THE RELATIONSHIP BETWEEN REASONS FOR PARTICIPATION AND ACHIEVEMENT

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ABSTRACT

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Asynchronous Online Discussions (AODs) are often used to encourage online learner participation as they are believed to approximate the verbal interactions of face-to-face (F2F) learning environments while facilitating learners' metacognitive and critical thinking skills (Deng and Tavares, 2013). Despite mixed and somewhat context dependent research on the relationship between AOD participation and achievement, there appears to be a tendency among teachers and instructional designers to encourage greater participation as it is believed that greater participation promotes greater achievement. Additionally, the act of online *participation* itself is often measured using visible artifacts like discussion and assignment posts submitted by students and evaluated by instructors and/or peers. This can lead educators to infer that the learners who participate more will earn higher grades than those who participate less.

To explore this tendency, this quantitative descriptive study examined students enrolled in an introductory college English course (n = 76) using Learning Management System (LMS) activity reports and survey results. This was done to better understand the relationship between (what may appear to be limited) participation and course achievement. Similarly, the study sought to better understand the relationship between the learners' *reasons* for participation and their *actual* achievement. The primary results contribute to a wide range of studies that examine the relationship between participation and achievement. The results share a finding with two other studies in particular; Graff, (2005) and Wikle and West (2019), namely that this study showed *no statistically significant* correlation between participation and achievement for

students who finished the course. Meaning that students who completed the course saw no statistically significant change in achievement for *over* or *under* participating. An unexpected finding of this study was that reasons for *not* participating contributed more to student behavior than reasons *for* posting.

This study also showed that learners' primary self-identified reasons for participating favored *performance, information seeking, UX and interest*; however, empirical performance data suggests that the relationship between learners' reasons for participation and their actual level of achievement is strongest when those reasons revolve around *topic complexity*, *UX*, *time management* and *social risk*. The gap between learners' metacognitive perception of participation reasons and their data-driven demonstrable reasons is explored in this paper.

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This was a team effort.

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Introduction

Social Cognitive Theory states:
"Learning and performance are distinct processes
although much learning occurs by doing,
we learn a great deal by observing."
-Zimmerman and Schunk 2014, p. 122

There is substantial extant scholarship dedicated to learner participation in both face-to-face (F2F) and online academic spaces (Bunge and Garcia, 1976; ; Lave and Wenger, 1991; Davies and Graff, 2005; Dennen, 2005; Hrastinski, 2008; Amichai-Hamburger et al., 2016). Though mixed in terms of *specific* outcomes, this body of research suggests that there can be a strong relationship between *active* class participation and positive outcomes such as course achievement, learning, course satisfaction, and benefits to community. (Jung, Choi, Lim, and Leem, 2002; Morris, Finnegan, and Sz-Shyan, 2005). Despite the apparent value of active participation, many learners appear to either *choose* or simply *appear to be*, non-participatory (Wise, et al., 2013) which can be assumed to be a negative trait, reducing learners' potential for success.

Extant theory suggests many different reasons why learners may participate at different levels. For example, Achievement Goal Theory (AGT) suggests that the reasons learners choose to participate can be based on approach/avoidance of performance/mastery goals (Harackiewicz et al., 2002; Kaplan and Maehr, 2007; Midgley et al., 2001). In contrast, Social Cognitive Theory (SCT) suggests that what appears to be non-participation may simply be unseen or *invisible* participation. Bandura (1986) and Schunk (2011) argue that *vicarious* learning - that which is done by observing, listening and otherwise appearing passive and invisible to peers and instructors - is a valid and often necessary part of SCT learning. Additionally, Lurker theory

(Edelmann, 2015; Perna, Interdonato, and Tagarelli, 2017) suggests that periods of lesser participation may simply be a waiting or learning strategy, intentionally employed, as the learner evaluates the learning environment before engaging in what they perceive to be a social risk. For some learners, participation level may be nothing more than a symptom of their inability to manage their time. In summary, there are many theories with overlapping claims about the relationship between participation and achievement.

Adding to the ambiguity, existing research tends to frame online course participation in terms of two polar extremes. One extreme is the actively engaged learner who posts and replies to every course prompt, while the other extreme is the learner who, at worst, doesn't visibly participate at all and, at best, superficially participates in order to meet some course-required level of participation (Dennen, 2008b; Howard, James III, and Taylor, 2002; Nonnecke, Preece and Andrews, 2006; Palmer, Holt, and Bray, 2008). Research literature frequently characterizes low participation *lurkers* as extreme non-participants (Lutz and Hofferman, 2017; Morris, Finnegan, and Sz-Shyan, 2005) who lurk for varied and nuanced reasons (Edelmann, 2017; Liao and Chou, 2012; Lutz and Hoffman, 2017; Nonnecke and Preece, 2001). This study chose to focus on participation as a continuum ranging between fully active participation (required participation and/or more) and full non-participation.

Figure 1

Learner Participation Continuum

The learner participation continuum is relevant as a lens for examining how social media and LMS based research suggest that a majority of participation is above or below the course mandated target. The continuum is meant to show that *ideal* course participation targets appear to be somewhat of an outlier rather than a norm.

Lurker literature, which studies those who consume substantial online content but generate relatively little themselves, (Edelman, 2015 and 2017) has explored this phenomenon at some length, both academically and in general internet use. Social media research suggests that lurking is a prevalent behavior in online communities. Nielsen (2006) suggested the 90-9-1 rule which states that when participating in interactive online environments, only one out of a hundred users create original content. 90 out of 100 users passively view content without adding anything new and the remaining nine percent of users edit the existing content. Mostly passive participation. This behavior is likely to manifest at some level in an online classroom.

In essence, it is common for online users to participate at levels that match their own personal preferences rather than the expectations of the digital environments' designers. Additionally, posting is not the only way to define participation, simply the most ubiquitous and expedient.

This study sought to shed light on participation strategies and reasoning behind their adoption for an online introductory college English course (ENG 100). The course was delivered on Blackboard (2019) LMS as a one month immersive, taken by Bachelors' students seeking to fulfill their general education requirements.

Overall, the literature around the relationship between participation and achievement is mixed with varying foci and outcomes. This study therefore confirmed *some* of the extant research on the lack of statistically significant relationship between overall participation and overall achievement, then covered new ground by asking participants *reasons* for their participation. It goes on to examine the relationship between these reasons and their course achievement.

For the purposes of this study, 'reason' is defined as *a learners' considerations when consciously deciding whether or not to participate*.

Purpose

The purpose of this study was to examine the relationship between what the learners *and* what the data suggested were the reasons learners *actually* participated and their resultant achievement. The primary focus of this study was to determine the reasons learners give for their behavior and compare them to the reasons that correlated to actual performance. The rationale for conducting this study was to go beyond the idea that greater participation resulted in greater achievement and to explore the *reasons* for participation and their relationship to achievement.

Review of Theory and Research

This literature review provides an overview of the prominence and efficacy of Asynchronous Online Discussion (AOD) threads in order to a) better understand the role participation plays in learning achievement, b) provide a rationale for identifying and studying an understudied population of learners, while also c) suggesting some of the reasons students may adopt LP learning strategies. To be clear, LP refers to *Limited Participation*, a level of participation and not Lave and Wengers' (1991) Legitimate Peripheral Participation (LPP).

There appears to be a strong overall relationship between cognitive engagement and participation which has been studied in K-12 education spaces. This relationship is less studied (and with less consensus) in undergraduate education. Fehrman and Watson's (2021) systematic review of AODs in online higher education (which includes undergraduates, pre-service teachers, grad students and faculty) made a few summative observations about their use and efficacy. They began by borrowing the definition of an AOD from Gao, Zhang and Franklin (2013) stating that an AODs are, "a learning space within an online learning context and primarily allow students to construct knowledge within their own mental and physical working spaces, while also interacting and building knowledge within a community of other learners," (p. 202). Fehrman and Watson concluded from their systematic review that while the AODs are intended to replace face-to-face discussion, their targeted purpose and productive practices tend to be applied on an ad hoc basis. Multiple researchers recommend tying participation to grades suggesting the benefit of AOD rubrics. "Beyond that, there is little agreement about the best way to structure discussions, how to integrate them into the class, what size online courses should be, how students should be grouped, what the role of students and/or instructors should be, or even how to measure what AODs accomplish," (p. 211). They suggest frameworks for common

practices around, “developing, structuring, moderating and assessing AODs,” (p. 211) however they saw no context independent practices.

Swan, Schenker, Arnold and Kuo (2007) looked at issues of assessment in undergraduate EdTech AODs in order to, “empirically test the common-sense notion that the quality of online course discussions can be shaped by how discussion is assessed, (p. 2649).” They found that quality of post criteria mattered. This study picks up the same questions about AOD assessment and takes the inquiry one step further by measuring achievement.

This review begins with an overview of the role that AODs play in undergraduate online learning, followed by the reasons undergraduate learners choose to participate as suggested by learning, Lurker, motivation and Goal Theory literature. The subsequent section reports what the literature has to say about the role of participation in online learning achievement. The literature review concludes with suggestions for new research areas within an underexplored population of learners.

The Connection Between Participation and Achievement

In short, the literature around the relationship between participation and achievement is mixed with varying foci and outcomes. Jung, Choi, Lim, and Leem (2002) concluded that social interaction between 124 Korean online undergraduate learners (studying career development skills) peers and instructors was key for the act of participation to enhance adult AOD learning in terms of achievement, satisfaction and participation. Asking a similar research question to this study, “What is the relationship of student participation to student persistence and achievement online?” (p. 221). Morris, Finnegan, and Sz-Shyan (2005) confirmed that stop-outs and dropouts (in their lower-division semester-based online courses) had low participation rates, but then went on to claim that evaluation of their 354 purely online undergrads could account for 31% of

achievement through participation measures. They defined participation to include, “viewing course content, viewing discussions, creating new discussion posts and responding to discussion posts... through four frequency variables (i.e., number of content pages viewed, number of discussion posts read, number of original posts, and number of follow-up posts) and four duration variables... [time spent] viewing content pages, reading discussions, creating original posts, and creating follow-up posts, (p.224).” While this study appears to accommodate for traditionally overlooked forms of invisible participation (by measuring page view time) it also cannot ensure that these observed phenomena are direct evidence of the participation they are seeking to measure.

The two studies most closely aligned with this study are by Davies and Graff (2005) and Wikle and West (2019). Davies and Graff examined 122 purely online first year undergraduate business students, they concluded that, “... greater online interaction did not lead to significantly higher performance for students achieving passing grades; however, students who failed in their courses tended to interact less frequently,” (p. 657). After tracking 74 microeconomics undergraduates, Wikle and West, who used semester-length, undergraduate microeconomics courses and measured participation using a substantive post threshold that included post word count, concept difficulty of question and an instructor quality rating to categorize participation level, agreed with Graff, but with the single proviso that the level of content difficulty played a role in the AOD participation/achievement relationship, and that only course content perceived by the learner to be of *medium* difficulty, Vygotsky’s (1978) Zone of Proximal Development, saw a statistically significant relationship between participation and achievement.

The Role of AODs in Online Learning

This section explores the role of Asynchronous Online Discussions in terms of their use and efficacy as an LMS learning tool, value as an interpersonal dialogue simulator, an informal assessment tool, a social engagement stimulator, a retention checking tool and an opportunity to deepen conceptual engagement.

AODs are built around the idea that, "It is assumed that learning is mediated by intrapersonal dialogue and facilitated by interpersonal dialogue." (Gorsky and Caspi, 2005, p. 137). *Online* learning traditionally seeks to simulate and stimulate intrapersonal dialogue learning using AODs. AODs are a virtual online space defined as, ''a text-based human-to-human communication via computer networks that provides a platform for the participants to interact with one another to exchange ideas, insights and personal experiences," (Hew and Cheung, 2003, p. 249). The reasons learners choose to participate under this model is because they are seeking to gratify a social need (Kumar, et al., 2011). The near ubiquitous use of AODs in online learning design is starting to raise questions of efficacy.

Some extant scholarship extols AODs as an essential component of effective course design (Davies and Graff, 2005; Gao, Zhang, and Franklin, 2013; Hew and Cheung, 2003), and yet some research shows AOD success relies on the quality and frequency of instructor intervention (You, 2016). Wikle and West (2019) observed that AODs were *ineffective* at enhancing learning outcomes for easy concepts (concepts understandable without the AOD), but improved learning outcomes for, "highly difficult concepts," (p. 222).

Participation in AODs can serve as an opportunity to *engage* learners by expanding the depth at which students explore key concepts and issues relating to the course. Lee (2019) shared that AODs should require, "open-ended prompts," (p.24). AODs are, at heart, meant to stimulate

participation through discussion, something many AODs do not end up achieving, focusing instead on basic social engagement or simple retention checks. This latter model *might* attract a learner to participate if they are motivated by mastery or interest goals.

There is a tendency among the legacy teachers to incorporate (and beyond that, assess) old modalities in the new spaces. Teacher beliefs centered on the idea that discussion is an essential teaching tool goes back to Socrates and his search for "truth" (Boghossian, 2006, p.717). As a *truth quest*, AODs appear to be considered a noble (possibly sacred) endeavor, essential to good learning. And yet, contemporary views on the role that *emotion* plays (Vasalou, Joinson, and Pitt, 2006) in students' experience of public participation suggests that there are potentially herculean barriers to AOD users wanting to choose to participate.

