Learning Community* on *Online Student Engagement* behaviors.

The MLR estimator and cluster/complex command were utilized due to the nested

responses of students answering to questions about the same course. The SEM models

were conducted for the subscales of *Online Student Engagement* were assessed

separately. It is hypothesized that greater levels of *Instructor Presence* and perceptions

of the *Online Learning Community* would be associated with more frequent behaviors of

Online Student Engagement.

Academic Engagement

Figure 10 represents Model E1: the structural model of *Instructor Presence* and

Online Learning Community on *Academic Engagement*. With the exception of χ^2 the

model fit well, where $\chi^2(669) = 2207.53$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR =

.04. (see Table 15). The R^2 was significant for *Academic Engagement* ($R^2 = .15$, $p \leq .05$),

indicating that 15% of the variance in *Academic Engagement* was explained by the

factors of *Instructor Presence* and *Online Learning Community*. The significant

standardized factor loadings for *Academic Engagement* from the subscales of *Instructor*

Presence and *Online Learning Community* ranged from .09 to .30 (see Figure 10). Three

significant pathways were from (1) *Instructional Design*, (2) *Sense of Community*, and (3)

Comfort Expressing Vulnerability. These findings suggest that instructional design and

connection to the members of the course are significantly related to how engaged

students are academically (e.g., studying regularly, putting forth effort).

Online Community Engagement

Figure 11 represents Model E2: the structural model of *Instructor Presence* and

Online Learning Community on *Online Community Engagement*. As a reminder, *Online*

Learning Community assesses the perceived connection between members of the

classroom community, whereas *Online Community Engagement* measures how much

students are engaged with their online community. With the exception to the χ^2 the

model fit well, where $\chi2(597) = 2059.69$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR =

.04. (see Table 15). The R^2 was significant for *Online Community Engagement* (R^2 = .33,

$p \leq .05$), indicating that 33% of the variance in *Online Community Engagement* was

explained by the factors of *Instructor Presence* and *Online Learning Community*. The

significant standardized factor loadings for *Online Community Engagement* from the

subscales of *Instructor Presence* and *Online Learning Community* ranged from .11 to .64

(see Figure 11). These significant pathways were from (1) *Instructor Facilitation*, (2)

Sense of Community, and (3) *Comfort Expressing Vulnerability*, suggesting that how

instructors facilitate learning and students' perceptions of their community are

significantly related to how engaged students are with their online community. However,

an unexpected negative estimate of -.25 was found between *Instructor Support* on *Online

Community Engagement*. This is likely due to multicollinearity as the independent

variables are highly correlated (*r*s = 67 to .93) and it makes it difficult for the model

estimates to account for independent contributions. Multicollinearity means that the

standard errors are inflated, and consequently, the estimates lack precision.

Life Application Engagement

Figure 12 represents Model E3: the structural model of *Instructor Presence* and

Learning Community on *Life Application Engagement*. With the exception of χ^2 the

model fit well: $\chi2(561) = 1895.55$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR = .04. (see

Table 15). The R^2 was significant for *Life Application Engagement* (R^2 = .14, $p \leq .05$),

indicating that 14% of the variance in *Life Application Engagement* was explained by the

factors of *Instructor Presence* and *Online Learning Community*. The significant

standardized factor loadings for Life Application Engagement from the subscales of

Instructor Presence and *Online Learning Community* ranged from .26 to .68 (see Figure

12). *Life Application Engagement* was significantly associated with students' *Sense of*

Community and *Comfort Expressing Vulnerabilities*. These findings suggest that students

who feel a sense of belongingness are more likely to apply their course material to their

life.

Social Engagement

Figure 13 represents Model E4: the structural model of *Instructor Presence* and

Learning Community on *Social Engagement*. With the exception to χ^2 the model fit well,

where $\chi2(527) = 1892.01$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR = .05. (see Table

15). The R^2 was significant for *Social Engagement* ($R^2 = .36$, $p \leq .05$), indicating that

36% of the variance in *Social Engagement* was explained by the factors of *Instructor*

Presence and *Online Learning Community*. The significant standardized factor loadings

for *Social Engagement* from the subscales of *Instructor Presence* and *Online Learning*

Community ranged from .02 to .21 (see Figure 13). These significant pathways were

from students' *Sense of Community* and *Instructor Facilitation*, suggesting that students

who felt they were part of a community and reported that their instructors did well with

facilitating learning were more likely to engage with others in the course socially.

Unexpectedly, two negative estimates were found for *Social Engagement* as associated

with *Direct Instruction* and *Instructor Support* (-.23 and -.19 respectively). Similar to

Online Community Engagement, the unexpected negative estimates are likely due to

issues of multicollinearity, given that the factors are correlated (*r*s .67 to .93).

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Summary of Aim 3

The purpose of Aim 3 was to examine potential factors that are related to student engagement. Through SEM analyses, there was evidence that some subscales of *Instructor Presence* and *Online Learning Community* were significantly related to the subscales of *Online Student Engagement* behaviors. In summary, the results indicate: (1) *Academic Engagement* (i.e., how engaged students academically by how often they study, put forth effort) was associated with *Instructional Design*, *Sense of Community*, and *Comfort Expressing Vulnerability*. (2) *Online Community Engagement* was associated with *Instructor Facilitation*, *Sense of Community*, and *Comfort Expressing Vulnerability*. (3) *Life Application Engagement* was significantly associated with students' *Sense of Community* and *Comfort Expressing Vulnerabilities*. (4) *Social Engagement* was significantly associated with *Sense of Community* and *Instructor Facilitation*. Interestingly, students' *Sense of Community* was consistently related to all four aspects of *Online Student Engagement.*

Aim 4: Potential Influencers of Online Student Engagement

The focus of Aim 4 was to examine potential individual characteristics such as gender, race/ethnicity, first generation student, reasons for taking online classes, personal challenges, among others, and how they each might influence the extent to which students engage with online learning environment. The analytic strategy used in each case, ANOVA or multiple regression, depended on the nature of the characteristic. First, four 2 (sex: female or male) x 5 (ethnicity: White, Hispanic/Latinx, Black, Asian, Other) x 2 (first generation status: yes or no) x 9 (living arrangement) x 2 (program status: ASU Online or iCourse) ANOVAs were computed; one for each form of student engagement:

1) *Academic Engagement*, 2) *Online Community Engagement* 3) *Life Application*

Engagement, and 4) *Social Engagement*. Then, four regression analyses were conducted

with the four types of engagement by age, reasons for taking online courses, and the

Importance of Peer Interaction scale as independent variables.

Academic Engagement

The omnibus ANOVA was not statistically significant ($F(249, 1205) = 1.15, p =$

.07) for academic engagement indicating that the effort students expend on studying,

reading course material, and taking good notes did not differ as a function of gender,

ethnicity, whether or not they were first generation, or enrolled in ASU Online or take a

class through iCourse. Moreover, it did not depend on their relationship-living

arrangement situation.

However, the regression analyses for *Academic Engagement* was significant,

where $F(7, 1438) = 11.26, p \leq .001$, and revealed that approximately 5% of the variance

in students; academic effort could be accounted for by age ($b = .01, p = .01$), convenience

of online courses ($b = .05, p = .01$), and *Importance of Peer Interactions* ($b = .11, p \leq$

.001). Specifically, students were more likely to be academically engaged by putting

effort into studying and preparing for classes if they (1) were older, (2) were taking the

online course because it was more convenient, or (3) placed value in peer interactions

(see Table 16).

Online Community Engagement

Similar to findings for academic engagement, the omnibus ANOVA, $F(249,$

$889.79) = 1.10, p = .16$, of *Online Community Engagement* failed to detect any personal

characteristics or situations that would influence the degree to which students participated

in the online community (such as through chat, small group forums or discussion boards). However, the linear combination was statistically significant, where $F(7, 1438) = 53.44$, $p \leq .001$. In particular, approximately 20% of the variance in *Online Community Engagement* in the sample could be accounted for by age, reasons for taking online courses, and importance of peer interaction. Convenience of online courses ($b = .05$, $p = .03$) and the *Importance of Peer Interaction* scale ($b = .34$, $p \leq .001$) was significantly associated with *Online Community Engagement* (see Table 17). In other words, the more students took online courses due to the convenience and the more value students placed on peer interaction, the higher their level of online participation and interaction with their classmates.

Life Application Engagement

The omnibus ANOVA was statistically significant ($F(249, 677.94) = 1.43$, $p \leq .001$) for *Life Application Engagement* and an examination of the univariate F-tests showed students' academic program ($F(1, 677.94) = 6.93$, $p = .009$) was associated with how much they found ways to apply course material to their lives. Specifically, ASU Online Students ($M = 4.07$, $SD = .74$) were more likely to apply course concepts and materials to their life than iCourse students ($M = 3.80$, $SD = .80$).

In addition, regression analyses ($F(7, 1438) = 21.83$, $p \leq .001$) showed that approximately 10% of the variance in *Life Application Engagement* scores could be accounted for by three potential factors: age, reasons for taking online courses, and importance of peer interaction. Age ($b = .01$, $p \leq .001$), taking online courses due to financial constraints ($b = .04$, $p = .02$), family responsibility ($b = .05$, $p \leq .01$), work demands ($b = .04$, $p = .02$), and the *Importance of Peer Interactions* ($b = .14$, $p \leq .001$)

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were all significantly related to *Life Application Engagement* (see Table 18). These findings suggest that the students who were taking online courses due to financial constraints, family responsibilities, and work demands were the more likely they were to try to apply courses to their life or find meaning in what they were learning. Furthermore, older students and students who placed higher value on peer interaction were also found to report higher levels of *Life Application Engagement*.

Social Engagement

The omnibus ANOVA for social engagement was statistically significant (F(249, 887.48) = 1.26, p = .008) and univariate F-statistics revealed an effect for first-generation status (F(1, 887.48) = 5.41, p = .02). Specifically, students who identified as first-generation students (M = 2.64, SD = .91) demonstrated higher levels of social engagement than students who were not first-generation (M = 2.56, SD = .85). In other words, first-generation students spent more time getting to know their instructor and classmates. There was no significant generation status influenced by ethnicity/race interactions detected. The mean of *Social Engagement* for first-generation Latino students and not first-generation Latino students were 2.68 and 2.67 respectively. Similarly, the mean of *Social Engagement* for first-generation White students and not first-generation White students were 2.53 and 2.51 respectively.

The multiple regression analysis conducted to evaluate the link between age, reasons for taking online courses, and importance of peer interaction with *Social Engagement* was statistically significant, where F(7, 1438) = 32.19, $p \leq$ .001. Approximately 13% of the variance in *Social Engagement* in the sample can be accounted for by age, reasons for taking online courses, and importance of peer

interaction. Age ($b = .01$, $p = .02$), health concerns as the reason for taking online courses ($b = .07$, $p \leq .001$), and *Importance of Peer Interactions* ($b = .26$, $p \leq .001$) were each significantly related to *Social Engagement* (see Table 19). Older students and students who sought out online courses due to health concerns were more likely to report making efforts in getting to know their instructor and classmates. Lastly, the higher students valued peer interaction, the higher their level of engaging socially with members of the class.

Summary of Aim 4

The goal of Aim 4 was to identify potential student-level characteristics that influenced students' engagement in their online courses. There were no significant differences in *Online Student Engagement* behaviors by gender, ethnicity, or living arrangements and no significant interactions. However, *Online Student Engagement* was consistently influenced by the importance students placed on their peer interaction. *Importance of Peer Interaction* was significantly and positively related to *Online Student Engagement* in every regression analysis. Students who valued peer interaction were more likely to be engaged in the course. Another interesting finding was that the older the students were the more likely they were to be academically engaged, apply course material to their life, and spend time getting to know the people in their course.

Discussion

With the growth of online learning in higher education, understanding how student engagement manifests in the online setting and is associated with academic outcomes is of increasing importance. Further, identifying factors that encourage online students' engagement can help educators to better serve this population. The current

study adds to this relatively new, yet growing body of literature by examining: (1) student desire to interact with their peers, (2) the relations between student engagement and academic performance, and (3) the relations between pedagogical and student personal characteristics with student engagement. First, the results from Aim 1 supported the proposition that students do value peer interactions in online learning contexts. Second, confirmatory factor analyses revealed a four-factor model of *Online Student Engagement* and preliminary support for the *Theory of Involvement* was found such that student engagement was related to positive academic outcomes. Third, findings from structural equation modeling suggested that instructor presence and the quality of online learning environments may encourage student engagement. Lastly, while demographic variables were not related to differences in terms of student engagement, student value of peer interaction was related to behaviors of online student engagement. Together these findings suggest that online student engagement is valuable to their online learning experience and instructors play a role in creating learning environments that are conducive to various forms of engagement. However, findings also illuminate the need for research (specifically longitudinal research) to explore how the factors and consequences of student engagement relate to one another and how they may affect student retention and the achievement of academic goals. The following sections are organized by aim and discuss the findings as they relate to previous studies, implications for practice, and recommendations for future research.

Aim 1

Given that online students do not have the same easy access to a supportive learning community that in-person students benefit from, the first aim of this study was to

examine the extent to which such interactions were indeed desired or valued by such students. For example, it is possible that students choose to pursue an online degree because they do not perceive interactions with their peers to be important to their educational goals. If this is the case, then creating and providing opportunities for online students to engage with their peers may, at a minimum, be a waste of instructor effort and take away from limited instructional time. At the worst, such opportunities may be counterproductive and instead, turn away online students who do not wish to spend their time with such interactions. With the rise of online education, it is somewhat surprising that research on student perspectives regarding required peer interaction is limited, while programs have been developed based on assumptions that online students find such opportunities and interactions beneficial. Thus, this gap in literature was addressed in this study with the intention that information gathered from Aim 1 would help instructors be more informed about whether or not to provide opportunities for peer interaction, and if so, how much was reasonable based on the extent to which their students viewed such activities to be meaningful and effective in achieving their educational goals.

Consistent with previous studies (Martin & Bolliger, 2018; Rilley, Gallagher-Lepake, & Killion, 2012), findings showed that students tend to value and welcome opportunities to engage with their peers online. For example, between 46.2% and 57.2% agreed or strongly agreed with statements indicating that interacting with fellow students was important to them personally as well as helped them learn the material and increase their interest in the topic. Further, roughly 60% of students thought that 50% or more of their courses should require peer interaction. This supports the proposition that, similar to their in-person counterparts, online students looking to build a supportive community

and work to create social presence by interacting with their peers in an educational setting (Garrison, 2011). The value online students place on creating such connections is further indicated by results from RM- ANOVA in which students reported that lacking a connection with their program or university (ASU) would be the most likely reasons for withdrawing from school, even more so than changing their educational or career goals, or facing financial, health, or work issues. Similar to previous studies (Buelow, Barry, & Rich, 2018), students' connections to others encourages connection to their course and persevere through their learning experience.

However, it is important to bear in mind that about 5-6% of students did not think that there should be any required peer interaction (5.2% reported that the optimal frequency of peer interactions was "never" and 6.1% reported that "none" of their classes should require peer interaction), and another 16.3% indicated peer interactions "once or twice" throughout a term was sufficient. Moreover, only 16% thought that 100% of their courses should require peer interactions, such as through discussion boards and Yellow Dig—and over 70% indicated 50% or *fewer* of their classes should require such interaction. Other studies have also found that a percentage of students in their sample did not find peer interactions enjoyable, nor that such interactions should be part of their online courses (Hurt, Moss, Bradley, Larson, & Lovelace, 2012; Martin & Bolliger, 2018). Additionally, one study found that although students were invested in participating in course discussions, they were not interested in getting to know their classmates (Bolliger & Halupa, 2018).

Such findings suggest two important implications. First, some amount of coordination within and across programs is needed to identify courses that would most

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benefit from peer engagement activities and allow instructors of some courses to limit or even forgo such requirements. Second, further research is needed to identify an optimal frequency with which students should be required to engage with their online peers that is beneficial, but not overly intrusive or counterproductive. For example, Drouin (2008) found evidence that there is an ideal amount of social interaction to foster engagement; however, no actual amount was reported. In contrast, the present study offers some preliminary recommendations based on student preferences; albeit further research is clearly needed. Specifically, students reported directly about their preferences regarding the frequency with which interactions with classmates should occur. Although as mentioned, there were students who thought such interactions should never occur, about 72% reported preferences between 3 times over the course to at least 2 times a week. Considering ASU Online courses are 7.5-week courses, this suggests that students would want to interact with their peers at least 1 or 2 times per week. This would be consistent with the weekly practice of having students write an original post and then replying to peers' original posts. It is worth noting that data for this study was collected during the fall semester of 2020 during a pandemic. Given the stress and hardship many experienced during the pandemic, it is telling that students want to interact with their online peers despite issues of "too much screen time" and other pandemic-related stressors.