In summary, AODs are often designed and intended to mirror the value of F2F discussions by *stimulating* and *simulating* online participation, serve as a forum for exploration and allow cultivation of deep thought. While this modality is engaging and effective for some learners (much as F2F classroom discussion works for *some* learners), AODs appear to be overused as universal learning tools and may lack the appeal and sensitivity to capture and assess the learning of all populations of learners.

The Reasons Learners Choose to Participate

In essence, the reasons that learners choose to participate in AODs often center around their personal preference for creating content (posting) or consuming content (reading). Regarding AOD mechanics; traditionally students are required to respond to an instructor prompt (student to teacher) and then comment on two of their peer's posts (student to student). Unlike F2F conversations, posted comments may *not* ultimately be heard/read (Wise, Speer, Marbouti, and Hsiao, 2013 - who examined 96 hybrid undergraduate business students) by peers. Some

learners may choose not to participate when they perceive that their peers are not responding to their initial post, leaving them feeling *left out* of the conversation and community.

There are many reasons learners participate *or don't*. There is evidence that those who choose limited participation, are, in some sense, *active* learners as well. Wise, Speer, Marbouti, and Hsiao (2013) projects that 77% of learners are listening (passively and vicariously learning) at any given time. Furthermore, Lee and Martins' study (2017) found that 85.88% learners post only as much as required to pass the class, suggesting an *active* participation strategy, albeit one aimed at earning a grade.

Reasons for participation in AODs can hinge on instructor presence (Bullen, 1998; Xie et al., 2006). Some AOD instructors use the discussion forum as a way to interact with their students. However, there is evidence that teacher presence can *reduce* voluntary peer-to-peer posting, "...when the instructor's intervention was minimal, students tended to more freely express their thoughts and opinions…," (An, Shin and Lim, 2009, p. 749). Selhorst, Bao, Williams and Klein (2017) found that overuse of AODs can result in a kind of AOD fatigue that can result in increased numbers of students withdrawing from college level courses.

After framing participation in terms of AODs, this section will review three theoretical perspectives on participation: that of a) learning literature, b) motivation literature and c) lurker literature. The aim of this section is to set the stage for viewing participation in AODs from a variety of perspectives that suggest an understudied population of learners. To that end the following three sections thematically aggregate the reasons proposed by the theories and theorists included in this literature review. It is essential to note that these categories Learning, Motivation and Lurking are an organizational structure and are not a psychological or predictive

structure in any way. From many perspectives the domains of these categories can be seen to overlap meaning.

Reasons for Participation According to Learning Literature

Viewed from a social cognitive theory (SCT) perspective, participation can be categorized into two convenient categories, enactive and vicarious (Bandura, 1986; Schunk, 2011). Enactive learning is the kind most commonly credited with results. Enactive learning tends to be hands-on, active participation that generates clearly tangible artifacts (posts, submissions etc.) that can be seen, vetted and assessed. On the other hand, vicarious learning, (watching, listening, reading, considering etc.), while equally essential to the processes of comprehension and mastery, is often invisible (Beaudoin, 2002) to peers and instructors alike (see Table 1). Vicarious learning is often more difficult to directly assess and is thus a less attractive outcome for educators, administrators and course designers.

Table 1

Reasons for Participation Level from Learner Literature

Reason	Explanation	Theory/Theorist
Learn 1 Belief that More is Better	Teacher/learner belief that learners may choose to post (or not) based on the belief that more participation leads to better learning, mastery, course achievements and outcomes.	Harackiewicz et al., (2002); Jung, Choi, Lim, and Leem (2002); Kaplan and Maehr, (2007); Midgley et al. (2001)
Learn 2 Feeling about Course Design	Learners may choose to post (or not) based on technology and user interface characteristics.	Cheung et al., (2008); Nonnecke and Preece (2001); Nonnecke and Preece (2004)
Learn 3 Feeling about Instructional Design	Learners may choose to post (or not) based on their level of comfort with the course assessment, reward system or instructor personality, course content being perceived as	Concannon, Flynn and Campbell (2005); Vonderwell and Zachariah, (2005); Concannon, Flynn, and Deng and Tavares,

Table 1 (cont'd)

	too easy or too hard.	(2013) Vygotsky (1979)
Learn 4 Perception of Instructor Presence	Learners may choose to post (or not) based on their impression of the frequency and quality of instructor interactions.	Bullen, (1998); Xie et al., (2006)
Learn 5 Perception of Information Load	Learners may choose to post (or not) based on perceptions of the course delivering too much/complex (overwhelming) or too little/simple (boring) information calibrated to their readiness.	Cheung et al., (2008); Vonderwell and Zachariah (2005)
Learn 6 Previous Knowledge, Writing and Ability Beliefs	Learners may choose to post (or not) based on entering the class with significantly more or less relevant content knowledge (calibration issue) or skill than required by the course.	Amichai - Hamburger et al. (2016); Cheung et al. (2008); Thompson (2007)

Learning literature often advocates that *more* participation will lead to *better* learning. Jung, Choi, Lim, and Leem (2002) studied 124 Korean undergraduates and supported the notion that, "social interaction with instructors and collaborative interaction with peer students are important in enhancing learning and active participation in online discussion," (p. 153). This assertion tacitly ignores any student concern over social risk.

There are, however, some voices that create space for alternate participation models. Lave and Wenger (1991) support (SCT) vicarious participation as valid learning when they describe Communities of Practice (CoPs) in terms of Legitimate Peripheral Participation (LPPs), a model of learning in which the learner (apprentice) learns by vicariously observing a teacher (master) practice their craft. Lave and Wenger explain that there is value in learning from the peripheral perspective, "Peripherality suggests that there are multiple, varied, more- or less - engaged and -inclusive ways of being located in the field of participation defined by a community," (p. 35-36). Combined with Bandura's work on SCT (1977), vicarious learning

supports the hypothesis that, given proper context, the peripheral student can learn through vicarious participation.

Theorists for the last few decades have repeatedly pointed out gaps in extant learning theory and offered reasons for revision. Harackiewicz et al., (2002) analyzed learning and motivation theory. They presented a strong argument that the ever-evolving goal theory continues, "...offers a more complex, but necessary, perspective on important issues of motivation, learning, and achievement, (p. 638)" Cheung et al., argue that the reasons, "... students choose to contribute in some forums but not in others are not fully understood, (p. 29)".

More specifically, through the lens of social constructivism, Alzahrani (2017) looked at 138 Saudi Arabian undergraduates using AODs and found, "no significant relationships between their participation in ODFs and grade point average, (p. 164)".

It can be argued that, while vicarious learning is not a guaranteed outcome of peripheral participation, unless vicarious peripheral participation can result in learning, then lectures, demos, instructional videos, textbooks and class discussions will have been a misuse of learner time.

Reasons for Participation According to Motivation Literature

According to Deng and Tavares (2013) who were examining preservice teachers through the lens of activity theory in terms of, "the motivating and inhibiting factors that influenced students' engagement in online discussions, (p. 167)". Level of interest appears to matter when it comes to student reasons for posting, (Bozkurt, Koutropoulos, Singh, and Honeychurch, 2020; Speily et al., (2020); Harackiewicz et al., 2002).

Research on students' motivation to take… part in online discussions (specifically) is still rather limited (Cheung, Hew, and Ng, 2008; Thompson, 2007; Xie, Debacker, and Ferguson,

2006).” However, extant Achievement Goal Theory (AGT) literature appears to address much of online learners’ experiences with participation motivation.

Table 2

Reasons for Participation Level from Motivation Literature

Reason	Explanation	Theory/Theorist
Motive 1 Desire for Social Interaction	Learners may choose to post (or not) post based on their desire to interact with individuals such as instructors or peers. Some seek to build social capital in the form of networking behavior.	Amichai - Hamburger et al. (2016); Cheung, Hew, and Ng. (2008); Kumar, et al., (2011); Nonnecke and Preece (2003); Xie et al. (2006); You, (2016)
Motive 2 Level of Interest	Learners may choose to post (or not) based on their personal interest in the course content or the people involved.	Deng and Tavares, (2013); Nonnecke and Preece (2001)
Motive 3 Mastery Goals	Learners may choose to post (or not) based on their approach to their desire to master the course content or strivings to avoid intrapersonal or absolute incompetence.	Harackiewicz et al. (2002); Kaplan and Maehr, (2007); Midgley et al. (2001)
Motive 4 Performance Goals	Learners may choose to post (or not) based on the approach of appearing to the class in a positive light or to avoid appearing in a negative one.	Harackiewicz et al. (2002); Kaplan and Maehr, (2007); Midgley et al. (2001)
Motive 5 Seeking Gratification; Information or Entertainment	Learners may choose to post (or not) based on their desire to entertain/inform or be entertained /informed by the conversation.	Amichai - Hamburger et al. (2016); Deng and Tavares, (2013); Nonnecke and Preece (2003)

One argument for why students choose to participate or not is based on their level of interest (Table 2, Motive 2a, level of interest). As Deng and Tavares (2013) wrote, “... if students perceived the discussion and topics to be interesting, they would have a higher level of motivation to take part in the discussions, (p. 169). Suggesting that interest can be an important

motivator for participation (Nonnecke and Preece, 2001). Flowerday and Shell (2015) examined 90 undergraduates in terms of the importance of *choice* as a tool for motivating engagement and interest. They found no significant relationship but continue to assert that interest level is an important factor in students' reasons for participating. They concluded that *situational* interest (Hidi and Renninger, 2006), the kind that arises in the moment rather than being held before the class began, motivated most.

In essence, broader motivation theories (see Table 2: Motivation) suggests that students who perceive participation *barriers* are disinclined to engage. Learners reasons for participation are often a result of their (extrinsic motivation) desire to earn a particular grade (achievement) balanced against intrinsic (avoidance) motivations in the form of concerns about previous knowledge, interest, ability beliefs, interpersonal relationships, social comfort, peer participation levels, technology design or access challenges and/or the reward structure of the course (Alexander, 2001; Barnett-Queen et al., 2005; Bullen, 1998; Cheung et al., 2008; Concannon, Flynn, and Campbell, 2005; Thompson, 2007; Vonderwell and Zachariah, 2005; Vygotsky, 1978; Xie et al., 2006). Vanessa Dennen (2005) asserted that a major factor influencing learners' choice to participate was the perceived “relevance of discussion topics” and, “connection of online discussions to other course activities,” (Deng and Tavares, 2013, p. 169).

More specifically, AGT literature suggests that the reasons learners participate are based on approach/avoidance of performance/mastery goals. (Harackiewicz et al., 2002; Kaplan and Maehr, 2007; Midgley et al., 2001). Overall, the reasons for participation are the desire to either pursue a desired outcome like a good grade or avoid a bad outcome like a poor grade (approach/avoidance achievement). For the purposes of this study, the difference between

performance/mastery goals (see Table 2; Motivation) is the desire to be judged in a positive light (performance) rather than focusing on actual course content learning (mastery).

More recent writing on Goal Theory by Harackiewicz et al., (2002) affirmed the positive potential of performance-approach goals and the idea that a combination of performance - approach and mastery - approach goals may be optimal for motivated learning. The implication here is that learners who choose performance reasons for participating may not achieve any less than those who choose mastery reasons for their participation. As previously stated, motivation to choose to participate varies between individual learners (Honeychurch et al., 2017; who wrote about the motivations of lurkers) and may fluctuate from one context to another. In essence, learners choose to participate at different times for different reasons.

Reasons for Participation According to Lurker Literature

Lurkers, or members of an online community who consume much more content than they create (Perna, Interdonato, and Tagarelli, 2017 whose research focused on non-academic Online Social Networks) are a ubiquitous participation practice outside of learning communities with lurkers far outnumbering traditional content creating participants (Nielsen, 2006 whose focus was commercial and social online communities). Inside of learning communities the number of lurkers drops, possibly due to motivation to participate based on achievement goals, (Harackiewicz et al., 2002; Kaplan and Maehr, 2007; Midgley et al., 2001). Wise et al., (2013), who studied AOD use among 96 business undergraduates, projects that 77% of learners are listening (passively and vicariously learning) at any given time. Furthermore, Lee and Martins' study (2017) of 86 educators in math and science, found that 85.88% of online learners (even, or perhaps especially, teachers) post only as much as required to pass the class, suggesting that a

majority of online students choose an active participation strategy, albeit one aimed at earning a grade.