There is a plethora of programs to foster these opportunities for peer interaction. In online higher education settings, a majority of students are familiar with, and prefer traditional discussion board forums. Indeed, the most common form of peer interaction happens on such asynchronous discussion board forums (Weil, McGuigan,

Kern, & Hu, 2013). Although it is possible that students may prefer traditional discussion

board forums because that is the platform they are most familiar with, students also

appear to be interested in learning about other tools to interact with their classmates both

formally and informally (Reilly, Gallagher-Lepake, & Killion, 2012). There is evidence

to suggest that students enjoy new technologies and are more likely to post and utilize

other platforms for discussions (Brush, Bargeron, Gruden, Borning, & Gupta, 2002), such

as social media type platforms. Thus, although findings suggest that most instructors and

students are familiar with traditional discussion board forums, instructors should not shy

away from utilizing different platforms to foster interactions among their students.

In sum, findings revealed that, in general, students value having time to interact

with their peers in an online educational setting. Moreover, no differences were found to

suggest that the value placed on peer interaction varied as a function of students' personal

characteristics or circumstances. Specifically, ANOVAs failed to detect any significant

differences in students' reports on the importance of peer interaction based on the factors:

gender, age, academic rank, ethnicity/race, nature of the personal challenges they face

(e.g., family, health, work), and the nature of the online opportunities (structured,

unstructured, how frequently required). However, some caveats are worth noting, such

as: students generally did not believe that all of their courses should require peer

interaction. Thus, caution is warranted in assuming that more engagement is necessarily

welcome or beneficial. Future research is still needed to determine optimal levels of

online community engagement and findings suggest that coordination within and across

programs could potentially maximize the impact of the online learning environment on

student outcomes.

Aim 2

As Aim 1 suggested, online students report valuing opportunities to socially engage (interact) with their fellow online peers and instructors. However, the emphasis on Aim 2 was to examine whether such engagement actually contributes to students' achievement (e.g., grades on homework and exams, GPA) and to retention and completion rates. To my knowledge, this is the first study to examine this question in completely asynchronous online courses in higher education. Toward this goal, the study examined the utility of applying the *Theory of Involvement* (Astin, 1984) to online learning contexts. With some exceptions that will be noted, findings were consistent with the *Theory of Involvement* premise that students are more successful (e.g., higher grades) when they are academically and socially engaged. That is, online students benefit when instructors design courses where students participate by engaging with online learning communities, such as via Discussion Boards and Yellow Dig.

Recall that the *Theory of Involvement* emerged from the study of in-person learning environments, and studies conducted within such contexts have been consistent with the theory's premise that the more students are engaged, the greater their academic performance (Chen, Lambert, & Guidry, 2010; Lei, Cui, & Zhou, 2018; Northey et al., 2018; Reyes et al., 2012). Conversely, students who are disengaged are at risk for failing out of school or withdrawing (Finn, 1989). Moreover, researchers working from this premise argue that students need to be engaged socially as well as academically to fully benefit from the learning environment. Thus, it follows then, that what contributes to academic success is not just the amount of energy students expend on academic tasks (such as studying), but also the extent to which they are involved in social activities and

events that provide opportunities for interacting and getting to know their classmates within a supportive university setting.

However, at the *Theory of Involvement* was developed based on in-person learning environments, I first had to operationalize what it means for online students to be academically and socially engaged. Specifically, although academic engagement was expected to involve the same types of behaviors and activities as required of in-person students, such as studying on a regular basis, taking good notes, listening and reading carefully and so on, social engagement was expected to be entirely different. That is, online students do not have the opportunities to interact with their classmates before and after class, out on the quad, in dorms, or during any of the many other and varied social events available to in-person students. Thus, an important step of Aim 2 was to examine what "social engagement" entails as it pertains to the online learning setting. Fortunately, preliminary studies have already begun to answer such questions, and I could build upon the work of Dixson's (2010) *Online Student Engagement* measure.

Measurement

Dixson's (2010) *Online Student Engagement Scale* (OSE) conceptualized engagement along four dimensions: skills, emotional, participation, and performance. KMO and Bartlett's Test that was conducted on a sample of 31 online students supported these four dimensions. Although the Dixson study offered promising results, clearly additional measurement work was needed. With minor re-conceptualization of scales, findings from the Confirmatory Factor Analyses (CFA) on the current sample was largely consistent with the OSE. For example, the "performance" dimension on the OSE was re-conceptualized for the current study as an outcome variable, as items included "getting

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good grades", and "doing well on tests." Consequently, this dimension (i.e., these two items) was dropped from the engagement measure and examined separately along with two other indicators of academic performance.

Although three remaining factors were expected to reflect skills, emotional, and participation, CFA results identified a four-factor solution. The first two were consistent with OSE's "skills" and "emotional" dimensions but were renamed to reflect specific types of ways that students engage with the course material. Specifically, they can engage "academically", such as through "staying up on the readings" and "making sure to study on a regular basis." Thus, this factor was labeled Academic *Engagement*. This form of engagement tends to be a pre-requisite for academic achievement; that is, students do not study, read, attend lectures, do homework, and so forth, they cannot do well in the class. In contrast, the OSE "emotional" dimension reflects students' attempts to connect the course material emotionally to their lives and included concepts such as "applying course material to life" and "finding ways to make the course interesting to me". This was labeled as *Life Application Engagement*. It could be argued that while this deeper processing of the material is not required for earning good grades, it could nevertheless contribute to success, so long as students engaged with the material in such a way.

Lastly, items reflecting the OSE dimension of "participation" loaded onto two factors in the current study. The first was comprised of active engagement with others, such as: "have fun in online chats, discussions or via email with the or other students" and "participate actively in small-group discussion forums" and was labeled *Online Community Engagement*. The second factor comprised of items that indicated students

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might go beyond merely participating in discussion boards (as might be required by the instructor), and towards taking the time/expending effort to get to know fellow students and the instructor. Thus, this factor was labeled *Social Engagement.*

In sum, findings from the adapted OSE supported the contention that there are multiple ways in which online students can be engaged academically and socially. Moreover, correlations indicated they were distinct forms of engagement. Additionally, Cronbach's alphas showed they could be reliably assessed (alphas ranged from .81 to .85). Thus, the next question was "Are these forms of engagement associated with academic achievement?"

Associations Between Forms of Engagement and Academic Performance

Consistent with the *Theory of Involvement*, correlational analyses showed positive, albeit modest, associations between all four forms of engagement and the four indices academic performance. However, when included together in SEM, only *Academic Engagement* emerged as a significant correlate of academic achievement, suggesting that other forms of engagement may not be accounting for unique variance in achievement beyond that accounted for by academic engagement. This finding is not really surprising given that students who expend effort studying regularly, learning the material, listening attentively to lectures, and being prepared and organized are more likely to do well on tests, and ultimately get good grades in class that contribute to an overall higher GPA. Although the behaviors of *Academic Engagement* may seem like rudimentary skills necessary to academic success, online students find these skills and abilities challenging (Baxter, 2012). This may shed light on the importance of equipping students with the skills and knowledge of *how* to perform the defining behaviors of

Academic Engagement as it seems to take additional effort for online students to be academically engaged. Yet, those who are able to be academically engaged are rewarded with positive academic outcomes.

Although other forms of engagement were not unique correlates of academic achievement once academic engagement was considered, I was nonetheless interested in understanding if such engagement conveyed any academic benefit to online students. Thus, I examined their contributions separately. For example, of primary interest in this study was the extent to which *Online Community Engagement* was beneficial to online students. This type of engagement refers to how active online students are in engaging with their online classmates in discussion boards and the like (Dixson, 2010). As hypothesized, students who were more likely to interact with their classmates were more likely to report higher overall GPA and strong performance on quizzes, tests, and grades in their current course. Thus, it appears that although it is more challenging to foster student-to-student relationships in online courses than in-person, online students who are able to connect with members of the course regularly perceive that such connections contribute to their learning of course material. It could be argued that when students are actively participating in discussions and connecting with their classmates academically, not only do they connect with their peers socially, but they also connect with the learning materials. In other words, regardless of intention, as students interact with their peers in this academic setting, they are also processing the course material, and this too, benefits their learning.

Life Application Engagement was also positively associated with students' overall GPA and performance in the current course. Students who were able to apply course

concepts to their own lives or find relevance in the concepts indicated that they achieved more academically (e.g., good grades). Students who were able to find connections between the course material and their life outside the classroom would essentially develop a strong understanding of the course concepts in order to apply it to their own lives. This application allows students to have a deeper, more personal, understanding that would allow them to retain the information better for assignments and assessments. It also helps them move away from regurgitating information for the sake of completing assignments and instead make connections to the material that are more long-lasting and meaningful. The implications from these findings suggest that instructors may want to pursue activities that encourage students to complete activities outside of the traditional online classroom (such as labs or hands-on activities; see Buelow, Barry, & Rich, 2018) that help students make connections between the material and their lives.

Partially consistent with the study hypotheses, was the finding that students who were socially engaged demonstrated strong academic performance in their course as measured by their self-reported success on quizzes, tests, and grade, though not their overall GPA. Forming relationships with instructors and peers tap into a different aspect of online student engagement. *Social Engagement* refers to the students' desire to get to know their classmates and instructors. Getting to know classmates personally may be related to academic success because these forms of engagement decrease the cognitive and emotional distance between the student, instructors, which foster learning opportunities (Bolliger & Halupa, 2018). Forming relationships with members of the class may also encourage students to be invested in their success in the course, allows

them to ask for help more readily, and motivates accessing the instructor for additional support. These findings suggest that educators should create opportunities for students to get to know the instructors and classmates informally, such as through introduction threads and informal virtual office hours. Contrary to the study hypotheses, *Social Engagement* was not significantly related to overall GPA. This is likely because getting to know members of a specific course does not serve the students after the course ends or in additional settings.

Although findings suggest that social forms of engagement may not contribute uniquely to online students' academic achievement once their academic engagement is considered, this does not mean the factors are not important. For example, as discussed earlier, online students desire such engagement; thus, it may be that such forms of engagement are important for different outcomes of interest. For example, while studying (e.g., academic engagement) may be key to academic success, social engagement may increase online students' sense of community and motivation; thus, possibly becoming a stronger correlate of academic retention or persistence. Unfortunately, there was not sufficient variability in the responses to the retention variable to examine this possibility, but future studies should examine if student engagement can increase course and semester-to-semester retention rates. Without a doubt, GPA, grades, and retention rates are key measures of *Academic Performance*. However, it would also be important to assess other aspects of academic outcomes such as student satisfaction with their learning and other indicators of psychosocial and emotional well-being.

While the findings of the current study are consistent with the *Theory of Involvement*, this theory does not make assertions that certain types of engagement are more valuable to students' academic achievement. However, previous studies conducted with middle school students has found that engagement was a significant mediator (Reyes et al., 2012; Scanlon, Del Toro, & Wang, 2020). Future research may want to consider the unique or additive contributions of various forms of student engagement to achievement or consider how the various forms relate to one another. For example, it is possible that social forms of engagement may motivate online students to engage more academically. In particular, online students may benefit psychologically or emotionally from a supportive online community that encourages them to invest more time into studying.

Preliminary support for this speculation was obtained by testing a mediated model in which *Academic Engagement* was examined as a mediator of the relations between *Online Community Engagement, Life Application Engagement* and *Social Engagement* and *Academic Performance*. The mediation model demonstrated adequate fit ($\chi2(215) = 1098.98$, $p \leq .001$; CFI = .94; RMESA = .05; SRMR = .05), and R^2 statistics were significant ($p < .05$) for: a) overall GPA ($R^2 = .07$), grade in the course ($R^2 = .06$), getting a good grade ($R^2 = .19$), and doing well on tests ($R^2 = .13$). Moreover, R^2 was significant for *Academic Engagement* ($R^2 = .48$) indicating that 48% of the variance in *Academic Engagement* was explained by *Online Community Engagement* (standardized $\beta = .34$, $p < .05$), *Life Application Engagement* (standardized $\beta = .48$, $p < .05$), and *Social Engagement* (non-significant). The significant standardized factor loadings from *Academic Engagement* to the measures of *Academic Performance* were all significant

and ranged from .25 to .44. Although a longitudinal study design with at least three time points is needed to appropriately examine these potential relations, these preliminary findings suggest that future research on this issue is clearly warranted.

Aim 3

Given the importance of student engagement on academic success, the next aim was to identify factors that are associated with students' engagement in their online courses. Understanding variability in online students' engagement can help educators identify best practices that would most benefit their students and help target efforts in improving particular aspects of student engagement. In general, it was hypothesized that instructor presence and positive perceptions of the online learning community would be related to student engagement. Support for specific hypotheses is discussed below.

All four forms of engagement (academic, online community, life application and social) were examined separately. In each case, student reports of their *Sense of Community* emerged as a significant correlate. Consistent with previous studies (Lear, Ansorge, & Steckelberg, 2010; Peacock, Cowan, Irvine, & Williams, 2020), these findings suggest that when students feel connected to other members of the course, they are more likely to keep up with their studies, participate in discussions, apply the course material to their own lives, and put effort into getting to know their instructors and classmates. As researchers have pointed out previously, creating a sense of community is more than creating opportunities to socialize (Oren, Mioduser, & Nachmias, 2002). When students feel that they are connected with their online community, there is a reduction in their perception of distance between themselves and others in the course (Rovai, 2002). Reducing the perceived distance allows students to connect with the

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course and engage with the material in a variety of ways. In fact, when students lack a sense of community, they are more likely to experience anxiety, frustration, and poor academic outcomes (Peacock, Cowan, Irvine, & Williams, 2020).

Academic Engagement

Sense of Community, *Instructional Design* and *Comfort Expressing Vulnerability* were significantly related to *Academic Engagement.* The findings revealed that how well students felt their instructors communicated course goals, topics, and assignments was related to how much effort students put into studying. Current best practices for online educators are to develop clear expectations that obviously align with the course objectives (ASHE, 2014). Students may perceive instructors with strong instructional design as more proactive and supportive (Stone & O'Shea, 2019). It is likely easier for students to be academically engaged and put effort into their study habits when they feel that their course is easy to navigate and expectations are clear. While low, the loading for *Comfort Expressing Vulnerability* on *Academic Engagement* was positive, suggesting that when students feel comfortable exposing their lack of understanding and speaking to their instructors and classmates, they are more likely to be academically engaged. This may be because students need to ask for help and are more willing to do so if they are comfortable exposing gaps in understanding. These results suggest that instructors should ensure an instructional design that states clear goals and expectations, as well as conveys to students that their online setting is a safe space to share questions and gaps in their understanding of course material.

Online Community Engagement

Comfort Expressing Vulnerability was also significantly related to *Online Community Engagement.* As Rovai (2002) argued, students need to feel comfortable with their online learning community before they can engage and learn. Students who felt they could be vulnerable with their peers were more likely to engage in discussions and interact with their classmates and instructor. Unsurprisingly, students want to be active in communities where they feel comfortable being vulnerable with others.

Student perceptions of their instructors' ability to facilitate was also associated with *Online Community Engagement.* These findings suggest that when instructors create a climate that encourages students to think and provide thoughtful assignments, students are going to be more likely to post and interact with their classmates and instructor. Prior research has uncovered the fact that instructor presence is related to students' engagement (Garrison, Cleveland-Innes, & Fung, 2010). However, based on this study findings, it may be more specific than general instructor presence. To be specific, instructors who are able to help students participate and encourage them to explore new topics are likely to foster student engagement with their online community – perhaps even more so than how clearly the instructor communicates course goals (i.e., *Instructional Design*) or provides feedback (i.e., *Direct Instruction*).

In sum, these results indicate that instructors who want students to be more active and participate more in discussions may want to focus on creating an online classroom that encourages students to feel comfortable speaking openly and develop a strong sense of instructor facilitation.

Life Application Engagement

Comfort Expressing Vulnerability was also significantly related to *Life Application Engagement.* It may be, that students who are comfortable speaking with their instructors would have a stronger understanding of the material and are therefore more equipped to engage with the course. In other words, students who are able to expose gaps in their understanding are more likely to have a strong enough grasp on the course content to apply the concepts to their lives outside the classroom. It was interesting that *Instructional Design* was not significantly related to *Life Application Engagement* given that how instructors set up the course and designed course assignments could influence students' ability to find relevance in the material. This may suggest that it is more valuable for students to feel a sense of belonging and comfortable in the environment, than it is to create thought-provoking content.

Social Engagement

Lastly, *Instructor Facilitation* was significantly related to *Social Engagement*. Student perceptions of their instructor's ability to facilitate a strong course was more likely to encourage students to get to know the members of the class. Similar to previous studies, instructor presence is associated with student engagement (Garrison, Cleveland-Innes, & Fung, 2010). Students may be more inclined to engage socially if they find their instructors are providing relevant and interesting assignments and helping facilitate good discussions amongst the students.

There were several unexpected negative loadings, such as (1) *Instructor Support* on *Online Community Engagement*, (2) *Direct Instruction* on *Social Engagement,* (3) and *Instructor Support* on *Social Engagement*. This may be due to the strong association

between *Sense of Community* and the four subscales of *Online Student Engagement*. Perhaps *Sense of Community* provides the strongest association, and the other subscales have trouble accounting for engagement over and above the influence of students' perceptions of their feelings of belongingness. This would further validate the importance of creating connections between students and the members of the course to foster student engagement. Online instructors may want to prioritize creating a sense of belongingness and community for their students to help encourage students to engage with the course overall.

Future studies may want to consider how the pedagogical factors of *Instructor Presence* and *Online Learning Community* fit with the *Theory of Involvement* model. A longitudinal study may be able to assess directionality between *Instructor Presence, Online Learning Community, Online Student Engagement,* and *Academic Performance*. It would also be helpful and valuable to assess if there were some subfactors that have stronger associations with *Online Student Engagement*, as this information can help educators focus on particular pedagogical skills in their online courses.

Aim 4

Identifying the pedagogical factors of social engagement has a lot of value for educators, but it is also important to examine if there were student personal characteristics that might have influenced the extent to which online students engage in their courses. There is conflicting evidence on whether online student experiences differ based on personal characteristics and situations. Some research has identified age, gender, and race or ethnicity to affect engagement in in-person courses (Hu & Kuh, 2002), success in online courses (Rovai, 2002), and retention (Shea & Bidjerano,

2018). However, other studies have found no significant differences (Robinson &

Hullinger, 2008, Shea et al., 2009) and some researchers argue that there are not any

consistent differences in online learning based on gender and ethnicity (Meyer,

2014). The findings from the results of Aim 4 have significant implications for how

higher education should approach their online courses and offerings.

Students' reports of *Academic Engagement, Online Community Engagement, Life*

Application Engagement, and *Social Engagement* did not differ by gender, ethnicity, or

living arrangements. These findings suggest that students' study habits, participation in

the online learning community, ability to apply concepts to their own lives, and desire to

get to know others is not dependent on individual characteristics or circumstances. The

implications of these results are fascinating and may suggest that the differences found in

in-person courses may not be found in online courses because the online realm is more

equitable. For example, the lack of differences in academic engagement may be that

online students have more equitable access to course materials. Often, sex and ethnicity

differences noted in academic success are products of inequitable situations (Pike & Kuh,

2005). Access to digital course material means that, so long as the student has access to

the internet, they can have access to their study materials rather than having to navigate

logistical issues with juggling inflexible work schedules, car troubles, etc. Furthermore,

researchers studying student engagement in in-person courses have identified that student

perceptions of their ethnic identity, experiences with discrimination, and lack of access to

instructors of color an explain differences in student engagement based on race and

ethnicity (Bingham & Okagki, 2012). Online environments may give BIPOC students

opportunities to engage in the material without the influence of these factors. However,

given the inconsistent findings, additional results are needed to perhaps explore if there are moderators that can explain why some samples produce different results. For example, perhaps the anonymity and facelessness of online courses removes the barriers of demographic and personal situations.

Importance of Peer Interaction was also consistently a significant and positively related to *Online Student Engagement*. Students who place importance on peer interaction are more likely to engage with their courses in terms of studying, participating in discussions, finding relevance in their learning materials, and wanting to get to know others in the course. This positive link suggests that instructors may be able to get their students engaged in the material by outlining the importance of peer interaction and encouraging their students to value the opportunities to interact with classmates.

Academic Engagement

Consistent with prior research (Bolliger & Halupa, 2018; Robinson & Hullinger, 2008), older students were more likely to report they engaged in their courses by studying and keeping up with the course materials. This is likely because older students probably have more responsibilities (such as a family) and more at stake to be successful in their courses. It may mean they feel pressured to put effort into their courses. Additionally, older students have likely had more experience in identifying study strategies that work for them. Students who report taking online courses because it is more convenient are more academically engaged. Similar to older students, students who are taking online courses for convenience may have study strategies that thrive in online learning environments and make it easier for them to engage academically.

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Online Community Engagement

Students who reported taking online courses due to convenience were more likely to participate in online discussions, post in discussion forums, and want to help their classmates. Many online students choose online courses because they are convenient when juggling competing roles and responsibilities. Asynchronous online courses can remove the barrier of inflexible meeting times and allows students to engage with their community. It also allows the students to conveniently select when they can post in forums and reply to peers without the constraints of having to be in a classroom at particular times of the week. As the theme of convenience and engagement continues to be present, this indicates that educators who want to encourage their students to engage in the online community discussions and forums may want to set up policies that students find convenient. For example, allowing students to have more time to complete discussion posts, may allow students the chance to participate more.

Life Application Engagement

ASU Online students had higher rates of *Life Application Engagement* than iCourse students (students who are enrolled in an in-person program but are taking an online course). Online modalities are very well suited for people who are outside the typical college mold. The mean age of ASU Online Students is 29 years old. Most of these online students have work and life experience. It might be that they find more relevance in the material because they are living it. For example, the material on family and marriage relationships may be more salient and relatable because they are married or because they might find the course work on adolescence interesting if they are raising teenagers.

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Students who were selecting online courses due to financial constraints, family responsibilities, and work demands were more likely to try to find relevance in course material and express a strong desire to learn the material. Their motivations for taking an online course are likely also the reason why they are invested in deeply understanding the material. For example, if they are concerned about financial constraints, then these students probably want to get the best "bang for the buck" and obtain as much information as they can out of each course. For students who are concerned about family responsibilities, the course material is likely relevant to the issues they are facing - such as marriage, raising children, and/or social justice issues. These students are likely to be invested in really learning the material well enough to be able to make it relevant to their life outside the classroom.

Social Engagement

The current study findings suggest that first generation students were more likely to report that they tried to get to know others in the course and spend time with their instructor, in comparison to non-first-generation students. While there is often an interaction effect between generation status and ethnicity, this study did not find any significant interactions suggesting these differences are simply related to generation status. Previous research of in-person college students have found that first-generation undergraduate students are less likely to be engaged (Soria & Stebleton, 2012). This is likely because first generation students have to pioneer challenging spaces for the first time and often without support. This can be a lonely experience and may encourage first-generation students to want to spend more time getting to know members of the course. One of the measures of social engagement was scheduling meetings with the

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instructor. Perhaps first-generation students may want to develop relationships with their instructors as a form of support in navigating the uncharted territory of college. Online courses may remove the obstacles and awkwardness in getting to know others that would give first-generation students (who typically have lower engagement rates) the chance to approach fellow classmates.

Previous studies have found that older students are more likely to be engaged in courses than younger counterparts (Bolliger & Halupa, 2018; Robinson & Hullinger, 2008). Older students are more likely to report getting to know their instructors and classmates and may find social engagement more approachable and accessible in online courses compared to younger students, who likely have college-attending peers also taking courses. Older students may be more stretched for time as they are likely to be full-time employees and may find it more productive to foster relationships with people in their course for convenience's sake.

Lastly, students who were taking online courses due to health concerns were more likely to be socially engaged. Students with health ailments may be isolated and connecting with online instructors and classmates may fit their health restrictions better. It is easier to develop relationships with the flexibility of an online course than having to make time to see someone in-person.

The significant and non-significant findings of Aim 4 are exciting. The lack of significant findings in demographic variables being related to student engagement suggests that contrary to many of the in-person studies that have found differences, online courses in this study may be leveling the playing field. A replication study would be helpful in assessing if online courses are moving towards a more inclusive classroom that

does not put students at greater "risk". Future researchers should also consider seeing if there is something unique to these social science online courses, which appear to remove barriers in student engagement. The significant findings suggesting that *Importance of Peer Interaction* was positively related to *Online Student Engagement* is encouraging and future studies may want to consider what factors encourage students to value peer interaction. *Importance of Peer Interaction* should also be considered when designing a longitudinal study design that examines *Instructor Presence, Online Learning Community, Online Student Engagement,* and *Academic Performance*. These factors are correlated and there may be directionality that can reveal important information on the student engagement processes.

Limitations and Summary of Future Directions

The current study had several limitations that should be addressed in future studies to further understand the role of various forms of engagement for students pursuing higher education in the online environment. For instance, despite attempts to achieve broad generalizability to online learners, generalizability of findings is limited by the sample obtained. In other words, although attempts were made to obtain a sample representative of all online students, it was not feasible to reach out to all available online instructors or programs at ASU. The resulting sample was largely obtained via courses offered by Family and Human Development and Sociology programs. While these courses serve a diversity of online students in terms of majors, age, racial backgrounds and so forth, they nevertheless were overwhelming doing well in the specific courses tapped by this study (e.g., getting good grades, planning on staying enrolled). These courses tend to be elective, cover topics that are personally interesting to students, and

thus, it may be easier to be engaged in materials that could be directly relevant to students' own lives and relationships. It is unclear if these study findings would generalize to core requirement online courses in physical/biological sciences, technology, engineering and math (STEM), or more theoretical courses.

In addition, instructors for the courses who allowed their students to participate in this study were all excellent (highly trained and evaluated) and experienced instructors (range five to eighteen years of teaching online at ASU). They also all had extensive training and participate in ongoing meetings to discuss the best online teaching practices. Moreover, the instructors whose students participated in the research study all utilized the Quality Matters Rubric (Dietz-Uhler, Fisher, & Han, 2007; Sadaf, Martin, & Ahlgrim-Delzell, 2019) for designing and implementing their courses; consequently, participating students were reporting on experiences with courses that demonstrated strong instructor presence and appropriate uses of peer interaction.

In sum, findings of this study may only generalize to courses that already have rigorous requirements to ensure a strong baseline of course design, instructor presence, and meaningful opportunities for peer interaction. Previous studies have shown courses that adhere to the Quality Matters Rubric have high rates of retention (Dietz-Uhler, Fisher, & Han, 2007) and students report that the Quality Matters Standards have a positive impact on their learning (Sadaf, Martin, & Ahlgrim-Delzell, 2019). Thus, replication studies are needed to compare courses that meet the Quality Matters Rubric requirements to courses that do not adhere to similar standards, or that use such standards as a control variable. Additionally, researchers should target and recruit instructors with varying years of experience in online teaching.

In addition to limitations with generalizability, findings from the current study highlight the need to better understand students' perceptions of peer interactions in online courses. That is, although the study showed that students do value peer interaction, it was not able to examine or determine the optimal balance between how much peer interaction students would want and how much was needed to maximize the positive impact of peer interactions on student outcomes. More research is needed in determining the optimal quantity or quality of peer interaction to recommend to instructors and educators.

The measures of student academic performance were also limited in their sensitivity to individual differences, Specifically, the current indicators of *Academic Performance* focused on overall GPA, self-reported grades in the specific class, and students' reported intentions for retention. However, it may be beneficial to have instructor-reported course engagement and achievement for each student, such as percent of assignments turned in, instructor-reported grades and quantity/quality of student online participation. Moreover, because 89% of students in this study intended on re-enrolling in courses the following semester and 9% of the students were graduating, there was not sufficient variability in retention rates to examine retention as an outcome variable. Similar to the limitations of generalizability mentioned previously, future research may want to target (identify) online students who are not as successful and who may be at risk for withdrawing to re-examine if the *Theory of Involvement* can be applicable to retention rates of online students.

In addition to academic outcomes such as grades, researchers may want to include other indicators of academic progress or satisfaction, such as student satisfaction with their learning (e.g., "C's earn degrees", degree completion is more important than getting

an "A" or "B"; how the degree they are pursuing will advance their career objectives) and other indicators of psychosocial and emotional well-being, such as stress-levels, academic resilience, and persistence.

The current study was a cross sectional study and thus was not able to assess causal relations or assess if there were alternative directional relations. Although the study found support for the application of the *Theory of Involvement* in online learning environments, this theory does not consider whether certain types of engagement are stronger predictors of academic performance or how the types of engagements may relate to each other. Thus, future studies may want to consider the unique or additive contributions of various forms of student engagement to achievement or consider how the various forms relate to one another. Specifically, a longitudinal study is needed in order to determine whether a mediation model – such that being academically engaged mediates the relation between other forms of engagement and academic achievement. A longitudinal study would also be helpful in assessing directionality and strength of associations between pedological factors and academic performance. Multiple time points would be key in gaining a better understanding of students who are less successful and gathering more information on students who withdraw. Having a better understanding of less successful students may remove the issues with variability (or rather, the lack of variability) and could also explain the issues of multicollinearity. This would also help strengthen the application of the *Theory of Involvement* beyond grades and GPA.

Conclusions

In conclusion, this dissertation study adds to the growing body of literature on online student engagement in online learning environments. The results of this study suggest that students want to have opportunities to interact with their peers in online courses. Further, behaviors of online student engagement are related to academic performance and support the application of the *Theory of Involvement* in online courses. The findings also indicate that student perceptions of their online community and value placed on peer interaction are an important correlate of behaviors of online student engagement. Lastly, excepting age, online student engagement does not seem to vary by students' demographic characteristics. The results of the study can help educators make more-informed decisions in designing their online courses, such that they can improve online student learning experiences and help online learners be successful in their courses.

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APPENDIX A

IRB FORMS

University Office of	PO Box 875204	(480) 965-9291
Evaluation and	Tempe, AZ 85287-5204	Facsimile
Educational Effectiveness		(480) 965-9283

MEMO

Date: **July 15, 2020**

To: **Khaerannisa Cortes, Doctoral Candidates**
Sanford School of Family Dynamics

From: **Shelly A. Potts, Ph.D., Senior Director**

Re: **Survey Review**

On 7/15/20, the ASU Survey Review committee reviewed the following request:

Title:	Students' perceptions of engagement in online courses and its effect on academic performance and retention rates
Investigator:	Khaerannisa Cortes
Unit	Sanford School of Family Dynamics
IRB ID:	Study00012172
Documents Reviewed:	Survey review form, IRB submission, participant communications, survey
Committee response:	Survey is approved as proposed. Refer to ASU policy on raffles when planning survey incentives: https://ogc.asu.edu/gambling-raffles.

cc: Susan Metosky
         Sheila Ainlay
         Becky Ladd

RECRUITMENT LETTER TO INSTRUCTOR

Dear [Instructor],

I hope you are doing well and staying healthy and safe. As a fellow instructor who teaches both ASU online courses and i-courses, I recognize the unique experiences and challenges of online learning and our students' community needs. It has motivated me to understand this distinct social community even more, especially with respect to how students' engagement at various levels in our courses relate to their academic success.

Thus, I have chosen to study the importance of the online community for our students for my dissertation. Specifically, I am interested in examining the link between various forms of student engagement and academic outcome, predictors of student engagement, and students' perceptions of required peer-interaction. Findings from this study would help online instructors better understand what forms of engagement help motivate our students and promote their success. would be happy to share the findings with you in a brief report based on my dissertation.

If you would be willing to allow your students to participate in this study, I believe their feedback and perspectives would prove invaluable. If you agree, please share the email with your students containing a description of the study and direct link to the survey. Although the surveys would be anonymous, I am able track participants so that you could provide them with extra credit, if you choose. Whether or not you provide extra incentive for them to participate, those that complete the survey will be entered into a raffle to win 1 of 4 $25 gift cards.

Because I am interested in students' perceptions of the online community and their engagement with each other, I am only recruiting classes in which students are either required or encouraged to engage in some level of peer-interaction, such as via DB or Yellowdig. Thus, please only send this invitation to your students in courses that require some form of peer-interaction.

Would you be willing to send out the attached email to your students?
☐ YES ☐ NO ☐ I need more information before agreeing.

If you are willing to participate, would you like for me to track your students for extra credit points?
☐ YES ☐ NO ☐ I need more information before deciding.