Table 3

Reasons for Participation Level from Lurker Literature

Reason	Explanation	Theory/Theorist
Lurk 1 Choices Regarding Time Management	Learners may choose to post (or not) based on a conscious choice to manage their time, either aiming to pass, but not earn an A, or simply deprioritizing this activity (AOD posting) in their academic lives.	Amichai - Hamburger et al. (2016); Nonnecke and Preece (2001)
Lurk 2 Desire for Sense of Community	Learners may choose to post (or not) based on perceptions of being unwelcome in the online community or not liking the community themselves.	Nonnecke and Preece (2001); Nonnecke and Preece (2004)
Lurk 3 Feelings of Nothing to Add	Learners may choose to post (or not) based on feeling that they have nothing new or better to add to the existing conversation. They may also feel a lack of agency. Some may feel left out of the conversation or that their posts will not be read.	Cheung et al., (2008); Preece, Nonnecke and Andrews (2001); Nonnecke and Preece (2004); Wise, Speer, Marbouti, and Hsiao, (2013)
Lurk 4 Feelings of Risk; social and personal	Learners may choose to post (or not) based on feelings of being generally vulnerable or specifically susceptible to negative peer/instructor response or loss of social status. Alternately risk of privacy or personal safety.	Barnett - Queen et al. (2005); Nonnecke and Preece (2001); Nonnecke and Preece (2004)
Lurk 5 Prefer to Observe	Learners may choose to post (or not) based on feelings of social risk, confidence, interest or motivation. Some learners prefer to consume rather than create content, they see it as enough. Some allow an evaluation period before joining.	Amichai - Hamburger et al. (2016); Beaudoin (2002); Lave and Wenger (1991); Nonnecke and Preece (2001); Nonnecke and Preece (2003); Perna, Interdonato, and Tagarelli, (2017); Preece, Nonnecke and Andrews (2004);

Table 3 (cont'd)		Takahashi et al., (2003)
Lurk 6 Prefer Invisible Participation Modes	Learners may choose to post (or not) based on their personal preference for apparently passive (vicarious) forms of participation; watching, listening, reading, observing, digesting, wondering, browsing, following, tracking, quiet learning, vicariously participating, internally engaging, invisibly engaging, introverted participating, Essentially their invisible participation goes unassessed by the course reward system.	Bandura, (1986); Bozkurt, Koutropoulos, Singh, and Honeychurch (2020); Dennen (2008b); Edelmann, Krimer and Parycek (2017); Goggins and Xing (2016); Lave and Wenger (1991); Wise et al., (2013);Wise, Zhao, and Hausknecht, (2014); Schunk, (2011)

Many vicarious modes of (Lurker) participation are invisible to traditional assessment. A learner shows no evidence of learning when they read peer posts, think about the content or consider its implications - all common methods of online participation in (non-academic) online web page interaction, (Wise, Zhao, and Hausknecht, 2014 exploring AOD learning analytics). This gap in the traditional assessment techniques appears at odds with what is known about how learning works. "While listening - taking in the externalizations of others by accessing existing posts - is largely invisible, it is also critical for discussions that build understanding…," (Wise, Speer, Marbouti, and Hsiao, 2013). Dennen, 2008b examined 32 hybrid undergraduates' use of AODs and found that learners were often (most of the time) viewing (participating in) AODs just to read - not to post. Some students reported feeling discouraged from *just* reading as it wasn't clearly linked to achievement-based grades. And yet, Beaudoin (2002) found that most of his students (nearly 80%) self-assessed equal or greater learning from reading the posts of others, as opposed to the learning they felt from writing their own. Their participation in reading was a learning strategy.

There are several theories about why lurkers choose lurker levels of participation (see Table 3), many revolve around a sense of social risk aversion, subject matter interest and course content challenge calibration. Other theorists have accused lurkers of acting as free-riders or social loafers. Regardless, it is important to note that Lurker choices about participation often change from one context to another (Takahashi et al., 2003, who examined thousands of discussion participants in interactive mailing lists and bulletin board systems). Honeychurch, Bozkurt, Singh, and Koutropoulos (2017) echoed this sentiment, writing, “There isn’t one sole reason why lurkers act the ways that they do in their respective communities.” In 2006 Nonnecke and Preece went on to write, “One reason why the majority of lurkers choose not to post is because they are reading and browsing, and that may be enough for them.” For these theorists, the main reason that lurkers choose their level of participation was that their invisible, passive modes of participation satisfied their subject's relevant wants and needs.

Figure 2

Preece and Nonnecke (2004) Top 5 Reasons for Lurking

Each reason can be considered to have an opposite corollary. For example, if the Lurker chooses to lurk because they believe that they are not part of the community, they may also choose *to* participate when they feel part of the community. These reasons are divided into

sections in order to help illustrate that there are a variety of evolving and overlapping theories about the reasons that lurkers choose to participate.

Malinen's 2015 literature review noted that there was no clear definition of online participation and that many definitions of participation are based on how the use benefits the community rather than how participation leads to the learners' own edification. The concept of lurking suggests that learners fall into one of two rigid and imprecise categories, lurker or participant. As Malinen wrote in 2015 participants fall into, "a simple active–passive dichotomy," (p. 228). The default assumption is that invisible learning does not take place or count in the required online learning space. In what was essentially a literature review, Amichai - Hamburger et al. asserted in (2016), "...Lurker is not an absolute term, but rather entails a wide range of lurking behaviors. It appears that each individual's level of participation… can be positioned along a continuum…" (p. 274).

Bozkurt, Koutropoulos, Singh, and Honeychurch (2020) whose work focused on Social Network Analysis (SNA) list the following verbs (aligned with SCT's vicarious learning concept) to represent the actions that constitute engagement with (or participation in) the course content; "watching, listening, reading, observing, digesting, wondering, browsing, following, tracking, quiet learning, vicariously participating, internally engaging, invisibly engaging, introverted participating," (p. 8). A Lurker who observes, listens, and/or thinks about course content (maybe even discussing it - with friends and family - outside of the formal learning space, may be learning. Goggins and Xing (2016) who looked at the AOD participation of 24 students, wrote, "... our study shows that students can participate through reading and that their participation time is also important," (p. 249). Lurkers lurk for different reasons and at different times (Liao and Chou, 2012; Lutz and Hoffman, 2017; Nonnecke and Preece, 2001).

Traditionally vicarious learning activities go unobserved and uncredited, and yet, theoretically, these verbs could conceivably be measured as evidence of participation.

Bozkurt, Koutropoulos, Singh, and Honeychurch (2020) describe Lurkers as literal Legitimate Peripheral Participants (LPP-ers) and go on to claim that integrating oneself into a learning community is a complex process. Furthermore, they state that evaluating that participation by a raised hand or a response to an AOD has limited our understanding of this process to purely "measurable phenomena, (p. 1)." None of these theories are advocating that pure observation is the key to learning, only that the *observable* act of student observation may be the window into more invisible academic cognitive processes.

As Perna, Interdonato and Tagarelli (2017) wrote, "silent users actually gain benefit from the community, since they observe the user-generated communications, (p. 2)". All the while they are observing and forming conclusions about social norms / netiquette (Lave and Wenger, 1991). Even as LPP learners, these *silent* members of the community offer value as an audience for the more traditionally engaged students.

Both scholarly works appear to suggest that there must be a learning community or community of practice, around which the LPP learner can exist as a de facto member, at the periphery, before fully committing. AOD's can provide a structure for students to understand the course content from a relatively safer psychological-transactional-social distance, allowing them to read, observe, consider, and get more comfortable with their own competence and their role in the online group before generating tangible evidence of participation. The theory holds that as the Lurker or LPP learner becomes more familiar with the learning community, their traditional participation rate will increase. Zheng and Warschauer (2015) believed that, "well-designed synchronous online discussions ... can result in increased participation and interaction, (p. 87)."

Their study observed K12 students and they specifically note synchronicity as a key factor in increasing participation. In their paper on *Reading as Peripheral Participation,* Antin and Cheshire (2010) whose research centered on Wikipedia participation were more explicit stating that, "Over time individuals become more embedded and engaged in the community and obtain complex knowledge about tasks that are more important for the community's goals, (p. 2)" Hew and Cheung (2008) assert that the student-to-student side of AOD interactions can increase learner participation over time.

The Role of Participation in Online Learning Achievement

This section examines the relationship between participation in online learning and achievement. The literature suggests a strong relationship between active class participation and achievement/grades (Morris, Finnegan, and Wu, 2005); aka *more is better*.

Beginning with the assumption that, "Participation is more than the total number of student postings in a discussion forum," (Vonderwell and Zachariah, 2005, p. 214) this study shares the following definition from Hrastinski (2008) who asserts that, "Online learner participation is a … complex process comprising doing, communicating, thinking, feeling and belonging, which occurs both online and offline," (p. 1761). This quote highlights the idea that participation is a complex construct composed of activities that take place inside and outside of the (visible) formal required learning space. Participation is a behavior that sometimes manifests as social, sometimes solitary. If participation is an essential component of learning and achievement; it is critical that a more comprehensive definition of participation (beyond posting) be adopted. Participation can involve the learning community or extracurricular communities (chatting with non-classmates) or even the learner's reflection alone - otherwise known as thinking.

Broadbent and Poon (2015) explored the relationship between Self-Learning Strategies (SLR) and course outcomes that included achievement. They maintain that SLR (a self-aware participation strategy) and course achievement both fall under social cognitive theory's enactive learning strategies. They wrote that, "... learning occurs (and enhances performance) when students are *both actively and passively participating* in peer learning via the discussion boards, (p. 12)." This position allows for the idea that passive learning is an essential part of the process. They go on to assert that, "Time management, metacognition, effort regulation, and critical thinking [are] positively correlated with academic outcomes…," (p. 13) - all four of these constructs, positively correlated to achievement. Time management, metacognition, effort regulation and critical thinking are invisible to standard methods of assessment and certainly elude tracking in an AOD. As each of these activities happens, no real-time evidence manifests in the online learning environment, despite the critical role they play in the process of learning.

The Opportunity to Know More About Limited Participation Learning

This section will frame the concept of Limited Participation (LP) as a subset of a continuum of participation, as well as a valid, theory-based and understudied large population of learners. Classrooms are full of LP learners. Based on social media participation research as many as 90% of learners may be participating below instructor suggested levels (Nielsen, 2006). Students may be participating passively (listening, thinking etc.) as much as 77% of the time (Wise, Speer, Marbouti, and Hsiao, 2013). Lee and Martin (2017) contend that as many as 85.88% of learners participate in AODs at the minimum levels required in order to pass the course. There is a lot of potential (vicarious) learning happening beyond what traditional AOD assessment currently measures. This gap raises new questions and suggests a new way of looking at AOD participation is called for in order to better understand this population of learners.

Participation as a Continuum

To better frame this conversation, it is useful to view participation as a continuum (See Figure 1). Extant research tends to polarize participation into two extremes. According to Speily et al., (2020) "…online [learning community] users are [traditionally] divided into two groups: lurkers (nonparticipants) and posters (participants) (p. 192)". In an educational context, one end of the continuum represents participation manifested as actively engaged learners who post and reply at, or beyond, required levels. At the other extreme are the learners who, at worst, don't visibly participate at all, and at best, post only to meet graded/required levels of participation (Dennen, 2008b; Howard, James III, and Taylor, 2002; Nonnecke, Preece and Andrews, 2006; Palmer, Holt, and Bray, 2008). It is between these two extremes that substantial (but not currently visible) learning may be happening.

By viewing participation as a continuum that ranges between fully active participation (required participation and/or more) and full non-participation, there is room to acknowledge, measure, support and better understand the invisible learning (Beaudoin, 2002). The validity of the theorists extreme categorization of participation is upheld by the lack of statistically significant achievement based on participation (greater than non-participation) in this study.

Why do Learners say that they Choose their Level of Participation?

Some learners begin with the intention of full participation and are unable to realize their ambition. Others may adopt an intentional strategy to *pass with a C* or some other lesser accomplishment, thereby reducing their need to meet posting expectations. Undoubtedly some will default to a limited participation level due to an in*ability* to meet the required post levels; however, there remains a wide variety of reasons that a learner might choose limited participation that are independent of pure ability to physically make the required number of

posts. Many reasons learners might give for limited participation are suggested by Lurker literature(see Table 3), however, lurker lit tends to define lurkers as extreme non-participants (Lutz and Hofferman, 2017; Morris, Finnegan, and Sz-Shyan, 2005), omitting most of the LP learner population. Goal Theory suggests that LP reasons relate to performance and mastery goals, learning theory suggests that some choose LP due to satisfaction and/or gratification with vicarious modes of interaction.

Ultimately learners who post for various reasons and do so at various times depending on their own wants, needs, goals, feelings and the larger context of the learning experience (Liao and Chou, 2012; Lutz and Hoffman, 2017; Nonnecke and Preece, 2001). If there is what (Beaudoin, 2002) refers to as *invisible learning* happening, then traditional assessment metrics will not detect that learning as participation and the relationship between participation and achievement will be weak.

Research Questions

This study conducted a quantitative descriptive study using a survey to identify learners' reasons for their behavior, along with quantitative summary and descriptive statistics associating participation strategy with final course grade (achievement). The three questions that guided the study were:

RQ1: What is the relationship between participation levels and achievement? RQ1 examined the assumption that *more is always better* when evaluating participation. Is there room for the possibility that reduced participation can still result in solid achievement?

RQ2: What reasons do learners give for their level of participation? RQ2 asked participants to give their own reasons for participating. It opened up the idea that not all *reasons* for participating (or not) can be generalized across all students at all times.

RQ3: What is the relationship between learner reasons for participation and their achievement? RQ3 looked for empirical data to examine the possibility that some participation reasons may result in better achievement learning than others and also to check for the level that students possessed metacognitive insights about their own participation behaviors.

Method

The following section outlines this study's environment, research design, participant population, data sources, procedure, measures, and data analysis.