Thank you for considering this request. If you have any questions concerning the research study, please contact Khaerannisa Cortes at kicortes@asu.edu. If you have any questions about your rights as a research participant, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance at 480-965-6788.

Sincerely,
Khaerannisa Cortes, M.S.
Doctoral Candidate
(Dr. Becky Ladd, Dissertation Chair)

RECRUITMENT LETTER TO PARTICIPANT

Dear [Student],

I hope you are doing well and staying healthy and safe. I am a doctoral student in the Family and Human Development program at Arizona State University. In addition to being a doctoral student, I am also an online instructor and have recognized the unique experiences and challenges of online learning and students' community needs. It has motivated me to understand this distinct social community even more, especially with respect to how students' engagement in our courses relate to their academic success.

Thus, I have chosen to study the importance of the online community for students for my dissertation. Specifically, I am interested in assessing the link between student engagement and academic outcome, predictors of student engagement, and students' perceptions of required peer-interaction. Findings from this study would help online instructors better understand what forms of engagement our students' prefer and are most related to their success. With your participation in in this study, you would be providing instructors with your unique perspectives on how to best meet online students' engagement needs.

If you choose to participate, you will be asked to answer questions about instructor and student engagement in online courses, the types of activities you find engaging, and your college experience. Participating in this study involves completing an online survey, which will take about 15-to-20 minutes. Participants will be entered into a raffle for one of four $25 Amazon gift cards upon completion of the survey.

You must be at least 18 years old to participate in this study, and your participation is voluntary. You can choose not to participate with no adverse effect on your grade, and once you have started the survey, you may choose to withdraw from the study at any time. I do not anticipate any risk or discomfort to you for participating.

Your responses to this survey will be anonymous. Data from this survey may also be used in research presentations or publications but will only be analyzed in aggregate form across all participants. Your name or any identifying information will not be associated with your data or shared with anyone outside the research team.

Thank you for considering this request. If you have any questions concerning the research study, please contact Khaerannisa Cortes at kicortes@asu.edu. If you have any questions about your rights as a research participant, or if you feel you have been placed

at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance at 480-965-6788.

Sincerely,
Khaerannisa Cortes, M.S.
Doctoral Candidate
(Dr. Becky Ladd, Dissertation Chair)
Dear [Instructor],

APPENDIX B

MEASURES

Demographic Data

1. What is your major?
   a) Arts (Herberger Institute)
   b) Business (accounting, finance, economics, supply chain)
   c) Communication
   d) Education
   e) Family & Human Development
   f) Graphic Information Technology
   g) Health-related (Community health, nursing, health solutions, global health, health ed & health promotion, kinesiology)
   h) Health Solutions (e.g., speech and hearing)
   i) Justice Studies/Criminal Justice/Criminology
   j) Liberal Studies
   k) Political Science
   l) Psychology
   m) Sociology
   n) STEM (math, biology, chemistry, engineering)
   o) Other: _____

2. What is your academic rank?
   a) Freshman
   b) Sophomore
   c) Junior
   d) Senior
   e) Other:

3. How old are you (in years)? _____

4. What is your sex?
   a) Female
   b) Male
   c) Non-binary
   d) Prefer not to say
   e) Other:

5. What is your ethnicity?
   a) American Indian or Alaska Native
   b) Asian
   c) Black or African American
   d) Hispanic or Latino
   e) Native Hawaiian or Other Pacific Islander
   f) White
   g) Biracial or Multiracial
   h) Other

6. Are you a first-generation student?
    a) Yes
    b) No

7. What is your relationship (living arrangement) status?
    a) Living alone (Single, widowed, separated, divorced)
    b) Living with roommates (not close friends)
    c) Living with close friends
    d) In a committed relationship but not cohabitating
    e) In a committed relationship and cohabitating
    f) Married and not living together
    g) Married and living together

8. How many dependent children do you have? _____

9. Which describes your academic program:
    a) ASU Online Student (never take any in-person courses)
    b) iCourse Student (taking an online course but registered as face-to-face student and could take in-person courses)

10. Including this current term, how many online courses have you taken?
    _____

11. Overall, I am satisfied with the online courses I have taken.
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

12. Overall, I have learned a great deal in the online courses I have taken.
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

13. What is your current GPA at ASU?
    a) 3.5 to 4.0
    b) 3.0 to 3.49
    c) 2.5 to 2.99
    d) 2.0 to 2.49
    e) Less than 2.0

14. How much do you agree with the following statement: FINANCIAL CONSTRAINTS have influenced my decision to take an online class or enroll in an online program.
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

15. How much do you agree with the following statement: FAMILY RESPONSIBILITIES have influenced my decision to take an online class or enroll in an online program.
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

16. How much do you agree with the following statement: HEALTH CONCERNS have influenced my decision to take an online class or enroll in an online program.
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

17. How much do you agree with the following statement: WORK DEMANDS have influenced my decision to take an online class or enroll in an online program.
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

18. How much do you agree with the following statement: CONVENIENCE OF ONLINE COURSES has influenced my decision to take an online class or enroll in an online program.
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree

e) Strongly agree

19. I feel supported and connected by FAMILY AND FRIENDS.
     a) Strongly disagree
     b) Disagree
     c) Neutral
     d) Agree
     e) Strongly agree
     f) N/A

20. I feel supported and connected by BEING ON CAMPUS.
     a) Strongly disagree
     b) Disagree
     c) Neutral
     d) Agree
     e) Strongly agree
     f) N/A

21. I feel supported and connected by WORK PEERS.
     a) Strongly disagree
     b) Disagree
     c) Neutral
     d) Agree
     e) Strongly agree
     f) N/A

22. I feel supported and connected by MY RELIGIOUS COMMUNITIES/PLACE
    OF WORSHIP.
     a) Strongly disagree
     b) Disagree
     c) Neutral
     d) Agree
     e) Strongly agree
     f) N/A

Current Online Course Context

Below you will be asked a series of questions regarding a course you are presently enrolled in.

What course led you to this survey?
a) CDE232: Human Development
b) CDE312/SOC312: Adolescence
c) CDE430: Infant/Toddler Development
d) CDE450: Child Dysfunction in the Family
e) FAS101: Personal Growth & Human Relationship
f) FAS264/SOC264: Gender & Society
g) FAS301: Intro to Parenting
h) FAS331: Marriage & Family Relationships
i) FAS332: Human Sexuality
j) FAS361/SOC391: Research Methods
k) FAS370: Family/Ethnic Cultural Diversity
l) FAS410: Military Families
m) FAS435/SOC435: Advanced Marriage/Family Relationships
n) SOC101: Intro to Sociology
o) SOC315: Courtship & Marriage
p) SOC334: Technology & Society
q) SOC340: The Sociology of Deviance
r) SOC352: Social Change
s) SOC424: Women & Health
t) SOC427: Sociology of Health/Illness
u) SOC483: History of Social Thought
v) SOC418/CDE418: Aging & the Life Course
w) SOC498/FAS498: Wonder
x) Other: _____

Please answer the following questions based on this particular course.

1. How much do you agree with this statement: I am taking this course online because I prefer online courses.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

2. In this course, how often are you required to post in the traditional Discussion Board (DB) forum?
   a. Never
   b. Once throughout the course
   c. Two to 10x through the course
   d. 11x to once a week
   e. At least two times a week
   f. Daily
   g. Other _____

3. In this course, how often are you required to post in Yellowdig?
   a. Never
   b. Once throughout the course
   c. Two to 10x through the course
   d. 11x to once a week
   e. At least two times a week
   f. Daily
   g. Other _____

<mark>If they select "Never" to both questions above, they will be asked:</mark>

4. If you never have to participate in online discussions via DB or Yellowdig in this course, have you taken a course in 2019 or 2020 in which you were required to?
   a. No
   b. If yes, what course? _____

   Please answer the following questions based on the course identified above.

<mark>If they select "No", they will not be able to continue the survey.</mark>

Academic Outcomes and Retention

1. What is your current grade in the course?
   a. A
   b. B
   c. C
   d. D
   e. E

Two outcome items from Dixson's Online Student Engagement Scales
2. Getting a good grade
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

3. Doing well on tests/quizzes
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

Retention

1. Are you registered for a course after this current term?
   a. Yes
   b. No, I am graduating
   c. No, I am taking a term off, but I will return
   d. No, I am withdrawing from ASU

==If they select "Yes" or "No, I am graduating" or "No, I am taking a term off, but I will return" they will be asked "hypothetically" why they would withdraw. For those who are withdrawing, they will be asked to rate reasons for why they are withdrawing.==

Hypothetically speaking, if I were to withdraw from ASU, it would likely be because of
OR
I am withdrawing because of:
2. financial reasons
   a. Very likely the reason
   b. Possibly the reason
   c. Not at all the reason

3. family
   a. Very likely the reason
   b. Possibly the reason
   c. Not at all the reason

4. health issues
   a. Very likely the reason
   b. Possibly the reason
   c. Not at all the reason

5. work demands
   a. Very likely the reason
   b. Possibly the reason
   c. Not at all the reason

6. Not feeling connected to, or supported by, my degree program
   a. Very likely the reason
   b. Possibly the reason
   c. Not at all the reason

7. Not feeling connected to, or supported by, ASU
   a. Very likely the reason
   b. Possibly the reason
   c. Not at all the reason

8. Career or education interest changes
   a. Very likely the reason
   b. Possibly the reason
   c. Not at all the reason

9. My level of engagement with OTHER STUDENTS influenced my decision to continue or not continue pursuing my degree at ASU
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

10. My level of engagement with MY INSTRUCTORS influenced my decision to continue or not continue pursuing my degree at ASU
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

11. Being engaged/happy with MY DEGREE PROGRAM influenced my decision to continue or not continue pursuing my degree at ASU
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

12. Being engaged/happy with my UNIVERSITY (i.e., ASU) influenced my decision to continue or not continue pursuing my degree at ASU
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

Adapted from Dixson's (2010) Online Student Engagement Scale

Below you will see a series of statements concerning the course you are presently enrolled in. Read each statement carefully and select the choice that comes closest to indicating how you feel about the course. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, select the neutral choice. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. Please respond to all items in this section.

Academic Engagement items

Within the course you identified previously, how well do the following behaviors, thoughts, and feelings describe you?

1. Making sure to study on a regular basis
    a. Not at all characteristic of me
    b. Not really characteristic of me
    c. Moderately characteristic of me
    d. Characteristic of me
    e. Very characteristic of me

2. Staying up on the readings
    a. Not at all characteristic of me
    b. Not really characteristic of me
    c. Moderately characteristic of me
    d. Characteristic of me
    e. Very characteristic of me

3. Looking over class notes between getting online to make sure I understand the material
    a. Not at all characteristic of me
    b. Not really characteristic of me
    c. Moderately characteristic of me
    d. Characteristic of me
    e. Very characteristic of me

4. Being organized
    a. Not at all characteristic of me
    b. Not really characteristic of me
    c. Moderately characteristic of me
    d. Characteristic of me
    e. Very characteristic of me

5. Taking good notes over readings, PowerPoints, or video lectures
    a. Not at all characteristic of me

b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

6. Listening/reading carefully
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

7. Finding ways to make the course material relevant to my life
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

8. Applying course material to my life
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

9. Finding ways to make the course interesting to me
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

10. Really desiring to learn the material
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

11. Putting forth effort
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me

e.   Very characteristic of me

Online Community Engagement items

From Dixson's (2010):

1. Having fun in online chats, discussions or via email with other students
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

2. Participating actively in small-group discussion forums
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

3. Helping fellow students
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

4. Engaging in conversations online (chat, discussions, email)
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

5. Posting in the discussion forum regularly
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

6. Getting to know other students in the class
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

Adapted from original survey by adding following questions to balance questions about other students:

7. Getting to know the course instructor
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

8. Meeting with the instructor (ask questions or make course comments)
   a. Not at all characteristic of me
   b. Not really characteristic of me
   c. Moderately characteristic of me
   d. Characteristic of me
   e. Very characteristic of me

<h1 style="text-align: center;">Instructor Presence</h1>
<h2 style="text-align: center;">Adapted from Shea's (2006) Teaching Presence Scale</h2>

Instructional Design:

1. The instructor clearly communicated important course goals (for example, provided documentation on course learning objectives).
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

2. The instructor clearly communicated important course topics (for example, provided a clear and accurate course overview).
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

3. The instructor provided clear instructions on how to participate in course learning activities (for example, provided clear instructions on how to complete course assignments successfully).
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

4. The instructor clearly communicated important due dates and time frames for learning activities that helped me keep pace with this course (for example, provided a clear and accurate course schedule, due dates, etc.)
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

5. The instructor helped me take advantage of the online environment in a way that assisted my learning (for example, provided clear instructions on how to participate in online discussion forums).
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree

     e. Strongly agree

6. The instructor helped students understand and practice the kinds of behaviors acceptable in online learning environments (for example, provided documentation on netiquette, i.e., polite forms of online interaction).
     a. Strongly disagree
     b. Disagree
     c. Neutral
     d. Agree
     e. Strongly agree

Instructor facilitation:

7. ~~The instructor was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.~~
     a. ~~Strongly disagree~~
     b. ~~Disagree~~
     c. ~~Neutral~~
     d. ~~Agree~~
     e. ~~Strongly agree~~

8. ~~The instructor was helpful in guiding the class towards understanding course topics in a way that assisted me to learn.~~
     a. ~~Strongly disagree~~
     b. ~~Disagree~~
     c. ~~Neutral~~
     d. ~~Agree~~
     e. ~~Strongly agree~~

9. The instructor acknowledged student participation in the course (for example, replied in a positive, encouraging manner to student submissions)
     a. Strongly disagree
     b. Disagree
     c. Neutral
     d. Agree
     e. Strongly agree

10. The instructor encouraged students to explore new concepts in this course (for example, encouraged "thinking out loud" or the exploration of new ideas)
     a. Strongly disagree
     b. Disagree
     c. Neutral
     d. Agree
     e. Strongly agree

11. The instructor helped keep students engaged and participating in productive dialogue.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

12. The instructor helped keep the participants on task in a way that assisted my learning.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

Direct instruction:

13. The instructor presented content or questions that helped me learn.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

14. The instructor focused discussion on relevant issues in a way that helped me learn.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

15. The instructor provided explanatory feedback that helped me learn (for example, responded helpfully to discussion comments or course assignments).
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

f.

16. The instructor helped me to revise my thinking (for example, correct misunderstandings) in a way that assisted my learning.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

17. The instructor provided useful information from a variety of sources that assisted my learning (for example, references to articles, textbooks, personal experiences, or links to relevant external websites).
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

Perceptions of Online Learning Community
Adapted from Rovai's (2002) Classroom Community Scale

1. ~~I feel that students in this course care about each other (e.g., treat each other respectfully, help each other when needed).~~
   a. ~~Strongly disagree~~
   b. ~~Disagree~~
   c. ~~Neutral~~
   d. ~~Agree~~
   e. ~~Strongly agree~~

2. I feel the instructor in this course cares about me (e.g., treats me respectfully, helps me when needed).
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

3. I feel my instructors encourage us to ask each other questions to help facilitate a sense of community and collaboration.
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

4. I feel connected to other students in this course (e.g., feel accepted).
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

5. I feel that it is easy to get help from my instructor when I have a question.
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

6. I feel a spirit of community in this course.
   a. Strongly disagree
   b. Disagree
   c. Neutral

d. Agree
e. Strongly agree

7. ~~I feel that I usually receive timely responses (i.e., within 48 hours) from other students in discussions.~~
    a. ~~Strongly disagree~~
    b. ~~Disagree~~
    c. ~~Neutral~~
    d. ~~Agree~~
    e. ~~Strongly agree~~

8. I feel that I usually receive timely responses (i.e., within 48 hours) from the instructor.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

9. I feel that members of this course are like a family.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

10. I feel uneasy exposing gaps in my understanding to other students. (R)
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

11. I feel uneasy exposing gaps in my understanding to my instructor. (R)
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

12. ~~I feel isolated in this course. (R)~~
    a. ~~Strongly disagree~~
    b. ~~Disagree~~
    c. ~~Neutral~~
    d. ~~Agree~~

13. I feel reluctant to speak openly to other students. (R)
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

14. I feel reluctant to speak openly to my instructor. (R)
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

15. I trust other students in this course.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree

16. I trust the instructor in this course.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

17. I feel that I can rely on my instructors in this course.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

18. I feel that other students do help me learn.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

19. I feel that members of this class depend on me.
  a. Strongly disagree
  b. Disagree
  c. Neutral
  d. Agree
  e. Strongly agree

20. ~~I feel uncertain (e.g., distrustful) about my other students in this course. (R)~~
  a. ~~Strongly disagree~~
  b. ~~Disagree~~
  c. ~~Neutral~~
  d. ~~Agree~~
  e. ~~Strongly agree~~

21. I feel confident that my instructor will support me.
  a. Strongly disagree
  b. Disagree
  c. Neutral
  d. Agree
  e. Strongly agree

22. I feel confident that my other students will support me.
  a. Strongly disagree
  b. Disagree
  c. Neutral
  d. Agree
  e. Strongly agree

Importance of Online Peer Interaction

Please consider all your experiences with online courses as well as your personal orientation toward learning to answer the following questions.