Research Design

LMS activity report information was gathered on participants' posting behavior (participation) and their achievement (grade) in the course English 100 (ENG 100), a required English course for all NU bachelor's students. The data for this correlational study comes from: a) LMS data on students' levels of achievement and levels of participation, and b) survey-based data on students' reasons for their participation (or lack of participation) in the online course discussions.

Environment: English 100 Course Structure

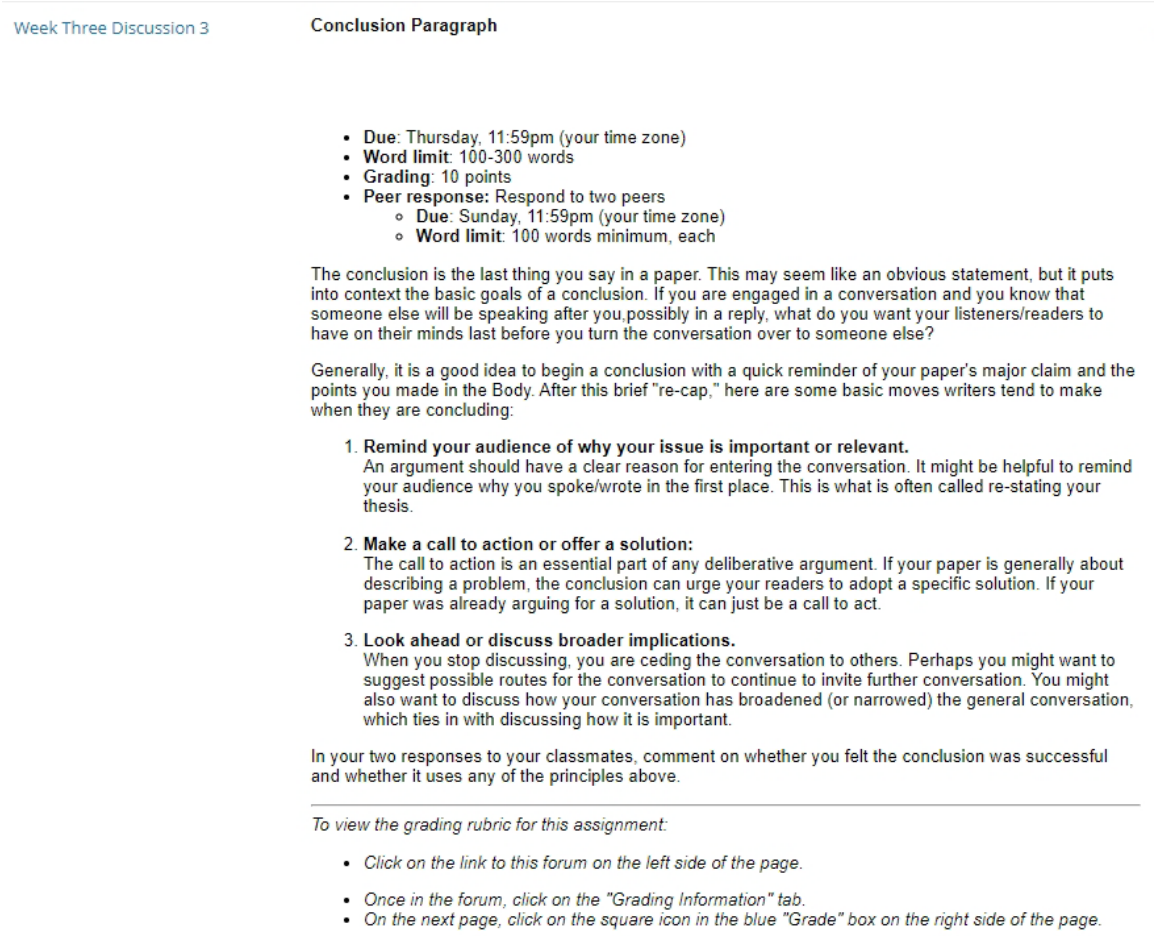
This study was conducted in the online undergraduate general education course English 100 (ENG 100) which is required of all undergraduate students at National University (NU) *with the exception of qualified transfer students*. Some students test out of transfer in the course, otherwise it is mandatory. It is important to note that while the course is designed to accommodate all levels of previous knowledge (completion of high school) the average age of an NU student is 35, meaning that the *average* ENG 100 student may not have set foot in a classroom (virtual or otherwise) in 17 years.

The course is designed to level all students to a basic formal paper writing skill level in preparation for a wide variety of majors. To that end the course is scaffolded in rehearsal of small foundational skills that culminate in a final paper. Peer feedback is often another chance to rehearse the adherence to formal MLA paper writing guidelines. The paper milestones based peer critique were structured as an AOD, as a convenient *platform for* peer critique (of format)

rather than a way to facilitate a forum for the robust exchange of substantive critical thought. For example, most of the week 3 AODs consist of posting portions of the paper, possible titles, a paragraph with MLA citations, and a conclusion paragraph (Figure 3). After the initial post, students were asked to respond to their peers with feedback. These AOD prompts tie into the actual weekly assignment of posting a rough draft of the course paper For more detail see Appendix C.

Figure 3

Sample AOD from ENG 100



Because the course is viewed as profoundly foundational to so many academic stakeholders (multiple academic majors, enrollment advisors, and administrative metrics) and

because it must accommodate a diverse population of learners, the instructional design tends toward utilitarianism, with clarity favored over graphic design aesthetics, ancillary learning outcomes or community building activities. See Appendix D for a list of ENG 100 course details: including weekly posts and assignments, point values and course learning outcomes.

Participants

NU uses the Blackboard Learning Management System (LMS) and has over 17,000 students (8,000 undergraduates ¾ of them over 25 years of age) taking month-long, one-at-a-time, immersive courses. NU race/ethnicity statistics average approximately ⅓ White, ⅓ Hispanic/Latino, followed by Black and Asian (NCES, 2016). More detailed demographic data was not collected as this was an *in situ* study that sought to collect data from the normal activity of the course itself while minimizing additional workload to both faculty and students while preserving the strict anonymity of the participants, so as not to discourage participation in the study itself. Participants consented only to the anonymous use of their LMS ENG 100 course activity data and results from a single survey. This means that while participants in this study all experienced the one month immersive format, neither the LMS data report nor the survey contained specific demographic indicators, therefore this study is unable to confirm if this study's participants follow the demographic patterns of the overall University.

In terms of survey response rate, during the six months of data collection all National University ENG 100 online students were asked to participate by opting into the study during their completion of the Qualtrics survey. The data generated by the Blackboard LMS contained participation data from 1,500 instances of students taking ENG 100 during the time of the study. Of those 1,080 were unique students who were not repeating the course during the time of the study. From the 1,080, 127 opted into the study by submitting surveys. 76 of those students

completed enough of the survey to be counted in the survey results. Of the 127 students who opted into the study through the survey, 91 had completed enough course data to be considered in the LMS activity reports.

Additionally, data collection (October 2020-February 2021) occurred during the Covid-19 pandemic, and while the course is normally offered completely online, the pandemic may have affected data collection and responses.

Procedure and Data Sources

The consent process (See Appendix A for language) was located at the beginning of the Qualtrics survey with a gateway preventing participants from engaging in the survey until they consented to participate in the study. Once consented, their LMS activity data was manually associated with their survey results and both anonymized. In general, duplicate and incomplete data were culled. A more comprehensive list of inclusion/exclusion criteria is outlined in Appendix B.

The survey was linked from the course to Qualtrics and the results manually matched to the LMS reported activity data before being anonymized for analysis. Students completed the course, their data being collected behind the scenes into activity reports and then students took the survey, opting into the study, and that data was downloaded from Qualtrics for analysis. Participant LMS data that correlated to survey takers was included in the study.

Learning Management System (LMS) Activity Report

A report generated by the Blackboard LMS at National University's Learning center was generated at the conclusion of each month-long course period. The reports contain aggregated posting data (from multiple sections of the course) and achievement scores reflecting student activity in ENG 100.

Each LMS report consisted of rows reflecting individual students with a unique confidential numeric identifier and columns reporting performance, participation and achievement results in aggregate. The LMS activity report provided the following information (Table 2) about study participants during their enrollment in ENG 100.

Table 4

Names of LMS Activity Report Columns with Detailed Descriptors

Report Column	Description
Total AOD posts	This data given the aggregate number of posts made by each individual student. It represents both initial posts and replies. It covers eight separate discussion topic assignments, two per week over a four-week period. This data is used to determine participation level.
Adjusted points earned	Each student has a final percentage grade calculated for them based on their total points earned (up to 305) in the course minus discussion thread related points (up to 115). Leaving the adjusted score to be calculated from the remaining 190 possible course points: 152 points = 80% achievement. This data is used to determine achievement.
Dropout.	If this category is triggered, the student would be considered a drop and not a non-participant. Their total number will be reported; however, their activity will not be used to calculate statistical analysis.
Four Digit Course Code	A four-digit code representing the month / session of the course offering will be used to track the participants. The first two digits represent the year, the last two the month; 2005 is May of 2020.
5-Digit Section Number	A five-digit section number (i.e., 61104), unique to each section of ENG 100 will be used to track the participants.
Student ID	A unique student ID number will be used to track individual student participants, no data will tie the student number to the student name.

Survey

A Qualtrics hosted survey (see Appendix A) linked from the ENG 100 course was made available to all ENG 100 students during the six months of data collection. Students were encouraged to participate; however, it was made explicitly clear that participation was not tied to their grade.

Measures

This study used three measures; 1) posts to measure participation level, 2) final adjusted grade to measure course achievement, and 3) survey reasons to measure participation strategies.

Participation Level

This study used the LMS activity data about the participants' total number of responses to the eight course discussion threads: three posts per thread consisting of one response to the prompt and two replies to peer posts. Given that required total posts was 35 (10 initial + 25 posts to peers), student total posts (N = 91) ranged from as low as 10 to as high as 86 with an average of 32.5 posts overall.

As the goal of this study was to measure the quantity rather than quality of participation, there was no substantive post requirement. Any post of any length or context was reported as participation.

Course Achievement

In this study, course achievement was measured by determining each student's final grade from the LMS activity report. The learner could have earned up to 305 points over the duration of the course. From this total, discussion thread related points (up to 115) were subtracted, leaving a *course achievement score*, calculated as a percentage of the remaining 190 possible course points. For example, a student who earns 152/190 points achieves an 80%

achievement score. All achievement scores were analyzed using this percentage achievement score, rather than point values.

Participation Reasons

There were 28 survey-question based reasons why students say that they *did* or *did not* participate (Appendix A). For each strategy (per participant), the response to the corresponding survey question was used to identify the saliency of that strategy for the participant. For example, the question about *preferring to observe* (Question 1, Appendix A), is used to determine each participants' preference for learning by observing. Survey question responses ranged from 1 (Strongly Disagree) to 5 (Strongly Agree).

Data Analysis

The following section explains how the measures listed above were used to address this study's research questions.

Research Question 1: What is the Relationship Between Participation Levels and Achievement?

To answer this question (N = 91), a Pearson's correlation was run between the number of times each participant posted (participation) and their percentage final adjusted grade (achievement). A scatterplot was created to further visualize this relationship.

Research Question 2: What Reason do Learners Give for Their Participation Level?

To examine what learners *say* about their reasons for participating, summary statistics from a survey (Appendix A) along with a mean score for each item (range 1 = Strongly Disagree to 5 = Strongly Agree) were used to describe participants' responses to the 28 Likert style survey questions about reasons for participating.

Research Question 3: What is the Relationship Between Learner Reasons for Participation and Their Actual Achievement?

The strength of the relationship between individual self-stated reasons for participation and achievement were examined using Spearman's Coefficient. Spearman's was calculated using each reason score (ranging between 1 and 5) and course achievement (a final adjusted grade stated as a percentage).

There were differing numbers of participants in the LMS data (N = 91) population and the survey data (n = 76) population. This participation variance is the result of 15 survey respondents opting into the study, allowing their LMS data to be measured, and then failing to complete the survey, thus removing them from the survey result measure.

Validity and Reliability

In compliance with the standards of both the Michigan State University and National University's Institutional Review Boards, and in pursuit of solid scholarship this study focused on gathering data on the phenomena of learner participation in as unobtrusive a way possible. The study followed protocols that added minimal time and effort to the workload of the adjunct faculty who assist with the data collection as well as the students themselves. By gathering consented quantitative data directly from the Blackboard LMS (rather than interacting directly with the study participants) the study gathered an empirical source of impartial information that required the least intrusion into student and faculty lives. The nature of the quantitative data collection process in the Blackboard LMS allowed the results to be mapped to individual participants while preserving their confidentiality in the reported findings.

In order to develop face and content validity, the survey instrument for this study was repeatedly piloted in order to enhance the reliability of participants interpreting the survey

questions as intended. For content validity, the survey questions themselves are derived directly from the research contained in Tables 1, 2 and 3. For face validity, the survey questions were then given to 3 separate undergraduate students who were asked to record a think-aloud as they worked through the survey. The results informed a new version which was reviewed by an experienced survey researcher who offered further direction. Finally, the survey was taken informally by 10 non-students who reported their minor misunderstandings which were used to adapt the final version of the survey, delivered in this study.

A correlation table of the survey items was also used to further examine reliability and validity (See Appendix D). Within each of the three broad categories of Learning, Motivation, and Lurking there are frequent statistically significant correlations. For example, each of the Motivation items significantly correlates with most of the other Motivations items. The level of association between items was expected given the way items were constructed to broadly sample themes in the motivation literature related to online learning.

Closer inspection of the table of correlations indicates potential measurement limitations of the survey. For example, items such as Learn 3a, Learn 3b, Learn 3c were constructed to assess the Learn 3 reason in the literature, *feelings about instructional design,* and yet, only Learn 3b and Learn 3c are significantly correlated, suggesting that some limitations in reliability and validity that should be addressed in future research.

Lastly, the table of correlations indicates that there are a large number of significant correlations between items of different categories of Learn, Motivation, and Lurking. This reinforces the approach that Learn, Motivation, and Lurking represent organizational categories and not unique or separate constructs that can be measured and assessed separately.

Results

This study echoed some of the extant research on the lack of statistically significant relationship between overall participation and overall achievement, and then covered new ground by asking participants *reasons* for their participation.

This section (organized by research questions) explores results and analysis.

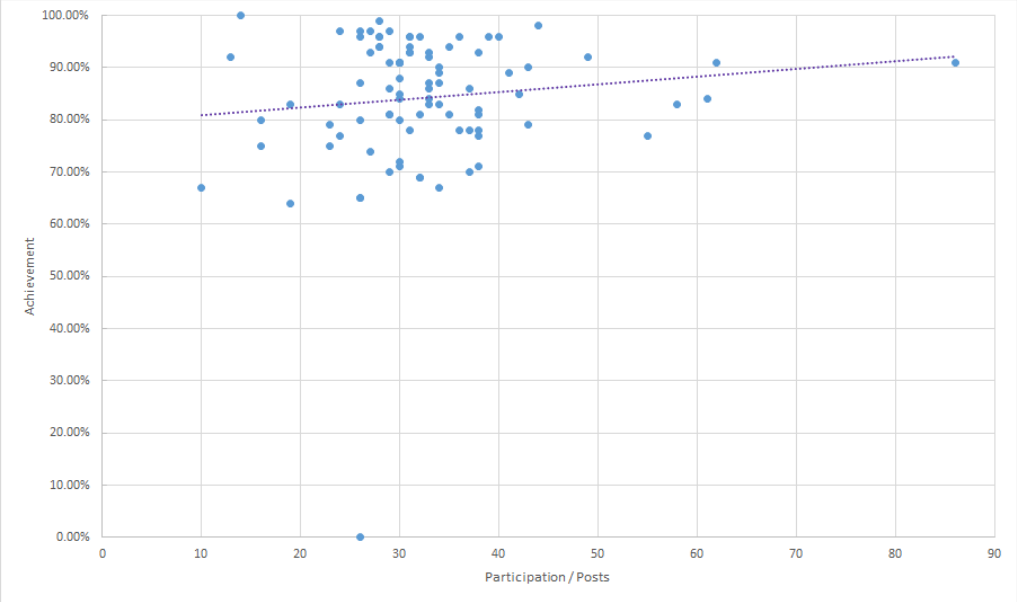
RQ1 Relationship Between Participation Levels and Achievement

Figure 4 depicts the relationship between participation and achievement. Participation was measured in the *number of participation posts* on the x-axis and *achievement as a percentage* on the y-axis. As the loosely clustered scatterplot illustrates, the relationship between participation levels and achievement is *not* statistically significant, $r(74) = .12$, $p > .05$.

To better understand the y-axis achievement score, remember that points earned by posting to the AODs were omitted from the adjusted final achievement score. This provided space for an outlier (26, 0) who posted consistently but erratically to AODs throughout the course, but nowhere else. While students who did not pass the course because they *dropped out* or *stopped out* (began the course but ceased attending for various reasons) were omitted from figure 4, extremely low participation was not always a guarantor of poor achievement as the student at (14, 100) illustrates. In their case, despite only posting 14 times to the course, they managed to earn all non-AOD course points.

Figure 4

Scatterplot of Relationship between Posts and Achievement Scores



RQ2 Reasons for Participation

Tables 5, 6 and 7 summarize the reasons the (n = 76) participants gave *for posting* and for *not posting* when responding to each of the 28 Likert questions. Each of the three tables contains descriptive statistics related to the numbered survey item responses, means, and standard deviations. Tables are broken into organizational categories that mirror the literature review, Learning, Motivation and Lurking. The categories are not meant to be not a psychological or predictive structure.

Descriptive statistics indicate that responses to six of the survey questions were markedly skewed toward strongly agreeing or disagreeing with the prompt, indicating a tendency toward consensus.

Learning

Survey reasons centering on the concept of learning (Table 5) appear to favor posting reasons centered on course design, Learn 2b (M = 3.53, SD = 0.96) and performance goals, Learn

1 (*M* = 3.43, *SD* = 1.10) posting more can lead to a better grade, and Learn 3a, posting because it earns course points, (*M* = 3.84, *SD* = 1.20) with the latter related to course grading and possessing the highest mean. Survey reasons that received the least support were related to course content complexity, Learn 5 (*M* = 2.09, *SD* = 1.10), the way the course was graded, Learn 3b (*M* = 2.07, *SD* = 1.07) and belief that the learner already knew the material, Learn 6c (*M* = 1.72, *SD* = 1.10).

Table 5

Survey Likert Percentages from Learning Literature; M, SD

Reason	Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strong Agree	M	SD
		1	2	3	4	5		
Learn 1	When I post it is because I think that if I post more, I will do better in the course	5%	15%	29%	33%	17%	3.43	1.10
Learn 2a	When I don't post it is because I feel like the course is too hard to navigate	39%	29%	16%	11%	5%	2.15	1.20
Learn 2b	When I post it is because I still need to learn more about the course	3%	12%	28%	44%	13%	3.53	0.96
Learn 3a	When I post it is because of the way the course is graded	7%	5%	24%	25%	39%	3.84	1.20
Learn 3b	When I don't post it is because I think that the course content is too hard	40%	25%	24%	9%	1%	2.07	1.07
Learn 3c	When I don't post it is because I think that the course content is too easy	43%	37%	16%	4%	0%	1.81	0.85

Table 5 (cont'd)

Learn 4a	When I post it is because I like to be social with my instructor	9%	11%	27%	40%	13%	3.37	1.14
Learn 4b	When I post it is because I like the instructor	13%	15%	44%	16%	12%	2.99	1.16
Learn 5	When I don't post it is because I think that the subject matter is too complicated	39%	28%	21%	9%	3%	2.09	1.10
Learn 6a	When I post it is because I feel like I know enough to sound smart	15%	36%	28%	12%	9%	2.65	1.16
Learn 6b	When I don't post it is because I learned the course content outside of class	28%	44%	19%	5%	4%	2.13	1.02
Learn 6c	When I don't post it is because I think that my skills are beyond this class	51%	33%	12%	1%	3%	1.72	0.92

These results could be affected by learners' expectations of consumer website level UX from their learning environment leading them to point at UX issues as the source of learning barriers. Similarly, the survey supports posting reasons related to the belief that posting more will result in higher achievement (Harackiewicz et al., (2002); Jung, Choi, Lim, and Leem (2002); Kaplan and Maehr, (2007); Midgley et al. (2001)), a belief unsupported by this study's RQ1.

Motivation

Survey reasons centering on the concept of motivation (Table 6) appear to favor posting reasons centered on posting as a way to learn, Motive 3, (*M* = 3.92, *SD* = 0.98), posting as a way to increase achievement, Motive 4 (*M* = 3.84, *SD* = 1.07) and as an information acquisition strategy, Motive 5a (*M* = 3.81, *SD* = 0.98). Overall, this category enjoyed the highest average mean response of 3.51. Survey reasons that received the least support were related to peer interaction, Motive 1b, (*M* = 2.77, *SD* = 1.10) and (*M* = 3.23, *SD* = 1.13) and entertainment seeking Motive 5b, (*M* = 3.36, *SD* = 1.04).

Table 6

Survey Likert Percentages from Motivation Literature; M, SD

Reason	Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strong Agree	M	SD
		1	2	3	4	5		
Motive 1a	When I post it is because I like to be social with my peers	9%	13%	36%	28%	13%	3.23	1.13
Motive 1b	When I post it is because I want to make an impression on my instructor	13%	27%	36%	17%	7%	2.77	1.10
Motive 2a	When I post it is because I am interested in this course	7%	5%	27%	47%	15%	3.57	1.03
Motive 2b	When I post it is because I am interested in this subject matter	7%	4%	28%	47%	15%	3.59	1.01
Motive 3	When I post it is because I see posting as a way to learn	1%	8%	20%	39%	32%	3.92	0.98
Motive 4	When I post it is because I see posting as a way to earn a better	3%	9%	21%	35%	32%	3.84	1.07

Table 6 (cont'd)

	grade							
Motive 5a	I post because I think it helps me get more information	3%	5%	27%	39%	27%	3.81	0.98
Motive 5b	When I post it is because I find discussion board threads entertaining	3%	19%	33%	31%	15%	3.36	1.04

These results support the posting reasons related to mastery goals (Harackiewicz et al. (2002); Kaplan and Maehr, (2007); Midgley et al. (2001)) or *posting as a way to learn* (Motive 3), despite similar questions in the learner category seeing less support. As with the learning category performance goals were reflected as strong reasons for posting (Motive 4). Motive 5a and Motive 5b are based on gratification seeking theories, (Amichai - Hamburger et al. (2016); Deng and Tavares, (2013); Nonnecke and Preece (2003)) saw mixed support with reasons related to information seeking being supported, but reasons related to entertainment seeking scoring much lower. Similarly, the reasons related to peer interaction scored lowest. This could reflect a sincere disinterest in peers or simply an inability to prioritize that value in the face of the mandate to earn good grades.

Lurking

Survey reasons centering on the concept of lurking (Table 7) appear to favor posting reasons centered on posting as a way to experience community, Lurk 2, (M = 3.12, SD = 1.11). They also favored reasons for *not posting* (the reasons that mattered in terms of actual participation and achievement) related to the intent to post more than they actually did-suggesting time management issues, Lurk 6, (M = 2.85, SD = 1.09) and the similarly themed

Lurk 1a, (M = 2.79, SD = 1.31) related to losing track of time. Survey reasons that received the least support were also related to time management, Lurk 1b, (M = 2.33, SD = 1.24) and (M = 2.37, SD = 1.19) as well as social risk, Lurk 6, (M = 2.36, SD = 1.27). The apparent support for and against posting reasons related to time management may indicate that the learners are unaware of the role that time management plays in their academic success or that they are answering the survey based on an idealized version of themselves which does not always manifest in the real learning environment.

Table 7

Survey Likert Percentages from Lurker Literature; M, SD

Reason	Survey Question	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strong Agree 5	M	SD
Lurk 1a	When I don't post it is because I sometimes lose track of time	21%	23%	23%	23%	12%	2.79	1.31
Lurk 1b	When I don't post it is because I have trouble juggling all my commitments	32%	28%	23%	9%	8%	2.33	1.24
Lurk 1c	When I don't post it is because I feel like I don't have enough time	31%	25%	24%	16%	4%	2.37	1.19
Lurk 2	When I post it is because I want to feel a sense of community	8%	23%	28%	32%	9%	3.12	1.11
Lurk 3	When I don't post it is because I feel like I have nothing new to add to the conversation	21%	17%	33%	24%	4%	2.72	1.17
Lurk 4	When I don't post it is because I am worried that the quality of my post will	33%	25%	20%	15%	7%	2.36	1.27

Table 7 (cont'd)

	embarrass me							
Lurk 5	When I don't post it is because I prefer to learn by reading the posts of others rather than posting myself	23%	25%	32%	19%	1%	2.51	1.08
Lurk 6	I plan to post more that I actually end up posting	12%	24%	37%	20%	7%	2.85	1.09

These results support the reasons related to the research of Nonnecke and Preece (2001, 2004) that saw the desire for community (or a sense of being unaccepted by the community) as a reason that lurkers initially hesitate to participate, but then gradually increase their engagement. Similarly, respondents supported reasons related to invisible modes of vicarious participation, Lurk 6, possibly related to perceived social risk, (Bandura, (1986); Bozkurt, Koutropoulos, Singh, and Honeychurch (2020); Dennen (2008b); Edelmann, Krimer and Parycek (2017); Goggins and Xing (2016); Lave and Wenger (1991); Wise et al., (2013);Wise, Zhao, and Hausknecht, (2014); Schunk, (2011)). And the ever present issue of not posting due to time management issues, Lurk 1 and Lurk 4, surfaces here as well (Amichai - Hamburger et al. (2016); Nonnecke and Preece (2001)).

RQ3 Relationships between Reasons, Achievement, and Levels of Participation

Research question 3 was designed to examine relationships between all the variables in the study, comparing reasons to both achievement level and participation levels. This section will report the results of Spearman's correlations by category while addressing some of the unexpected findings.