1. What proportion of online courses do you think should require peer interaction?
   a. None
   b. less than 50%
   c. 50%
   d. more than 50%
   e. All of them

2. What do you think is the optimal frequency for interacting with other students online to help you feel connected and a sense of community?
   a. Never
   b. Once or twice throughout the course
   c. Three to 10x through the course
   d. 11x to once a week
   e. At least two times a week
   f. Daily
   g. Other _____

3. How strongly do you agree with the following statements: I think it's very important for me to interact with other students in my online courses.
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

4. How strongly do you agree with the following statements: I believe engaging with the other students helped me learn the material.
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

5. How strongly do you agree with the following statements: I believe engaging with the other students helped increase my interest in the topic.
   a. Strongly disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly agree

6. If interacting with other students was required, what is your preferred platform?
   a. Traditional Discussion Board (DB) forums
   b. Yellowdig
   c. Presentations
   d. Peer Review

7. Please rate how you feel about the following assignments designed for peer interaction: Discussion Boards in traditional DB forums
   a. I never like these assignments.
   b. I usually do not like these assignments.
   c. I neither like nor dislike these assignments.
   d. I usually like these assignments.
   e. I always like these assignments.
   f. I don't know; I've never used it.

8. Please rate how you feel about the following assignments designed for peer interaction: Discussion Boards in Yellowdig
   a. I never like these assignments.
   b. I usually do not like these assignments.
   c. I neither like nor dislike these assignments.
   d. I usually like these assignments.
   e. I always like these assignments.
   f. I don't know; I've never used it.

9. Please rate how you feel about the following assignments designed for peer interaction: Presentations
   a. I never like these assignments.
   b. I usually do not like these assignments.
   c. I neither like nor dislike these assignments.
   d. I usually like these assignments.
   e. I always like these assignments.
   f. I don't know; I've never used it.

10. Please rate how you feel about the following assignments designed for peer interaction: Peer Review
   a. I never like these assignments.
   b. I usually do not like these assignments.
   c. I neither like nor dislike these assignments.
   d. I usually like these assignments.
   e. I always like these assignments.
   f. I don't know; I've never used it.

APPENDIX C

TABLES

Table 1

Means (Standard Deviations), Skewness, Kurtosis and Cronbach Alpha for Main Study
Variables of the Pilot Study

Study Variable	Mean (SD)	Skewness (SE)	Kurtosis (SE)	α
Academic Outcomes				
Current GPA	3.33 (.63)	-1.37 (.20)	4.14 (.39)	--
Getting a Good Grade	4.47 (.63)	-.94 (.20)	.63 (.40)	--
Doing Well on Tests/Quizzes	4.32 (.78)	-.98 (.20)	.40 (.40)	--
Online Student Engagement				
Academic Engagement	4.12 (.63)	-.63 (.20)	.19 (.39)	.86
Online Community Engagement	3.56 (.81)	-.17 (.20)	-.56 (.39)	.89
Instructor Presence				
Direct Instruction	4.44 (.56)	-.59 (.20)	-.51 (.39)	.87
Instructional Design	4.66 (.49)	-1.30 (.20)	.93 (.39)	.96
Instructor Facilitation	4.46 (.56)	-.73 (.20)	-.38 (.39)	.93
Online Learning Community	3.96 (.55)	-.35 (.20)	-.46 (.39)	.91

Table 2

Means (Standard Deviations), Skewness, Kurtosis and Range for Numerical Demographic Variables

Study Variable	*N*	Mean (SD)	Skewness (SE)	Kurtosis (SE)	Range
Age (in years old)	1488	25.94 (7.75)	1.70 (.06)	2.98 (.13)	17 – 64
Number of dependents	1465	.46 (1.04)	2.87 (.06)	9.81 (.13)	0 – 7
Number of online courses	1488	10.78 (8.59)	1.80 (.06)	4.41 (.13)	1 – 60

Table 3

Descriptive Statistics for Nominal Demographic Variables

Demographic Variable	Frequency (Percentage)
Gender (N = 1506)	
Female	1259 (84%)
Male	232 (15%)
Non-binary	12 (.8%)
Prefer not to say	2 (.1%)
Other	1 (.1%)
Ethnicity (N = 1507)	
White	808 (54%)
Hispanic or Latino	322 (21%)
Biracial or Multiracial	118 (8%)
Black or African American	102 (7%)
Asian	94 (6%)
Other	34 (2%)
American Indian/Alaska Native	23 (2%)
Native Hawaiian/Pacific Islander	6 (<0%)

Relationship Status & Living Arrangement ($N = 1507$)

Living with family but single, widowed, separated, divorced	317 (21%)
Married and living together	292 (19%)
In a committed relationship and cohabitating	248 (17%)
Living with close friends	196 (13%)
Living with family and in a committed relationship	179 (12%)
Living alone	125 (8%)
In a committed relationship but not cohabitating	70 (5%)
Living with roommates (not close friends)	69 (5%)
Married and not living together	11 (<0%)

Academic Rank ($N = 1491$)

Freshmen	91 (6%)
Sophomore	282 (19%)
Junior	521 (35%)
Senior	565 (38%)
Other	14 (<0%)
Transfer and unsure	8 (<0%)
Second baccalaureate/Nondegree seeking	4 (<0%)

Major ($N = 1506$)

Family & Human Development	324 (22%)

Health-related	273 (18%)
Psychology	189 (13%)
Sociology	158 (11%)
Communication	95 (6%)
STEM	80 (5%)
Education	76 (5%)
Business	65 (4%)
Liberal Studies	63 (4%)
Health Solutions	47 (3%)
Justice Studies/Criminal	26 (2%)
Political Science	25 (2%)
Arts (Herberger Institute)	16 (1%)
Interdisciplinary Studies	16 (1%)
Other	13 (<0%)
Organizational Leadership	6 (<0%)
Community Advocacy	5 (<0%)
Double-majoring	5 (<0%)
English	4 (<0%)
Graphic Information Technology	3 (<0%)
Anthropology	3 (<0%)
Applied Psychological Science	2 (<0%)

General Studies	2 (<0%)
Journalism	2 (<0%)
Social & Behavioral Science	2 (<0%)
Spanish	2 (<0%)
Women and Gender Studies	2 (<0%)
Digital Audiences	1 (<0%)
Social Work	1 (<0%)
First Generation Students ($N = 1503$)	
No, not first generation	824 (45%)
Yes, first generation	679 (55%)

Table 4

Descriptive Statistics for Ordinal-level Academic Performance

Academic Performance	Frequency (Percentage)
Current GPA	
Less than 2.0	25 (2%)
2.0 – 2.49	63 (4%)
2.5 – 2.99	222 (15%)
3.0 – 3.49	449 (30%)
3.5 – 4.0	745 (50%)
Current Grade in the Identified Course	
E	11 (<0%)
D	20 (1%)
C	117 (8%)
B	403 (27%)
A	940 (63%)

Table 5

Descriptive Statistics for Retention

Retention	Frequency (Percentage)
Retention	
Yes, I am returning next term	1323 (87%)
No, I am graduating	138 (9%)
No, I am taking a term off, but I will return	30 (2%)
No, I am withdrawing from ASU	2 (30%)

Table 6

Means (Standard Deviations), Skewness, Kurtosis and Range for Numerical Demographic Variables

Study Variable	Mean (SD)	Skewness (SE)	Kurtosis (SE)	Range
If I were to withdraw from ASU, it would likely be because of				
Financial Reasons	1.96 (.81)	0.08 (.10)	-1.46 (.19)	1 – 3
Family	2.54 (.66)	-1.11 (.10)	0.04 (.19)	1 – 3
Health Issues	2.53 (.65)	-1.06 (.10)	0.00 (.19)	1 – 3
Work Demands	2.39 (.72)	-0.76 (.10)	-0.74 (.19)	1 – 3
Not feeling connected to, or supported, by my degree	2.62 (.63)	-1.42 (.10)	0.82 (.19)	1 – 3
Not feeling connected to, or supported, by ASU	2.60 (.64)	-1.34 (.10)	0.59 (.19)	1 – 3
Career or education interest changes	2.36 (.68)	-0.58 (.10)	-0.73 (.19)	1 – 3
My level of engagement with _____ would influence my decision to continue or not continue pursuing my degree at ASU				
Other Students	2.24 (1.13)	0.62 (.10)	-0.40 (.19)	1 – 5
My Instructors	2.91 (1.19)	-0.09 (.10)	-0.98 (.19)	1 – 5
My Degree Program	3.91 (.98)	-1.13 (.10)	1.34 (.19)	1 – 5
My University (i.e., ASU)	3.62 (1.05)	-0.66 (.10)	-0.01 (.19)	1 – 5

Table 7

Means (Standard Deviations), Skewness, Kurtosis and Cronbach Alpha for Main Study Variables

Study Variable	Mean (SD)	Skewness (SE)	Kurtosis (SE)	α
Academic Performance	4.25 (.64)	-.83 (.06)	.37 (.13)	.72
Overall GPA	4.21 (.95)	-1.18 (.06)	.94 (.13)	--
Current Grade in the Course	4.50 (.76)	-1.72 (.06)	3.33 (.13)	--
Getting a Good Grade	4.34 (.76)	-1.11 (.06)	1.35 (.13)	--
Doing Well on Tests/Quizzes	3.97 (.91)	-.63 (.06)	-.00 (.13)	--
Online Student Engagement				
Academic Engagement	3.88 (.67)	-.30 (.06)	-.22 (.13)	.85
Online Community Engagement	3.28 (.86)	-.16 (.06)	-.30 (.13)	.84
Life Application Engagement	3.97 (.77)	-.55 (.06)	-.13 (.13)	.85
Social Engagement	2.59 (.88)	.37 (.06)	.03 (.13)	.81

Instructor Presence

Direct Instruction	4.19 (.68)	-.70 (.06)	.62 (.13)	.87
Instructional Design	4.55 (.56)	-1.38 (.06)	2.93 (.13)	.93
Instructor Facilitation	4.18 (.74)	-.73 (.06)	.40 (.13)	.89

Online Learning Community

Instructor Support	4.10 (.64)	-.56 (.06)	.44 (.13)	.90
Sense of Community	3.16 (.73)	-.20 (.06)	-.03 (.13)	.85
Comfort Expressing Vulnerability	3.62 (.78)	-.55 (.06)	.34 (.13)	.81

Table 8

Descriptive Statistics for Nominal-level Variables of Importance (value) of Online Peer Interaction

Importance of Online Peer Interaction	Frequency	Percentage
Optimal Frequency of Peer Interaction		
Never	78	5.2%
Once or twice throughout the course	247	16.3%
Three to 10x throughout the course	334	22.1%
11x throughout the course to once a week	261	17.2%
At least two times a week	491	32.4%
Daily	35	2.3%
Courses that Should Require Peer Interaction		
None	93	6.1%
Less than 50%	469	32.0%
50%	481	32.8%
More than 50%	191	13.0%
All of them	233	15.9%
Preferred Platform for Peer Interaction		
Traditional Discussion Board (DB) forums	1066	70.4%
Yellowdig	274	18.1%
Presentations	33	2.2%
Peer Review	73	4.8%

Table 9

Means (Standard Deviations), Skewness, and Kurtosis for Ordinal-level Variables of Importance (value) of Online Peer Interaction

Study Variable	Mean (SD)	Skewness (SE)	Kurtosis (SE)	α	Frequency of Responses (Percentage)				
					Strongly Disagree	Disagree	Neutral	Agree	Strong Agree
Importance of Peer Interaction	3.32	-.51	-.52	0.91	--	--	--	--	--
	(1.11)	(.06)	(.13)						
I think it's very important for me to interact with other students in my online courses.	3.19 (1.20)	-.35 (.06)	-.80 (.13)	--	177 (12%)	232 (15.8%)	384 (26.1%)	491 (33.4%)	188 (12.8%)
I believe engaging with the other students helped me learn the material.	3.36 (1.20)	-.55 (.06)	-.657 (.13)	--	152 (10.3%)	208 (14.1%)	290 (19.7%)	595 (40.4%)	226 (15.4%)
I believe engaging with the other students helped increase my interest in the topic.	3.41 (1.20)	-.57 (.06)	-.62 (.13)	--	141 (9.6%)	207 (14.1%)	280 (19.1%)	590 (40.2%)	250 (17.0%)

Table 10

Correlation of the Study Variables of Aims 2 and 3

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Academic Performance	1. Overall GPA	--													
	2. Current Grade in the Course	.43**	--												
	3. Getting a good grade	.41**	.40**	--											
	4. Doing well on tests/quizzes	.25**	.35**	.57**	--										
Online Student Engagement	5. Academic Engagement	.26**	.24**	.40**	.34**	--									
	6. Online Community Engagement	.14**	.10**	.21**	.10**	.46**	--								
	7. Life Application Engagement	.06*	.05*	.17**	.14**	.50**	.36**	--							
	8. Social Engagement	.06*	.08**	.09**	.06*	.39**	.61**	.29**	--						
Instructor Presence	9. Instructional design	.09**	.17**	.19**	.17**	.21**	.12**	.22**	.05	--					
	10. Instructor facilitation	.04	.09**	.10**	.12**	.24**	.24**	.21**	.17**	.62**	--				
	11. Direct instruction	.05*	.11**	.12**	.13**	.22**	.23**	.23**	.17**	.66**	.83**	--			
Online Learning Community	12. Instructor Support	.09**	.15**	.15**	.15**	.25**	.26**	.25**	.23**	.61**	.67**	.69**	--		
	13. Sense of Community	.07**	.07*	.08**	.04	.28**	.47**	.26**	.44**	.26**	.42**	.44**	.55**	--	
	14. Comfort Expressing Vulnerability	.06*	.10**	.14**	.12**	.17**	.19**	.15**	.10**	.23**	.20**	.21**	.33**	.20**	--

Note. ** $p \leq .01$; * $p \leq .05$

Online Student Engagement, Instructor Presence, Online Learning Community are factors computed with averaged item scores

Table 11

Summary of Confirmatory Factor Analysis Fit Results for Online Student Engagement Behaviors

Model	χ^2	*df*	*p*	RMSEA (90% CI)	CFI	SRMR	Model Comparison	S-B Scaled $\Delta\chi^2$ diff	Δdf
A1: One factor	5766.96	152	$\leq$ .001	.16 (.15 - .16)	.55	.107	--	--	--
A2: Two factors	4746.32	151	$\leq$ .001	.14 (.14 - .15)	.63	.108	A1 to A2	-224.11	1
A3: Three factors	3152.43	149	$\leq$ .001	.12 (.11 - .12)	.76	.120	A1 to A3	-868.13	3
A4: Four factors	1249.49	146	$\leq$ .001	.07 (.07 - .08)	.91	.058	A1 to A4	6821.47***	6
A5: Four factors with covariances	799.21	143	$\leq$ .001	.06 (.05 - .06)	.95	.042	A4 to A5	450.28***	3

Note. RMSEA = root mean square error of approximation. CFI = comparative fit index. SRMR = standardized root mean square residual.

*** *p* < .001

Table 12

Summary of Confirmatory Factor Analysis Fit Results for Instructor Presence

Model	χ^2	*df*	*p*	RMSEA (90% CI)	CFI	SRMR	Model Comparison	S-B Scaled $\Delta\chi^2$ diff	Δdf
B1: One factor	1922.139	90	$\leq$ .001	.12 (.11 - .12)	.76	.088	--	--	--
B2: Two factors	775.689	89	$\leq$ .001	.07 (.07 - .08)	.91	.055	B1 to B2	77.02***	1
B3: Three factors	677.986	87	$\leq$ .001	.07 (.06 - .07)	.92	.051	B1 to B3	223.45***	3
B4: Three factors with covariances	446.122	85	$\leq$ .001	05 (.05 - .06)	.95	.044	B3 to B4	790.76***	2

Note. RMSEA = root mean square error of approximation. CFI = comparative fit index. SRMR = standardized root mean square residual.