Unexpected Result: Differences in Reasons for Participation vs Reasons for not Participating

An unexpected finding of this study is that survey items about reasons why students participate acted differently than items about why students did *not* participate. Survey items asking learners about their reasons for participating, phrased in the form of, "*When I post*…" appear to have no relationship with either student achievement or student participation, whereas survey items asking learners about their reasons for *not* participating, phrased in the form of, "*When I don't post*…" repeatedly reflected in participants achievement (5 items) and participation (2 items). For example, Learn 1: *When I post* it is because I like to be social with my peers (a reason for participating) versus Lurk 1a *When I don't post* it is because I sometimes lose track of time (a reason for not participating). Both achievement and participation correlated with survey item Lurk 2, *When I don't post it is because I lose track of time*). See tables 9 and 11 for more detail.

Table 8

Survey Items Related to Not Posting

Reason	Survey Question	Correlation with Achievement	p-value	Correlation with Participation	p-value
Learn 2a	When I don't post it is because I feel like the course is too hard to navigate	-0.30	0.01*	-0.03	0.79
Learn 3b	When I don't post it is because I think that the course content is too hard	-0.30	0.01*	0.01	0.91
Learn 3c	When I don't post it is because I think that the course content is too easy	-0.12	0.29	0.11	0.33
Learn 5	When I don't post it is because I think that the subject matter is too complicated	-0.29	0.01*	0.08	0.48

Table 8 (cont'd)

Learn 6b	When I don't post it is because I learned the course content outside of class	-0.15	0.21	0.04	0.71
Learn 6c	When I don't post it is because I think that my skills are beyond this class	-0.11	0.36	-0.15	0.21
Lurk 1a	When I don't post it is because I sometimes lose track of time	-0.26	0.02*	-0.35	0.00*
Lurk 1b	When I don't post it is because I have trouble juggling all my commitments	-0.21	0.08	-0.15	0.18
Lurk 1c	When I don't post it is because I feel like I don't have enough time	-0.15	0.20	-0.26	0.02*
Lurk 3	When I don't post it is because I feel like I have nothing new to add to the conversation	-0.15	0.20	-0.03	0.80
Lurk 4	When I don't post it is because I am worried that the quality of my post will embarrass me	-0.26	0.03*	-0.03	0.81
Lurk 5	When I don't post it is because I prefer to learn by reading the posts of others rather than posting myself	-0.11	0.36	0.02	0.86
Lurk 6	I plan to post more that I actually end up posting	-0.24	0.04	0.10	0.37

* $p < 0.05$

Just shy of half of the survey items, (13 of 28 or 46%) were phrased in the form of, Reasons why I *don't* post… A quick glance at this table's first column reveals that there are no reasons from the Motivation category, this is due to all of the Motivation category questions being phrased as reasons for posting (*When I post*…), rather than including a few questions

phased as reasons for not posting (*When I don't post*…). This omission could be addressed in future studies or attributed to the categorical distinction being purely organizational rather than attributing it to theory.

As Lurking definitions often center on apparent non-participatory behaviors, more of the lurker survey questions (all but one) were phrased in the form of a negative, (*When I don't post*…) allowing for more insight into the reasons learners do not participate. The final question (Lurk 6: I plan to post more that I actually end up posting), deviated from the standard question format, however, it was clearly targeting reasons for *not* participating.

Thematically the reasons for not posting questions related to course UX , course or content difficulty, perceptions of previous knowledge, invisible learning, time management, and social risk. Of those, time management and social risk had the greatest impact on achievement and participation.

Learning

As previously noted, the distinction of categories (Learning, Motivation and Lurking) is not a psychological or predictive structure, but one of organizational convenience, from many perspectives the categories have overlapping domains.

Table 9 (below) reports the results of the Spearman's correlation between (categorically) learner based reasons for participation and achievement / participation. Only two items appeared to have a relationship to student behavior, both phrased as reasons for *not* posting. The first, Learn 2a, UX $r(74) = -.3$, $p < 0.05$. The second was Learn 3b, course difficulty $r(74) = -.3$, $p < 0.05$. Both suggest that students' negative perceptions about course design choices (Concannon, Flynn and Campbell (2005); Vonderwell and Zachariah, (2005); Concannon, Flynn, and Deng

and Tavares, (2013)) can negatively impact achievement. None of the categorical learning results impacted participation.

Table 9

Correlation Between Survey Reasons and Participation/ Achievement; Learning Literature Reasons

Reason	Survey Question	Correlation with Achievement	p-value	Correlation with Participation	p-value
Learn 1	When I post it is because I think that if I post more, I will do better in the course	-0.05	0.65	0.16	0.16
Learn 2a	When I don't post it is because I feel like the course is too hard to navigate	-0.30	0.01*	-0.03	0.79
Learn 2b	When I post it is because I still need to learn more about the course	0.00	0.97	0.18	0.12
Learn 3a	When I post it is because of the way the course is graded	0.04	0.70	0.07	0.54
Learn 3b	When I don't post it is because I think that the course content is too hard	-0.30	0.01*	0.01	0.91
Learn 3c	When I don't post it is because I think that the course content is too easy	-0.12	0.29	0.11	0.33
Learn 4a	When I post it is because I like to be social with my instructor	-0.03	0.78	0.13	0.28
Learn 4b	When I post it is because I like the instructor	0.02	0.88	0.14	0.22
Learn 5	When I don't post it is because I think that the subject matter is too complicated	-0.29	0.01*	0.08	0.48
Learn 6a	When I post it is because I feel like I know enough to sound smart	-0.04	0.75	-0.07	0.56

Table 9 (cont'd)

Learn 6b	When I don't post it is because I learned the course content outside of class	-0.15	0.21	0.04	0.71
Learn 6c	When I don't post it is because I think that my skills are beyond this class	-0.11	0.36	-0.15	0.21

* $p < 0.05$

Motivation

Table 10 reports the results of the Spearman's correlation between (categorically) motivation based reasons for participation and achievement / participation. None of the results displayed a strong relationship with this study's learners' participation or achievement; however, all of these categorical survey items were phrased as reasons for posting and the only reasons that impacted participation and achievement were reasons for *not* posting.

Table 10

Correlation Between Survey Reasons and Participation/ Achievement; Motivation Literature Reasons

Reason	Survey Question	Correlation with Achievement	p-value	Correlation with Participation	p-value
Motive 1a	When I post it is because I like to be social with my peers	0.00	0.98	-0.09	0.43
Motive 1b	When I post it is because I want to make an impression on my instructor	-0.21	0.07	0.06	0.62
Motive 2a	When I post it is because I am interested in this course	0.15	0.20	0.19	0.10

Table 10 (cont'd)

Motive 2b	When I post it is because I am interested in this subject matter	0.12	0.33	0.14	0.23
Motive 3	When I post it is because I see posting as a way to learn	0.16	0.18	0.11	0.34
Motive 4	When I post it is because I see posting as a way to earn a better grade	0.19	0.10	0.12	0.32
Motive 5a	I post because I think it helps me get more information	-0.03	0.83	0.18	0.13
Motive 5b	When I post it is because I find discussion board threads entertaining	0.06	0.60	-0.03	0.80

* $p < 0.05$

Lurker

Table 11 (below) reports the results of the Spearman's correlation between (categorically) lurker based reasons for participation and achievement / participation. Four of the results impacted student behavior, two achievement and two participation; all were phrased as reasons for *not* posting. It is important to note that the only survey item to be significant in both categories, Lurk 1a, 1b and 1c (losing track of time) was related to time management.

The two results that possessed a relationship with achievement were Lurk 1a, time management $r(74) = -.26$, $p < 0.05$ and Lurk 4, social risk $r(74) = -.26$, $p < 0.05$. Both of these factors can be seen as reasons to lurk (Amichai - Hamburger et al. (2016); Nonnecke and Preece (2001)), possibly because the learner falls behind and is concerned about embarrassment if they participate.

The two results that possessed a relationship with participation were both Lurk 1a, 1b and 1c, time management questions, $r(74) = -.35$, $p < 0.05$ and $r(74) = -.26$, $p < 0.05$. The first time management item was the same item that had a relationship with achievement and the second differentiated itself from the first by focusing on *feelings* of not having enough time rather than self-assessing as someone who loses track of time. Arguably not having enough time puts the locus of control outside of the learner whereas declaring that you lose track of time places the onus on the learner. Either way, both factors appear to negatively impact actual course participation. In terms of theory this supports the idea that lurkers sometimes lurk because they do not feel like they are keeping pace with the community of practice.

Table 11

Correlation Between Survey Reasons and Participation/ Achievement; Lurker Literature Reasons

Reason	Survey Question	Correlation with Achievement	p-value	Correlation with Participation	p-value
Lurk 1a	When I don't post it is because I sometimes lose track of time	-0.26	0.02*	-0.35	0.00*
Lurk 1b	When I don't post it is because I have trouble juggling all my commitments	-0.21	0.08	-0.15	0.18
Lurk 1c	When I don't post it is because I feel like I don't have enough time	-0.15	0.20	-0.26	0.02*
Lurk 2	When I post it is because I want to feel a sense of community	-0.10	0.41	-0.05	0.67
Lurk 3	When I don't post it is because I feel like I have nothing new to add to the conversation	-0.15	0.20	-0.03	0.80
Lurk 4	When I don't post it is because I am worried that the quality of my	-0.26	0.03*	-0.03	0.81

Table 11 (cont'd)

	post will embarrass me				
Lurk 5	When I don't post it is because I prefer to learn by reading the posts of others rather than posting myself	-0.11	0.36	0.02	0.86
Lurk 6	I plan to post more that I actually end up posting	-0.24	0.04	0.10	0.37

* $p < 0.05$

See Appendix B for a comprehensive list of open ended survey comments from participants who specifically *agreed* or *strongly agreed* with reasons that were relevant to RQ3.

Discussion

As previously stated, the learner participation continuum (Figure 1) remains *of interest* as research suggests that under (and over) participation makes up a substantial portion of online academic behavior. The results of this study suggest that a continuum of participation rather than categorical designations reflects *actual* activity. Additionally, while participation in academic forums is more robust than that of public internet forums (social media etc.) learner participation is still often different from course mandated ideals.

There are many possible reasons why reasons for not posting matter more than reasons for posting. For example, learners motivated by performance avoidance goals (Harackiewicz et al. (2002); Kaplan and Maehr, (2007); Midgley et al. (2001)) may be more strongly influenced by reasons for not participating than reasons for participating. Some learners may be engaged in LPP for Lurking (Bozkurt, Koutropoulos, Singh, and Honeychurch, 2020)) as they evaluate their comfort, role and fit for the group. Alternately the idea in the learners mind that they have legitimate reasons for not participating; social risk Dennen (2008b), time management Broadbent and Poon (2015), course difficulty Vygotsky's (1978), may become a self-fulfilling prophecy that leads to reduced participation and performance for the learners. Finally, questions phrased in the negative may reflect the learners fears rather than their goals, fear that may be more compelling (over time) than the initial goals. As this study was not originally designed to be sensitive to this question, future research will be needed to formally address it.

There are four main findings from this study; 1) there was no relationship between levels of participation and achievement, 2) there were varied reasons students gave for participating and *not* participating in course discussions, 3) the reasons students gave for *not* participating mattered

the most and 4) there was some mixed support for the lurker hypothesis. These four findings are discussed in greater detail below.

There was No Relationship Between Levels of Participation and Achievement

Supported by some of the extant research and challenging to others, this study found that the relationship between participation levels and achievement was *not* statistically significant, $r(74) = .12$, $p > .05$. *More* student participation was not a guarantor of *higher* grades and *less* participation was not a predictor of lower grades. This finding aligns with the prior research conducted by Davies and Graff (2005) and Wikle and West (2019), furthermore the findings appear to contravene the popular teacher belief that more participation predicts higher achievement. The caveat to this finding is that there does indeed appear to be a relationship between extremely low participation levels and achievement, but only for students who *drop out or stop out*. In other words, students who do not finish the course do not tend to earn a passing grade.

There are Varied Reasons Students Give for Participating and *not* Participating in AODs

There were 28 survey question items that suggested different reasons for participation. There was at least some support for *all* of the reasons, suggesting that learners' reasons for posting and not posting vary across the sample.

The lack of a statistically significant relationship between participation and achievement created the need for RQ2, the hypothesis being that perhaps overall participation would not predict achievement, but *specific reasons for participation* might. This hypothesis turned out to be true in its inverse - in the sense that reasons for *not* participating sometimes predicted achievement. Additionally, self-stated survey reasons *for* learner posting behavior appear to have

little to do with final course achievement. Possible rationale for this is explored in RQ3 of the discussion section.

Overall, the five reasons with the highest means, suggesting they are the most commonly held reasons, were all phrased in the positive, as in *reasons why I post.* Four out of five of these reasons were categorized as motivation reasons, one from learning. They were (from highest to lowest of the top 5) Motive 3, *When I post it is because I see posting as a way to learn*. Learn 3a, *When I post it is because of the way the course is graded* which is (mean) tied with Motive 4, *When I post it is because I see posting as a way to earn a better grade*. Motive 5a, *I post because I think it helps me get more information*, and finally Motive 2b, *When I post it is because I am interested in this subject matter*. The reasons for posting appear to heavily favor performance and mastery goals (Harackiewicz et al., 2002; Kaplan and Maehr, 2007; Midgley et al., 2001). Students say that they participate in order to learn, earn good grades, get information and gratify their level of interest (Nonnecke and Preece, 2001; Nonnecke and Preece, 2003; Deng and Tavares, 2013; Amichai - Hamburger et al., 2016).