*** $p < .001$

Table 13

Summary of Confirmatory Factor Analysis Fit Results for Online Learning Community

Model	χ^2	*df*	*p*	RMSEA (90% CI)	CFI	SRMR	Model Comparison	S-B Scaled $\Delta\chi^2$ diff	Δdf
C1: One factor	4384.30	119	$\leq$ .001	16 (.15 - .16)	.67	.119	--	--	--
C2: Two factors	2971.46	118	$\leq$ .001	.13 (.12 - .13)	.75	.105	C1 to C2	-258.01	1
C3: Three factors	1788.98	116	$\leq$ .001	.10 (.10 - .10)	.86	.068	C1 to C3	1596.37***	3
C4: Three factors with covariances	746.39	108	$\leq$ .001	.06 (.06 - .07)	.95	.050	C3 to C4	570.79***	8

Note. RMSEA = root mean square error of approximation. CFI = comparative fit index. SRMR = standardized root mean square residual.

*** $p < .001$

Table 14

Summary of Model Fit Statistics for Aim 2: Online Student Engagement on Academic Performance

Model	χ^2	*df*	*p*	Scaling	RMSEA (90% CI)	CFI	SRMR
D1: Academic Engagement	237.935	37	$\leq$ .001	1.13	.06 (.05 - .07)	.96	.034
D2: Online Community Engagement	118.24	21	$\leq$ .001	.92	.06 (.05 - .07)	.97	.025
D3: Life Application Engagement	41.35	13	$\leq$ .001	.83	.04 (.03 - .05)	.99	.019
D4: Social Engagement	13.389	7	.06	.53	.03 (.00 - .04)	.99	.007

Note. RMSEA = root mean square error of approximation. CFI = comparative fit index. SRMR = standardized root mean square residual.

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Table 15

Summary of Model Fit Statistics for Aim 3: Instructor Presence and Online Learning Community on Online Student

Engagement

Model	χ^2	*df*	*p*	Scaling	RMSEA (90% CI)	CFI	SRMR
E1: Academic Engagement	2207.53	669	≤ .001	1.16	.04 (.04 - .04)	.95	.041
E2: Online Community Engagement	2059.69	596	≤ .001	1.17	.04 (.04 - .04)	.95	.044
E3: Life Application Engagement	1895.55	561	≤ .001	1.19	.04 (.04 - .04)	.95	.043
E4: Social Engagement	1892.01	527	≤ .001	1.19	.04 (.04 - .05)	.95	.046

Note. RMSEA = root mean square error of approximation. CFI = comparative fit index. SRMR = standardized root mean square residual.

Table 16

Regression Results for Academic Engagement by Age, Reasons for Taking Online Courses, and Importance of Peer

Interaction

	β	t	p	F	df	p	Adjusted R^2
Academic Engagement				11.26	7	$\leq .001$	.05
Age	0.01	3.06	$\leq .01$				
Financial Constraints	-0.01	-0.55	0.59				
Family Responsibilities	0.02	1.65	0.10				
Health Concerns	0.01	1.04	0.31				
Work Demands	0.01	0.42	0.68				
Convenience of Online Courses	0.05	2.53	0.01				
Importance of Peer Interaction	-0.01	-0.46	0.65				

Table 17

Regression Results for Online Community Engagement by Age, Reasons for Taking Online Courses, and Importance

of Peer Interaction

	β	t	p	F	df	p	Adjusted R^2
Online Community Engagement				53.44	7	$\leq .001$	.20
Age	0.00	-0.48	0.63				
Financial Constraints	-0.01	-0.87	0.45				
Family Responsibilities	0.02	0.97	0.33				
Health Concerns	0.03	1.93	0.06				
Work Demands	-0.01	-0.61	0.54				
Convenience of Online Courses	0.05	2.18	0.03				
Importance of Peer Interaction	.34	18.85	$\leq .001$				

Table 18

Regression Results for Life Application Engagement by Age, Reasons for Taking Online Courses, and Importance of Peer Interaction

	β	t	p	F	df	p	Adjusted R^2
Life Application Engagement				21.83	7	$\leq .001$	.10
Age	0.01	5.03	$\leq .001$				
Financial Constraints	0.04	2.32	0.02				
Family Responsibilities	0.05	2.98	$\leq .01$				
Health Concerns	0.00	-0.14	0.89				
Work Demands	0.04	2.21	0.03				
Convenience of Online Courses	0.01	0.31	0.76				
Importance of Peer Interaction	0.14	7.80	$\leq .001$				

Table 19

Regression Results Design for Social Engagement by Age, Reasons for Taking Online Courses, and Importance of Peer

Interaction

	β	t	p	F	df	p	Adjusted R^2
Social Engagement				32.19	7	$\leq .001$	.13
Age	0.01	2.03	0.02				
Financial Constraints	0.01	0.78	0.31				
Family Responsibilities	0.02	0.97	0.29				
Health Concerns	0.07	4.55	$\leq .001$				
Work Demands	0.00	-0.19	0.77				
Convenience of Online Courses	-0.03	-1.11	0.23				
Importance of Peer Interaction	0.26	13.59	$\leq .001$				

APPENDIX D

FIGURES
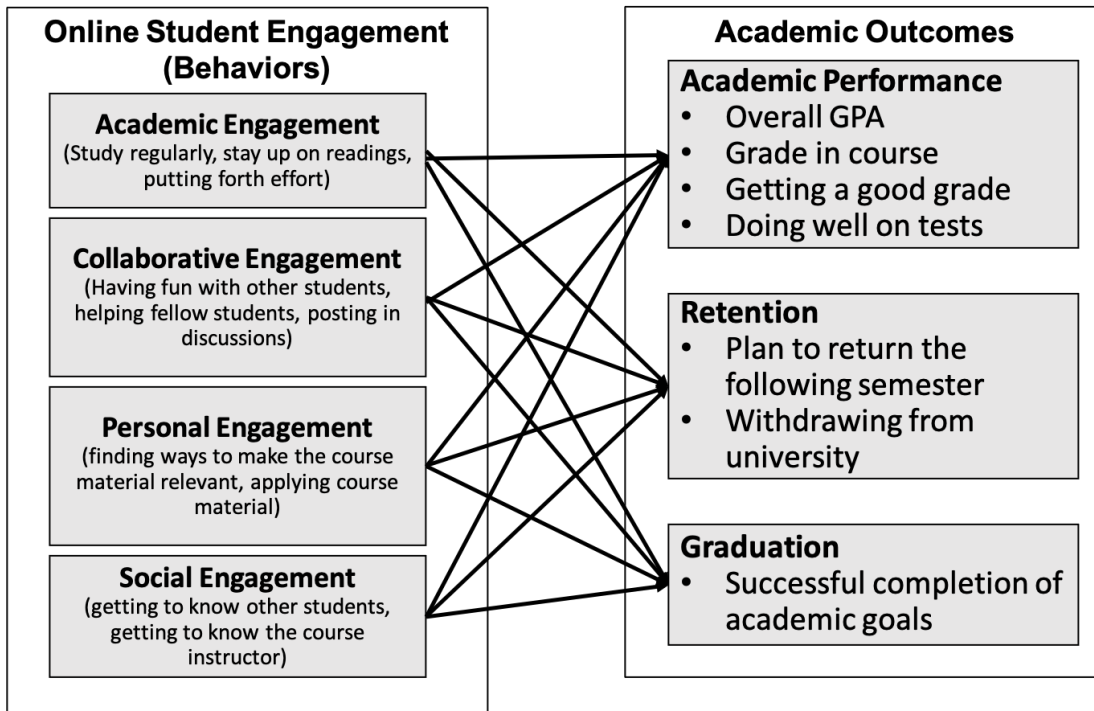
Figure 1. Theoretical model of the *Theory of Involvement* applied to online learning contexts.
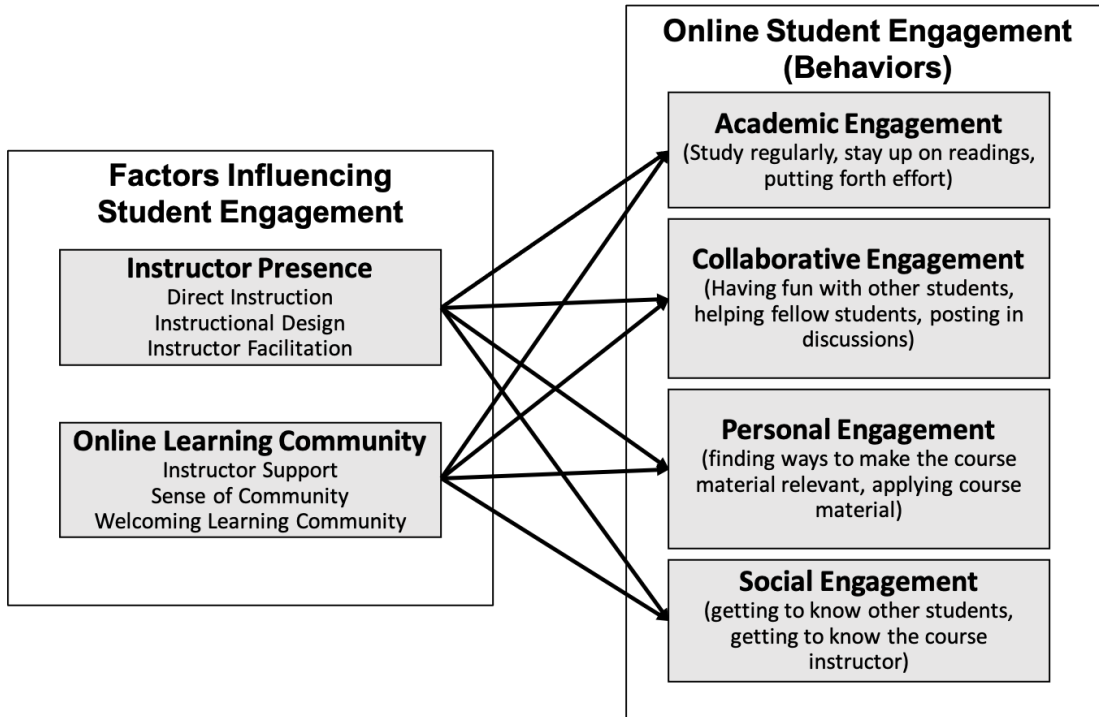
Figure 2. Theoretical model of the factors influencing student engagement in online learning contexts.
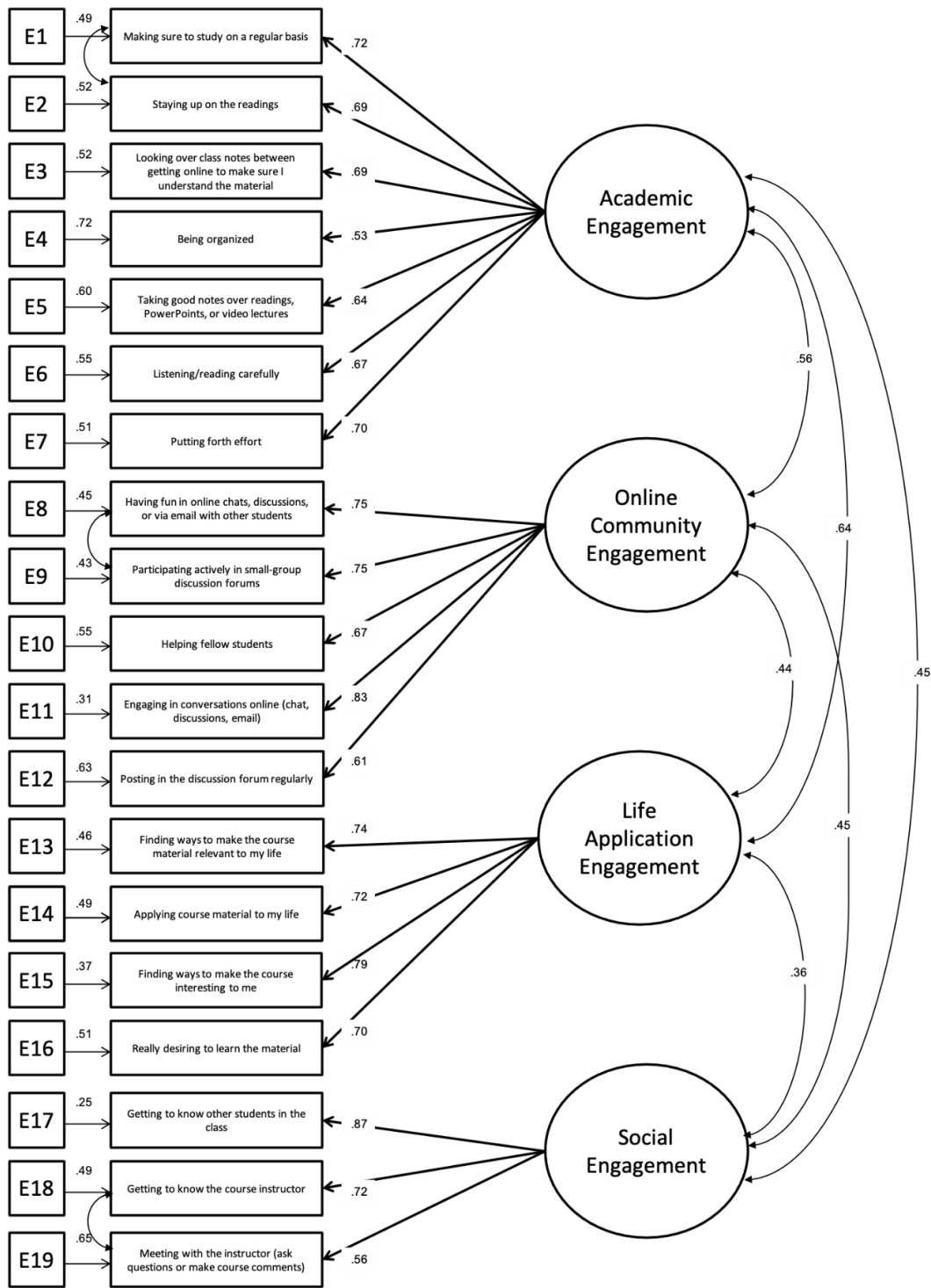
Figure 3. Model A5: The final CFA model for *Online Student Engagement* with fit indices of $\chi2(143) = 799.21$, $p \leq .001$; CFI = .95; RMESA = .06; SRMR = .042
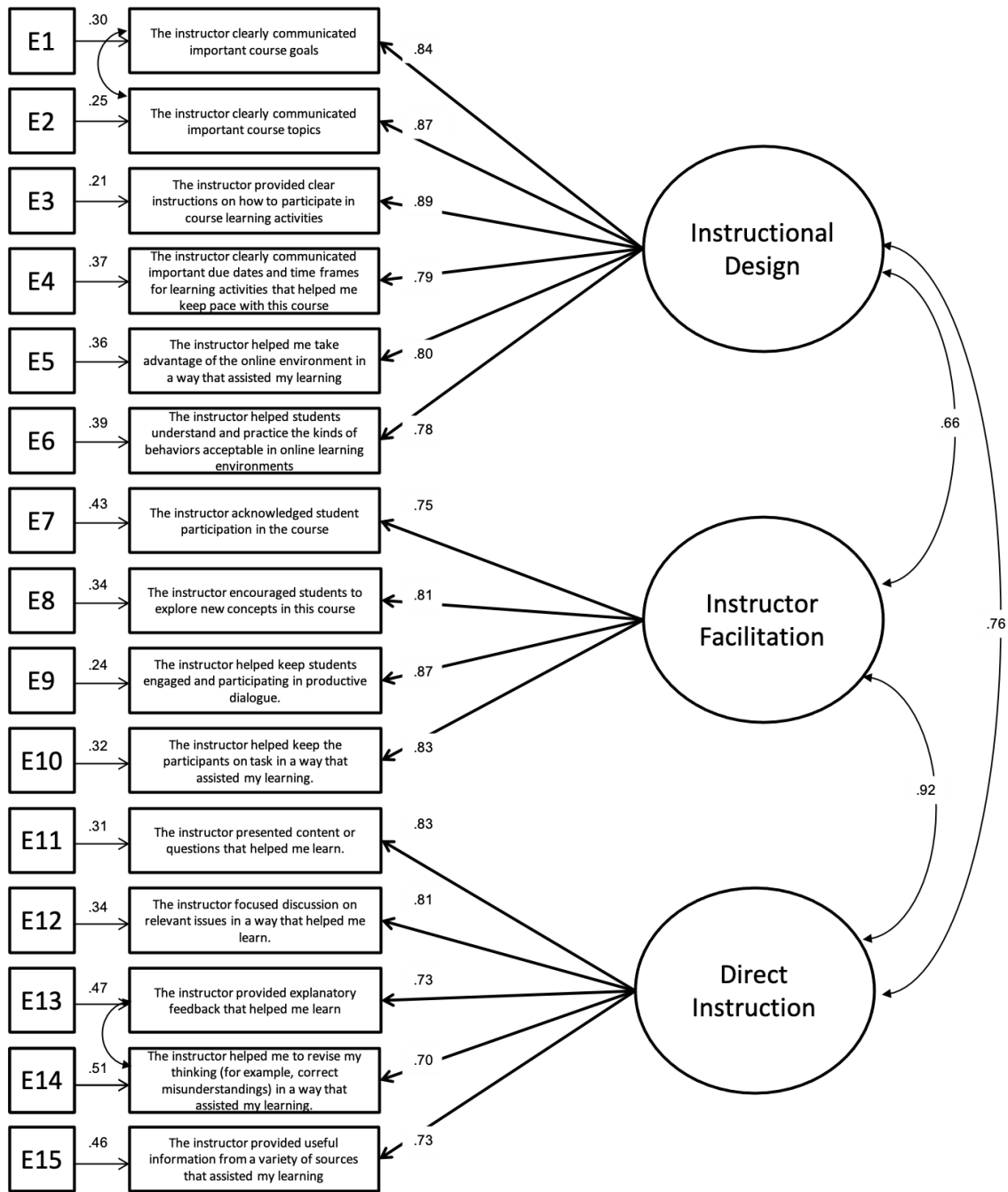
Figure 4. Model B4: The final CFA model for *Instructor Presence* with fit indices of χ2(85) = 446.12, *p* ≤ .001; CFI = .95; RMESA = .05; SRMR = .044
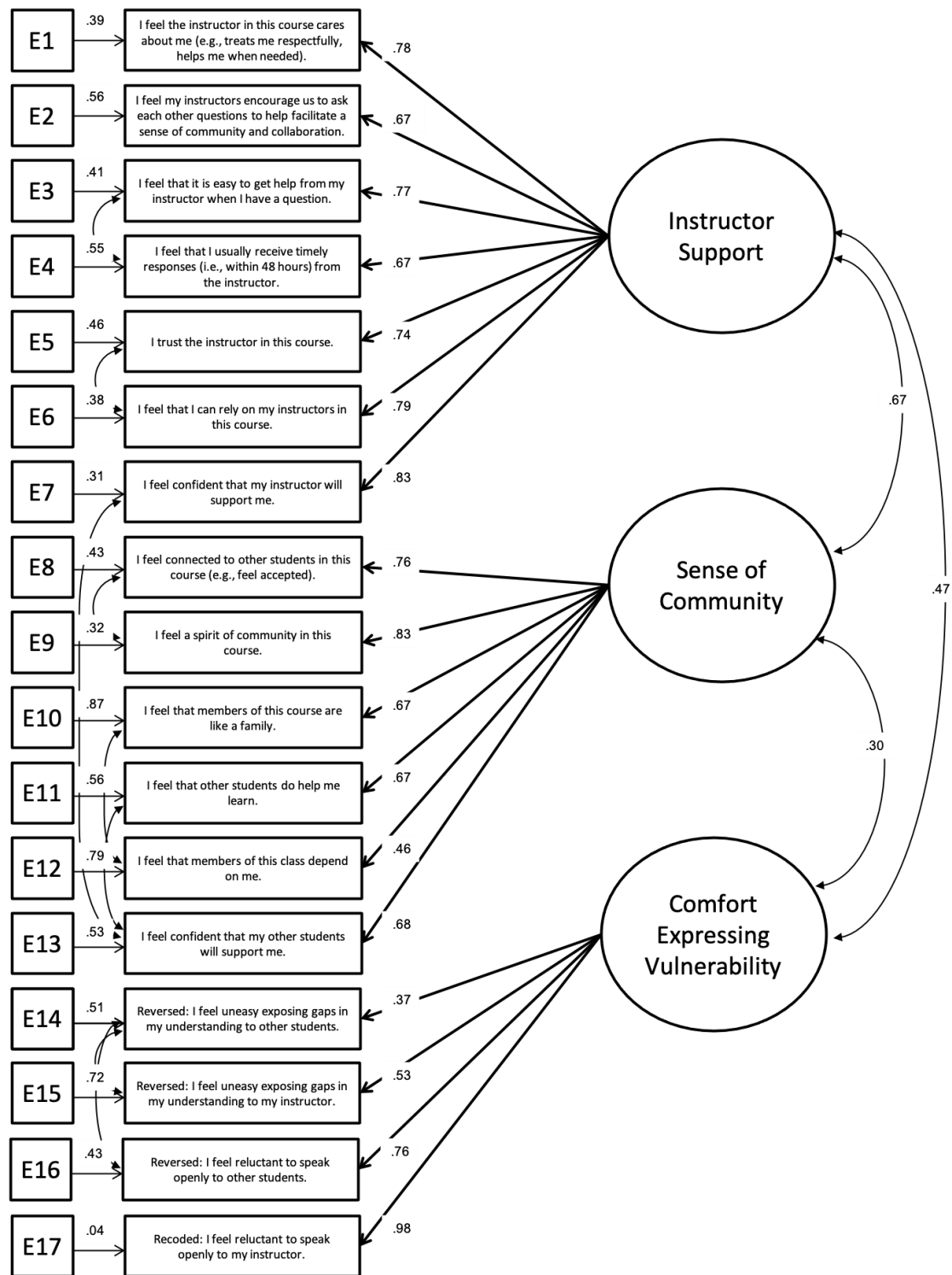
Figure 5. Model C4: the final CFA model for *Online Learning Community* with fit indices of χ2(108) = 746.34, *p* ≤ .001; CFI = .95; RMESA = .06; SRMR = .050
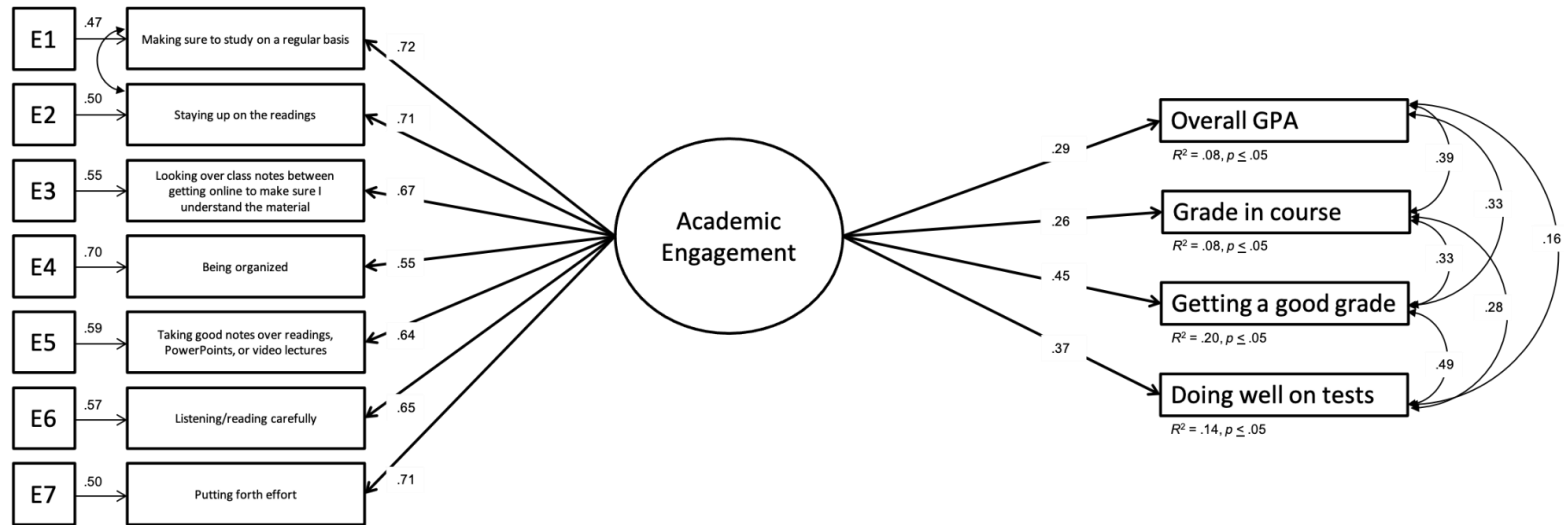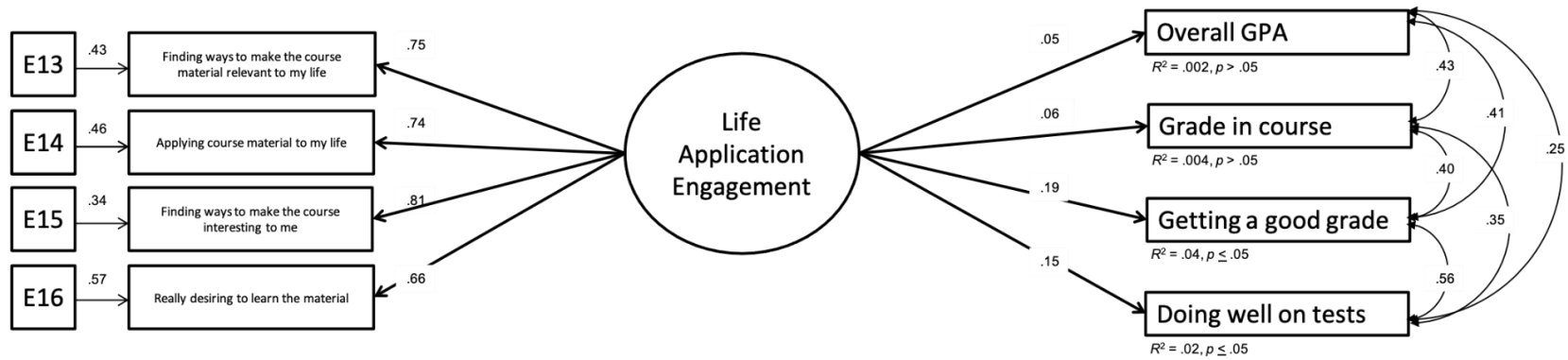
Figure 6. Model D1: The structural model of *Academic Engagement* on *Academic Performance* with statistically significant at *p* ≤ .05 on solid lines. The fit indices for this model are: $\chi^2(37) = 237.94$, $p \leq .001$; CFI = .96; RMESA = .06; SRMR = .034
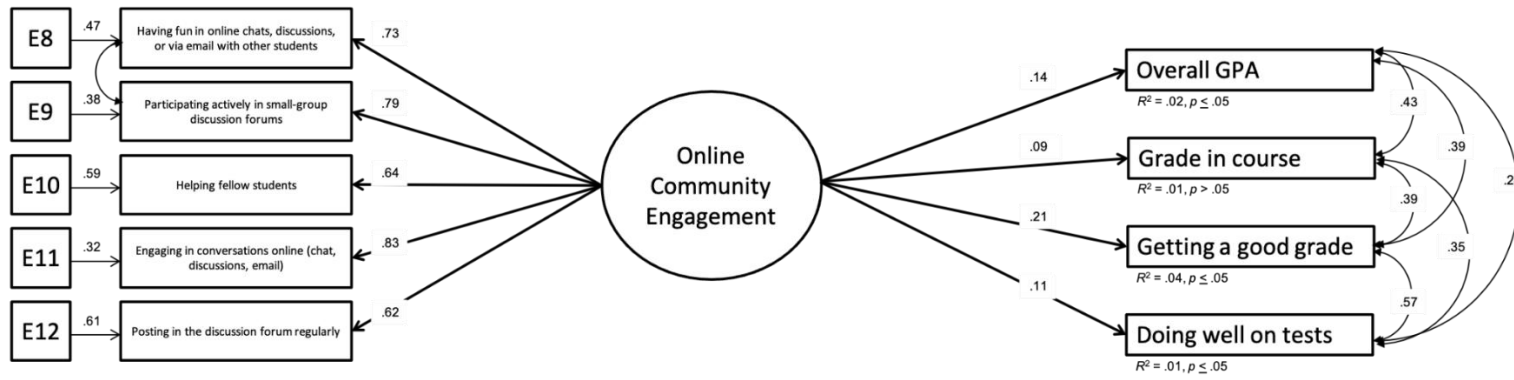
Figure 7. Model D2: The structural model of *Online Community Engagement* on *Academic Performance* with statistically significant at $p \leq .05$ on solid lines. The fit indices for this model are: $\chi^2(21) = 118.238$, $p \leq .001$; CFI = .97; RMESA = .06; SRMR = .025
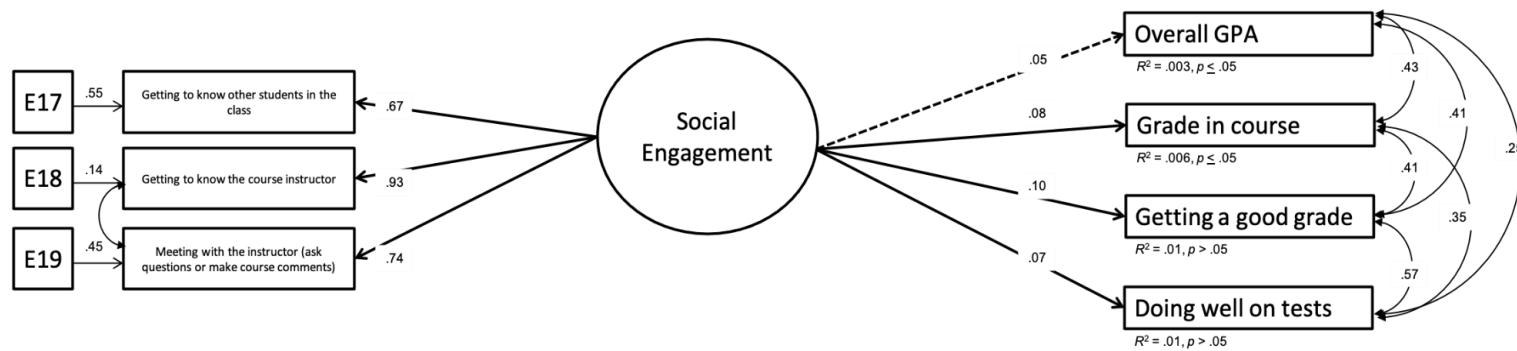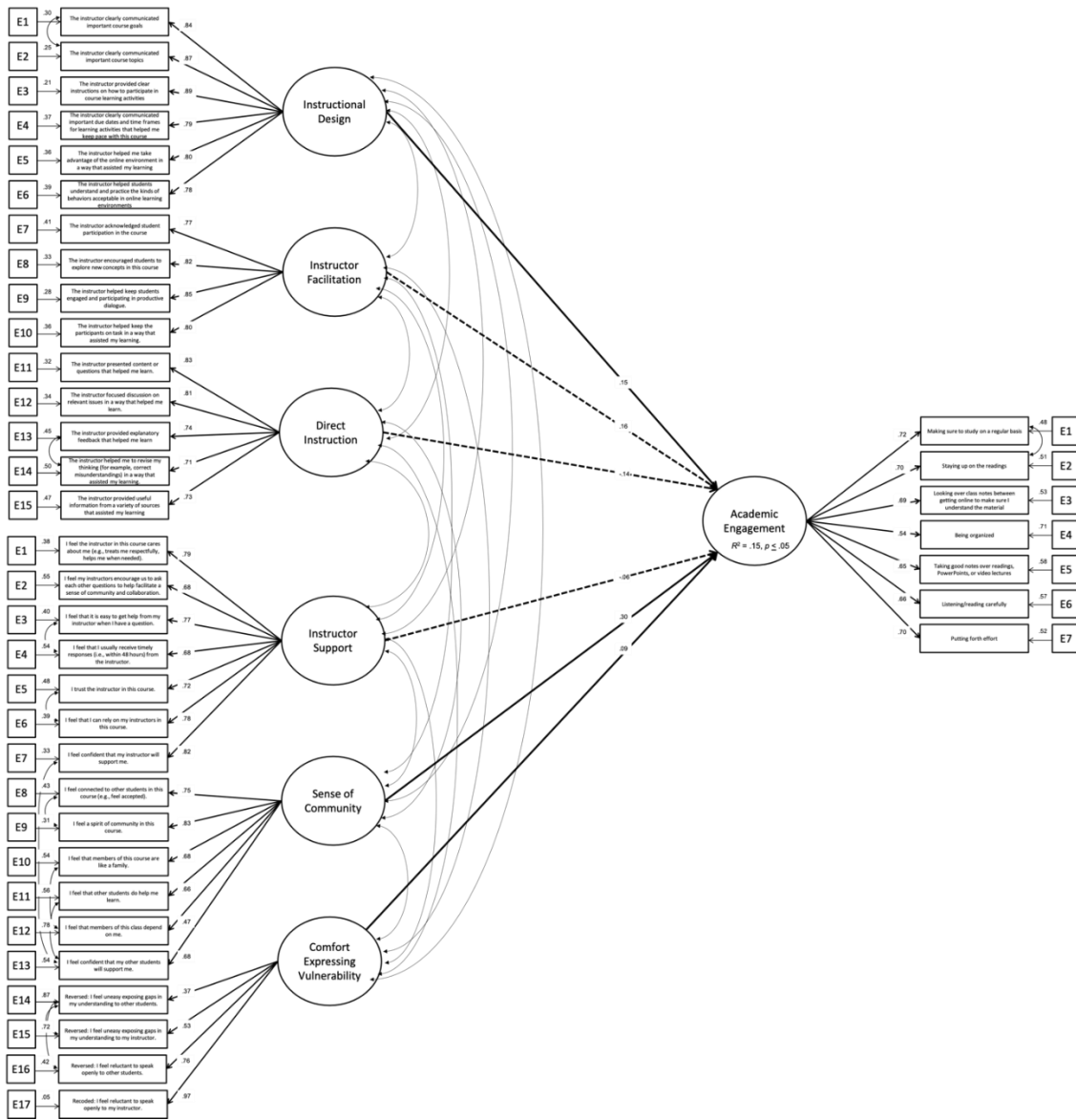
Figure 8. Model D3: The structural model of *Life Application Engagement* on *Academic Performance* with statistically significant at $p \leq .05$ on solid lines. The fit indices for this model are: $\chi^2(13) = 41.352$, $p \leq .001$; CFI = .99; RMESA = .04; SRMR = .019