The five items with the lowest means, suggesting that they are the least commonly held reasons, were all phrased in the negative as *reasons I don't post*. All five of the lowest scoring responses were categorized as learning reasons. They were (from lowest to highest of bottom 5) Learn 6c When *I don't post it is because I think that my skills are beyond this class*. Learn 3c *When I don't post it is because I think that the course content is too easy*. Learn 3b *When I don't post it is because I think that the course content is too hard*. Learn 5, *When I don't post it is because I think that the subject matter is too complicated* and finally Learn 6, *When I don't post it is because I learned the course content outside of class*. The strongly rejected reasons appear to favor admission that the learner is smarter than the course, the course is too complex for the

learner, or that they learned the content outside the course. Essentially the students reject reasons that would put them outside the social circle of their peers. This aligns with the research about learners' desire for community (Nonnecke and Preece, 2001 and 2004) from Table 3.

It is interesting to note that when Table 3 survey results are viewed as top and bottom five mean scores, learners most strongly accepted reasons *for* posting behavior, reasons that had no relationship with achievement and yet that same population of learners rejected reasons for *not* posting, the category that had the strongest relationship with predicting achievement.

In terms of performance focus, college students are repeatedly told that good grades are important for learning, maintaining good programmatic standing, scholarship eligibility and possibly grad school admittance. It's possible study participants were truly focused on performance goals (Midgley et al., 2001; Harackiewicz et al., 2002; Kaplan and Maehr, 2007) and despite being assured that the survey was confidential, answered so as to appear focused on earning a good grade.

It is possible that learners may not view the scaffolded activities in the ENG100 course as meaningful to their personal goals, their academic learning or their chosen field of study. For learners returning to school after a decade or more away, a linear and iterative skill building *conversation* may feel inauthentic and have little appeal. The mechanical nature of the learning may encourage a performance approach whereas a more authentic peer based AOD experience might have helped the learners to see how the small steps are all integrated into the larger overall programmatic outcomes. It's possible that (Table 1) perceptions of instructor presence (Bullen, 1998; Xie et al., 2006) played more of a role in student perception of AOD relevance than surveys reveal. A clearer bridge between the ENG 100 AODs and each learner's personal goals

might raise interest, stimulate a more robust engagement and narrow the gap between participation and achievement.

The Reasons Students Give for *not* Participating Matter Most

There appears to be a meaningful distinction between reasons *for* posting and reasons for *not* posting (see Table 8). Reasons *for* posting possessed little relationship to outcomes, whereas some of the reasons for *not* posting did appear to have a stronger relationship with levels of achievement and/or participation.

The highest (mean score) reasons for *not* posting in this study were: *topic complexity*, *UX*, *time management* and *social risk*. These reasons evolved from the Table 3 research categories: feelings about instructional design/course design and perception of information load, feelings of social risk, choices regarding time management, information seeking, and performance goals.

Both Deng and Tavares (2013) and Wikle and West (2019) speak directly to the relationship between topic complexity and participation. Wikle and West specifically, link the usefulness of AODs in predicting achievement to the thoughtful and proper calibration of topic complexity. They suggested that a better alignment between skill and topic complexity could be used to increase participation.

Learners may choose not to post based on their level of comfort with the course UX (Concannon, Flynn and Campbell, 2005; Vonderwell and Zachariah, 2005; Concannon, Flynn, and Deng and Tavares, 2013). Nonnecke and Preece (2001) and Amichai - Hamburger et al. (2016) along with Deng and Tavares (2013) consider reasons for not participating in terms of time management, explaining that posting takes time, and if the learner is making strategic decisions about how to spend that time they may or may not see the return on investment for

participating in any given AOD. The idea that social risk can encourage non-posting behavior is explored extensively in Lurker literature (Edelmann, 2015; Perna, Interdonato, and Tagarelli, 2017; Bozkurt, Koutropoulos, Singh, and Honeychurch, 2020; Ruthotto et al., 2020). This correlates with the findings of the study, namely that issues of social risk can encourage a wait-and-see attitude resulting in non-posting behavior.

There was Mixed Support for the Lurker Hypothesis

A number of survey respondents indicated Lurker-like tendencies. Some indicated that they sometimes participated less when they thought that they already knew the course content, others declared that they sometimes prefer to read (consume) content rather than post (create) content. Questions like survey item Learn 6b, *When I don't post, it's because I learned the course content outside of class* showed 9% (or about 7 of 76 participants) agreed or strongly agreed. This item showed $r(74) = -.15$, $p = 0.21$ and $r(74) = .04$ $p = 0.71$ relationship to achievement and participation respectively.

Furthermore, survey item Lurk 5, *When I don't post, it's because I prefer to learn by reading the posts of others, showed* that 20% (around 15 of the 76 participants) agreed or strongly agreed with this sentiment. This item showed $r(74) = -.11$, $p = 0.36$ and $r(74) = .02$, $p = 0.86$ relationship to achievement and participation respectively.

Viewed another way, learners who favored Lurker behaviors did not see a negative impact on their achievement or participation levels. Lurking did not appear to diminish their achievement. These students represent a substantial amount of learner behavior. In contrast, some of the *non*-lurker reasons for *not* posting did negatively impact achievement and participation levels.

Limitations

In terms of survey participation rates, 127 out of a possible 1,080 students (just under 12%) represents a somewhat low response rate. This may be explained by a number of factors including the perception that the survey was conducted by an external entity unrelated to the ENG 100 course. Additionally, the survey was located at the end of a *required* course. The students, who demonstrated strong performance goal orientations, were well aware that the survey played no role in their final course grade. General survey fatigue aside, the idea of circling back to complete a survey was likely to appear unappealing to students who had already turned their attention to the next immersive course, starting in just a few days.

The unexpected divide between student reasons *for* and reasons for *not* posting ended up being a limitation of this study. Had this phenomenon been factored into the original study design, measures more sensitive to this issue could have been built into the data collection process.

Exploratory Factor Analysis (EFA) was explored during this study, and preliminary examination of seven factors with Eigenvalues above 1.0 did not show anything conceptually different from the unfactored data and so it was set aside. If pursued it may have yielded further insights into the research questions.

This study could have benefitted from intentional differentiation between substantive equality, literal participation quantity and different kinds of participation suggested by the literature; invisible, passive, active, enactive, lurking, observing, vicarious etc. See Tables 1, 2 and 3 for more detail.

Covid - 19 may have put additional burdens on the study participants who were asked to participate sometime between the end of 2020 through the beginning of 2021. The pandemic

may have placed additional burdens (personal illness, caring for others, new childcare issues, restricted access to wi-fi, travel complexities, and living arrangements) on the participants which may have influenced their responses and therefore study results.

The phrasing of the survey questions, while intended to standardize responses, may have resulted in misleading responses. Some participants may have answered the survey questions from a specific moment in time rather than reflecting on their general or overall behavior. For example, they may have answered questions containing a negative, (such as, "when I don't post") in the affirmative. Additionally, participants may have answered the survey question as if the reason only applied to the specific, singular moment when they (for example) *don't post*, which may have been a small percentage of their actual experiences. For example, *when I don't post it's because I ran out of time*. That may have been true *once*, however, they only ran out of time *once* during the entire course and so answered holistically from that isolated perspective.

The sample size for this study distilled over time which may have resulted in a biased sample based on self-selection. Students who do not like to post may be equally reticent to participate in surveys. Similarly, some of the students started the voluntary survey, opted into the study and then failed to complete the survey itself. This may have impacted the findings.

There is a paucity of demographic data collected in this study, while this is intentional, there could be beneficial insights gleaned from gathering participant demographic data such as gender, age, ethnicity, SES, and first generation college status. As these factors can inform social confidence and access to educational resources, they may play an influential role in the reasons that these learners actively participate (or lurk) in AODs. The scarcity of demographic data in this study may limit interpretation of how the theory categories inform the study's results.

Furthermore, this study includes a robust, and yet relatively small homogenous sample population from which to draw conclusions about global learning. The study focused on a specific learning content; an undergraduate beginning English course, which does not encompass the nuances of learning in K12 environments or even upper division or graduate studies. To the same point, a liberal arts course may have substantively different learning demands than hard science or mathematically based learning. Finally, the results of this study may not generalize to a classroom situation which involves training military or working professionals whose lives or livelihood depends on mastery of the material.

General limitations of this study include the idea that it was assumed that learners hear the call to action; they understand that they must post a certain number of times in a substantive fashion and that students consciously choose their level of interaction. This study assumes that students' basic needs for food, shelter and access to technology did not impede participation.

Conclusion

Reasons *for* participating appear to be distinctly different from reasons for *not* participating. Lower participation levels do not always mean that less learning is happening. Learners may choose to observe or consider before participating. The learning itself may be vicarious and invisible to current metrics. If learners are on track to finish the course, then middling participation levels may be optimal for reaching their personal achievement goals.

Ultimately, it is unclear to what degree learners possess accurate metacognition about their own reasons for participation, however, limited participation levels may be strategic and chosen with performance goals in mind. Finally, participation rates may be a much more powerful tool for predicting course *completion*, than course *achievement*.

Implications for Theory

In terms of future research, the results of this study indicate that the distinction between reasons *for* doing something (like participating) and the reasons for *not* doing something may be distinctly different from each other, rather than simply reflecting the degree to which a person engages in a given activity. Learner's reasons for *not* engaging in an activity (like posting to AODs) are distinctly different from reasons *for* engaging in that activity, therefore it is important to design studies that discreetly capture both facets separately. Additionally, learner reasons for *not* posting may matter more than the frequency of posts. This insight may have bearing on learning behavior and achievement. As this study was not originally set up to be sensitive to this unexpected idea, future work in this area could be beneficial to both theory and practice. While crafting language sensitive to reasons for and against posting special attention should be given to the implications of positive and negatively worded survey questions.

Additionally, future research could explore the role of trust or teamwork in distance learning participation. A broader definition of *participation* could include measures of vicarious or passive participation that rely less on traditional course artifact generation. Moreover, analysis of posting behaviors after having a long or short posting break could be as informative as examining instructor and students' response times. A study rooted in examining the reasons for the participation patterns of students who do *not* complete the course may inform student-remediation and course-design innovations. Continued inquiry into the relationship between the ways that students wish to *appear* to their instructors / peers and their *actual behavior* may allow for course design that better accommodates learners' preference for limiting social risk.

Subsequent studies could be set up to better harness complex statistical analysis such as Exploratory Factor Analysis (EFA) in order to reduce the number of factors, isolate thematic elements and add internal reliability to the measures. Future research could be built around the concept of a substantive post wherein the quality of participation (the complexity of student posts and responses) was measured in addition to the quantity of posts or the kinds of posts (initial vs. peer response). A more nuanced examination of how both the LPP posting behavior itself (and the reasons for posting) change over time is more realistic in a participant population being observed over a semester or a full academic year A study built to differentiate between different kinds of participation, invisible, reading, writing, replying etc. might reveal new themes. A study built to capture basic demographic data might begin to isolate extra-curricular factors that influence reasons for participation.

Implications for Practice

The practice of counting student posts as a method of measuring participation may not be an accurate predictor of student learning or achievement. In contrast, the *reasons* students post

(or *don't*) appear to be a more important predictor of achievement. Therefore, practitioners may improve student persistence and/or participation if they can discover (through observation, discussion or solicitation) students' reasons for *not* posting and either *support* the reasons (if they are a learning strategy) or *address/mediate* the reasons if they are fear based.

Additionally, practitioners may want to encourage their online students to post tangible artifacts that represent their *vicarious* learning. For example, a screenshot of a topic relevant social media discussion, a rough transcript of a topic relevant face-to-face conversation, a meme they saw that made them think about the topic in a new way etc.

APPENDICES

APPENDIX A: Survey

This appendix contains the survey given to study participants.

Default Question Block

Time

This survey requires about
5-10 minutes

Age

Click the box below ↓ to indicate you are over 18 ↓

○ CLICK HERE to indicate that you are over 18 years of age

Q13

Please type your full name here. This allows survey results to be compared to your ENG 100 course activity. Your data are *100% confidential*. Your name will **not** be published.

Reasons for Participation; Survey

MINIMAL RISK RESEARCH CONSENT FORM
Study Title: The Relationship Between the Reasons for Limited Discussion Thread Participation and Achievement
Principal Investigator: Dr. Matthew Koehler
Researcher: Mr. Brian Arnold

Research Participant Information

You are being asked to participate in a voluntary research study. After reading the text below, if you have any additional questions, please contact Brian Arnold (arnol100@msu.edu). Brian Arnold is a professor at National University; however, he does not teach English 100 and will have no input on your course grade.

1. PURPOSE OF RESEARCH

The purpose of this research study is to gather data about the reasons learners have for deciding whether or not to participate in your ENG 100 online discussion board. This knowledge will be used to further understanding of online learner participation strategies.

2. WHAT YOU WILL DO

This survey asks participants to respond to a series of questions (18) related to their online course participation levels.

3. POTENTIAL BENEFITS

Participants may gain insight into their own reasons for online participation and behaviors.