Figure 9. Model D4: The structural model of *Social Engagement* on *Academic Performance* with statistically significant at $p \leq .05$ on solid lines. The fit indices for this model are: $\chi^2(7) = 13.39$, $p = .06$; CFI = .99; RMESA = .03; SRMR = .007

Figure 10. Model E1: The structural model of *Instructor Presence* and *Learning Community* on *Academic Engagement* with statistically significant at $p \leq .05$ on solid lines. Dashed paths were included in the model, but the estimates were not significant. The fit indices for this model are: $\chi2(669) = 2207.53$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR = .04. Intrafactor correlations *r*s for *Instructor Presence* ranged from .67 to .92 ($p \leq .05$). Intrafactor correlations *r*s for *Learning Community* ranged from .30 to 67 ($p \leq .05$). Correlations between the factors of *Instructor Presence* and *Learning Community* *r*s ranged from .31 to .78 ($p \leq .05$).
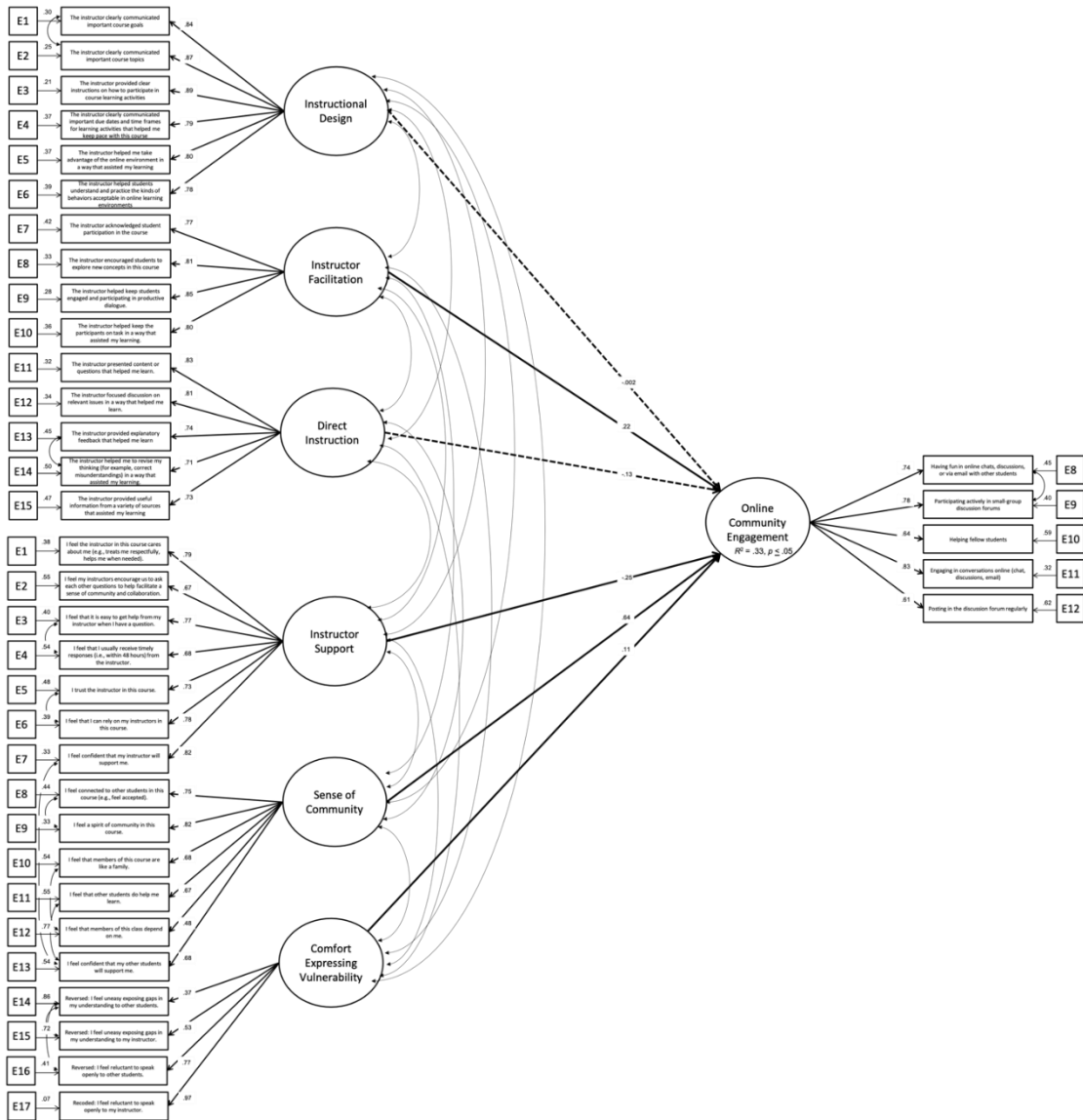
Figure 11. Model E2: The structural model of *Instructor Presence* and *Learning Community* on *Online Community Engagement* with statistically significant at $p \leq .05$ on solid lines. Dashed paths were included in the model, but the estimates were not significant. The fit indices for this model are: $\chi2(597) = 2059.69$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR = .04. Intrafactor correlations rs for *Instructor Presence* ranged from .67 to .93 ($p \leq .05$). Intrafactor correlations rs for *Learning Community* ranged from .30 to .67 ($p \leq .05$). Correlations between the factors of *Instructor Presence* and *Learning Community* rs ranged from .31 to .78 ($p \leq .05$).
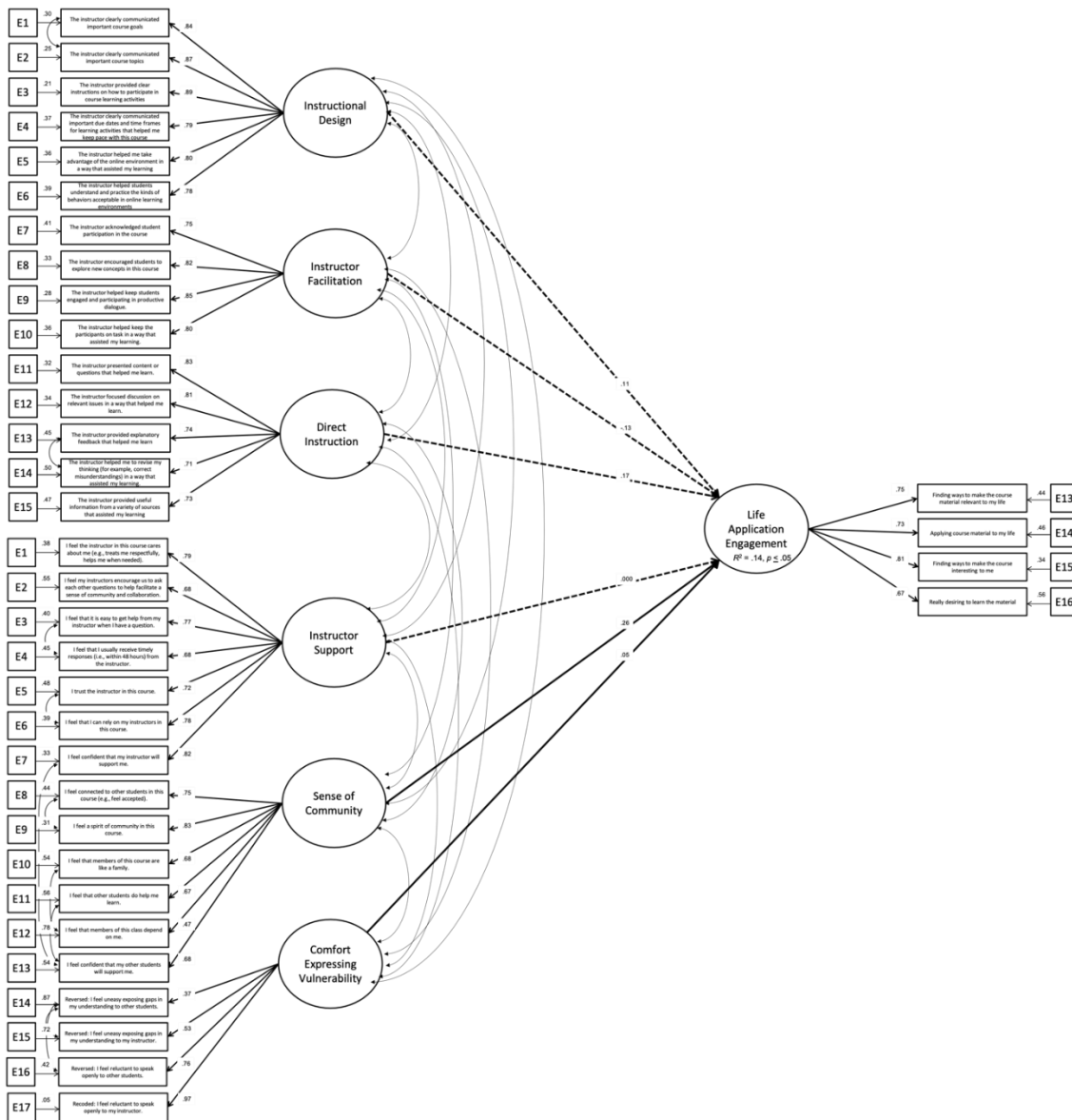
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Figure 12. Model E3: The structural model of *Instructor Presence* and *Learning Community* on *Life Application Engagement* with statistically significant at $p \leq .05$ on solid lines. Dashed paths were included in the model, but the estimates were not significant. The fit indices for this model are: $\chi2(561) = 1895.55$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR = .04. Intrafactor correlations rs for *Instructor Presence* ranged from .67 to .93 ($p \leq .05$). Intrafactor correlations rs for *Learning Community* ranged from .30 to .67 ($p \leq .05$). Correlations between the factors of *Instructor Presence* and *Learning Community* rs ranged from .31 to .78 ($p \leq .05$).
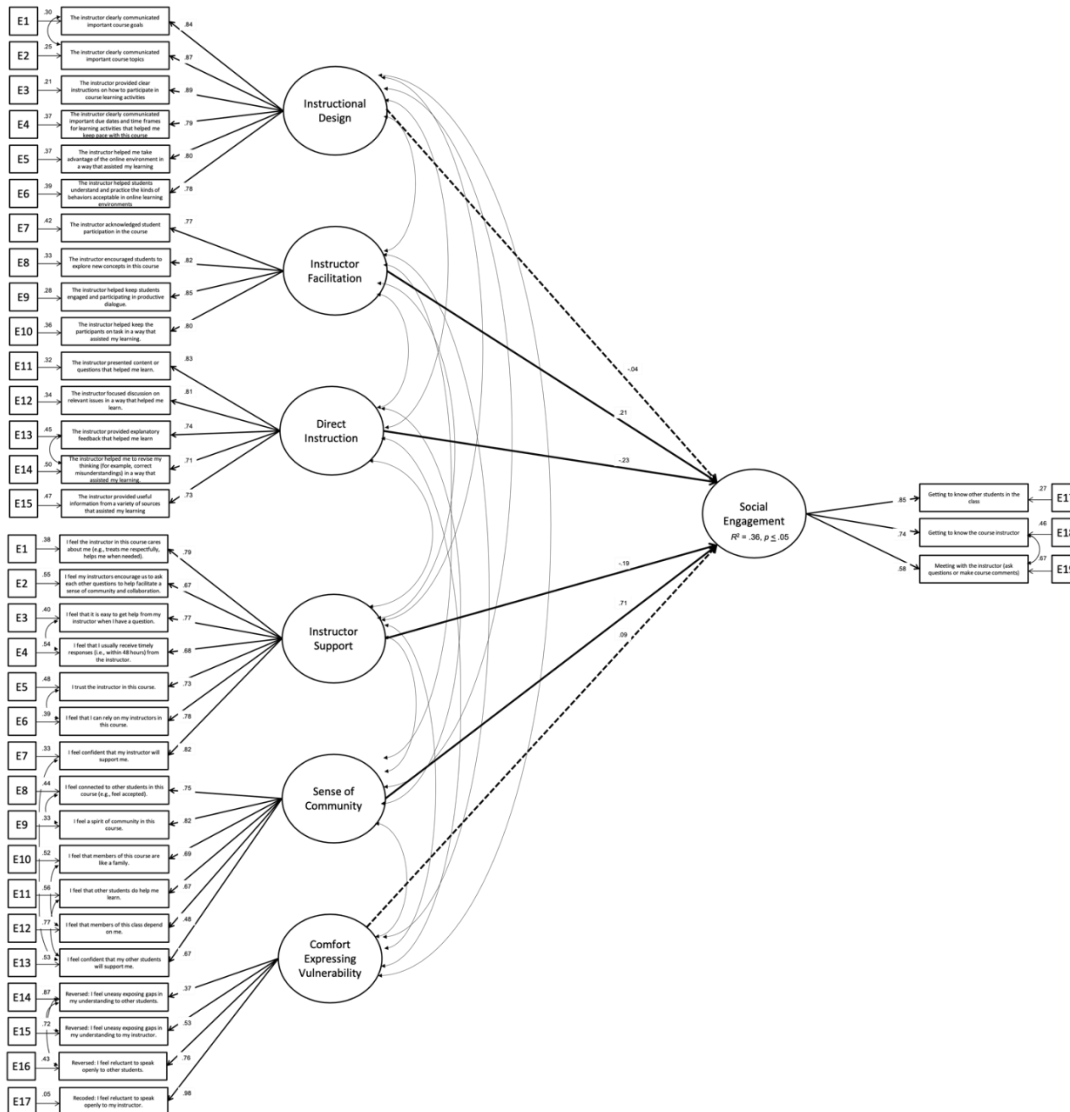
Figure 13. Model E4: The structural model of *Instructor Presence* and *Learning Community* on *Social Engagement* with statistically significant at $p \leq .05$ on solid lines. Dashed paths were included in the model, but the estimates were not significant. The fit indices for this model are: $\chi2(527) = 1892.01$, $p \leq .001$; CFI = .95; RMESA = .04; SRMR = .05. Intrafactor correlations *r*s for *Instructor Presence* ranged from .67 to .93 ($p \leq .05$). Intrafactor correlations *r*s for *Learning Community* ranged from .29 to .67 ($p \leq .05$). Correlations between the factors of *Instructor Presence* and *Learning Community* *r*s ranged from .31 to .78 ($p \leq .05$).