4. POTENTIAL RISKS

Participants in this study entails no substantive risk.

5. PRIVACY AND CONFIDENTIALITY

The survey is confidential. The results will be kept until the actual study is completed in the next 12-24 months.

6. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW

You have the right to say no to participate in the research. You can stop taking the survey at any time. There will be no consequences if you stop. You will not be criticized or contacted afterward.

7. COSTS AND COMPENSATION FOR BEING IN THE STUDY

This study requires 5-10 minutes of your time.

8. CONTACT INFORMATION

If you have concerns or questions about this study, scientific issues, how to do any part of it, or to report an issue, please contact the researcher Brian Arnold arnol100@msu.edu 310 425 5822 at 2685 Regina Ave Thousand Oaks CA 91360.

If you have questions or concerns about your role and rights as a research participant or would like to register a complaint about this study, please contact (anonymously if you wish) the National University IRB board using irb@nu.edu.

Directions:
When answering the following questions, please consider your level of recent participation in ENG 100. The answer scale: (left to right) Strongly Disagree to Strongly Agree. Please click on one circle for each question.

----------NEW PAGE----------

Q11

Did you post to the discussion board in ENG 100?

☐ YES, because (fill in your answer below)

☐ NO, because (fill in your answer below)

---------- Page Break ---

Q12

Please list all the reasons why you would post to the discussion board.

---------- Page Break ---

When answering the following questions, please consider your level of recent participation in ENG 100. The remaining Likert style questions ask you to indicate how true each statement is of your own reasons for posting. The answer scale ranges from Strongly Disagree ←→ Strongly Agree. Please click on one (1) circle for each question. NOTE: If participating on a small screen/mobile device click the downward chevron "\/" to reveal selection choices.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
When I don't post it is because I prefer to learn by reading the posts of others rather than posting myself	○	○	○	○	○
When I don't post it is because I sometimes lose track of time	○	○	○	○	○
When I post it is because I want to feel a sense of community	○	○	○	○	○
When I post it is because I like to be social with my peers	○	○	○	○	○
When I post it is because I like to be social with my instructor	○	○	○	○	○
When I don't post it is because I have trouble juggling all my commitments	○	○	○	○	○
When I don't post it is because I think that the subject matter is too complicated	○	○	○	○	○
When I don't post it is because I feel like the course is too hard to navigate	○	○	○	○	○
When I post it is because of the way the course is graded	○	○	○	○	○
I plan to post more that I actually end up posting	○	○	○	○	○
When I don't post it is because I think that the course content is too hard	○	○	○	○	○
When I don't post it is because I think that the course content is too easy	○	○	○	○	○
When I post it is because I am interested in this course	○	○	○	○	○
When I post it is because I am interested in this subject matter	○	○	○	○	○

When I don't post it is because I feel like I have nothing new to add to the conversation	○	○	○	○	○
When I don't post it is because I am worried that the quality of my post will embarrass me	○	○	○	○	○
When I don't post it is because I feel like I don't have enough time	○	○	○	○	○
I post because I think it helps me get more information	○	○	○	○	○
When I post it is because I find discussion board threads entertaining	○	○	○	○	○
When I post it is because I feel like I know enough to sound smart	○	○	○	○	○
When I post it is because I see posting as a way to learn	○	○	○	○	○
When I post it is because I see posting as a way to earn a better grade	○	○	○	○	○
When I post it is because I think that if I post more, I will do better in the course	○	○	○	○	○
When I post it is because I like the instructor	○	○	○	○	○
When I post it is because I still need to learn more about the course	○	○	○	○	○
When I don't post it is because I learned the course content outside of class	○	○	○	○	○
When I post it is because I want to make an impression on my instructor	○	○	○	○	○
When I don't post it is because I think that my skills are beyond this class	○	○	○	○	○

Open

Please add any other reason that plays an important role in your decision to post or not.

Page Break

Thank You Page | Thank you for participating in this survey;Questions? Contact: Brian J. Arnolda

For inquiries contact:

Brian J. Arnold
arnol100@msu.edu
310 425 5822

END SURVEY

APPENDIX B: Data Collection Protocols

This appendix chronicles the protocols followed while collecting study data.

- Responses from students who did not take the course online were omitted.
- Responses with incomplete names were omitted if they could not be isolated by the date that the course was taken.
- Redundant or incomplete student survey responses were discarded.
- Participant names and data were manually matched from Survey to LMS activity report. When a match was imperfect, triangulated using the month that the course was taken and date survey was taken, if still imperfect, the results were discarded.
- When all activity was labeled NULL, student records were checked and often LMS activity reports could be used to isolate missing data. When this was not possible, the response was discarded.
- Initial Data report showed NULL data for any student who changed sections after enrolling, this required a second round of reports to be run costing additional time.
- Some students filled out the survey, then dropped out of ENG100 to re-enroll later. The most recent successful enrollments were used when possible.
- When students filled out the survey but earned an F their participation was further examined. If they showed no evidence of finishing the course their data was removed. If they completed the course but failed then they were included. The threshold for examining this phenomenon was a final adjusted grade below 60%. Initially 13 participants were flagged as achieving 60% or below in the course, 11 below 40%.

- When survey or course results were triggered by enrollment or starting the survey, but no data was generated in either, they were discarded. If survey responses contained data, but course activity was low, (clicks, but no submissions) results were kept.
- Names were stripped from spreadsheets leaving participants identified with a randomly assigned three digit unique “participant” number.
- Some ENG100 section point totals differed from standard. Participant achievement is still calculated as a percentage of total possible points for that section of that course.

APPENDIX C: ENG 100 Course Details

This appendix details the four-week English 100 (ENG 100) course at National University in terms of AOD posts (Table 6), AOD topics and assignment topics (Table 7). ENG 100 is a four week course required for NU undergraduates.

In terms of posts, students were required to post a response to a discussion prompt 3 times in week 1, once in week 2, four times in week 3 and twice in week 4. A total of 25 peer response posts were required bringing the total number of required posts to 35.

In terms of topics, week 1, students were required to write about the ethics of their chosen major, summarize an article and an opening paragraph to their paper. Week 2 they were required to write an annotated bibliography, three sandwich quotes, (intro, quote and unpacked) and submit a rough outline of their paper. Week 3 students were required to write five possible paper titles along with a rough draft of the paper. Finally in week 4 students submitted their final paper.

Students were evaluated based on the following course outcomes:

- Identify main idea and themes in reading.
- Apply patterns of academic discourse to formal essays.
- Paraphrase and summarize source language.
- Generate unified and coherent formal essays.
- Develop paragraphs with clear topic sentences, supportive examples and evidence, and concluding sentences.
- Write clear thesis statements, supportive body paragraphs, introductions and conclusions.
- Write on a focused topic.
- Incorporate source material into sentences in accordance with the conventions of textual appropriation and citation.

- Use effective revising and editing strategies in revising one's own work and the work of peers.
- Write clear, effective sentences in accordance with the conventions of Standard English and college-level academic writing.

APPENDIX D: Correlation Matrix

Table 12

Spearman's Two Tailed Listwise Correlation of Survey Questions

	Learn 1	Learn 2a	Learn 2b	Learn 3a	Learn 3b	Learn 3c	Learn 4a	Learn 4b	Learn 5	Learn 6a	Learn 6b	Learn 6c	Lurk 1a	Lurk1b	Lurk1c	Lurk2	Lurk 3	Lurk 4	Lurk 5	Lurk 6	Motive 1a	Motive 1b	Motive 2a	Motive 2b	Motive 3	Motive 4	Motive 5a	Motive 5b
Learn1	1.00	-0.08	**0.47**	0.00	0.02	-0.04	**0.45**	**0.51**	0.07	0.22	-0.02	-0.08	-0.18	0.01	0.05	**0.37**	-0.11	0.01	-0.10	0.14	**0.38**	**0.33**	**0.41**	**0.48**	**0.39**	**0.47**	**0.39**	**0.41**
Learn2a	-0.08	1.00	**-0.23**	-0.07	**0.91**	**0.61**	-0.14	-0.03	**0.77**	-0.13	**0.37**	**0.29**	**0.44**	**0.57**	**0.49**	**-0.24**	**0.58**	**0.70**	**0.34**	0.19	-0.20	0.04	**-0.30**	-0.13	**-0.53**	**-0.28**	**-0.46**	**-0.24**
Learn2b	**0.47**	**-0.23**	1.00	0.07	-0.22	-0.14	**0.46**	**0.60**	-0.07	**0.38**	-0.23	-0.17	-0.17	0.00	-0.04	**0.36**	-0.02	-0.07	-0.03	**0.23**	**0.39**	**0.31**	**0.53**	**0.40**	**0.56**	**0.48**	**0.64**	**0.49**
Learn3a	0.00	-0.07	0.07	1.00	-0.16	-0.16	-0.14	0.02	-0.10	-0.01	0.03	-0.18	0.11	0.06	0.17	-0.12	-0.01	-0.05	-0.12	-0.02	-0.17	-0.12	-0.05	-0.08	0.09	**0.33**	0.17	0.19
Learn3b	0.02	**0.91**	-0.22	-0.16	1.00	**0.72**	-0.12	0.02	**0.78**	-0.07	**0.49**	**0.43**	**0.43**	**0.61**	**0.52**	-0.21	**0.56**	**0.67**	**0.43**	0.22	-0.17	0.08	**-0.25**	-0.12	**-0.47**	**-0.24**	**-0.43**	**-0.25**
Learn3c	-0.04	**0.61**	-0.14	-0.16	**0.72**	1.00	-0.07	0.16	**0.72**	-0.03	**0.49**	**0.67**	**0.28**	**0.57**	**0.40**	-0.12	**0.38**	**0.55**	**0.37**	0.21	-0.10	0.14	-0.14	-0.09	**-0.40**	-0.21	**-0.29**	-0.13
Learn4a	**0.45**	-0.14	**0.46**	-0.14	-0.12	-0.07	1.00	**0.54**	0.08	**0.32**	-0.09	-0.19	-0.04	-0.02	-0.17	**0.60**	-0.17	0.00	-0.07	**0.32**	**0.79**	**0.35**	**0.50**	**0.48**	**0.35**	**0.30**	**0.45**	**0.50**
Learn4b	**0.51**	-0.03	**0.60**	0.02	0.02	0.16	**0.54**	1.00	0.14	**0.30**	0.08	0.10	-0.08	0.12	0.01	**0.41**	0.04	0.15	-0.02	0.19	**0.45**	**0.34**	**0.44**	**0.43**	**0.27**	**0.41**	**0.24**	**0.46**
Learn5	0.07	**0.77**	-0.07	-0.10	**0.78**	**0.72**	0.08	0.14	1.00	0.01	**0.43**	**0.42**	**0.32**	**0.55**	**0.41**	-0.10	**0.49**	**0.72**	**0.31**	**0.29**	-0.01	0.14	-0.20	-0.03	**-0.35**	-0.15	**-0.24**	-0.17
Learn6a	0.22	-0.13	**0.38**	-0.01	-0.07	-0.03	**0.32**	**0.30**	0.01	1.00	0.07	0.08	0.06	-0.03	0.05	0.20	0.09	0.09	0.03	0.10	0.18	**0.31**	**0.23**	**0.27**	**0.28**	**0.33**	0.19	**0.54**
Learn6b	-0.02	**0.37**	-0.23	0.03	**0.49**	**0.49**	-0.09	0.08	**0.43**	0.07	1.00	**0.47**	0.20	**0.30**	**0.32**	**-0.26**	**0.46**	**0.34**	**0.29**	0.05	-0.15	0.21	**-0.26**	-0.07	**-0.31**	0.07	**-0.39**	-0.16
Learn6c	-0.08	**0.29**	-0.17	-0.18	**0.43**	**0.67**	-0.19	0.10	**0.42**	0.08	**0.47**	1.00	**0.25**	**0.36**	**0.38**	-0.13	**0.26**	**0.33**	0.09	0.03	-0.17	0.17	**-0.24**	**-0.27**	**-0.33**	**-0.25**	**-0.36**	**-0.23**
Lurk1a	-0.18	**0.44**	-0.17	0.11	**0.43**	**0.27**	-0.04	-0.08	**0.32**	0.06	0.20	**0.25**	1.00	**0.59**	**0.54**	-0.07	**0.40**	**0.40**	**0.29**	0.13	-0.14	0.03	-0.20	**-0.25**	**-0.38**	-0.17	-0.26	-0.12
Lurk1b	0.01	**0.57**	0.00	0.06	**0.61**	**0.57**	-0.02	0.12	**0.55**	-0.03	**0.30**	**0.36**	**0.59**	1.00	**0.72**	-0.05	**0.44**	**0.52**	**0.42**	0.23	-0.09	0.16	-0.07	-0.03	**-0.37**	-0.03	-0.16	-0.02
Lurk1c	0.05	**0.49**	-0.04	0.17	**0.52**	**0.40**	-0.17	0.01	**0.41**	0.05	**0.32**	**0.38**	**0.54**	**0.72**	1.00	-0.22	**0.48**	**0.54**	**0.23**	0.10	**-0.27**	0.11	**-0.25**	-0.16	**-0.37**	0.06	-0.20	-0.05
Lurk2	**0.37**	**-0.24**	**0.36**	-0.12	-0.21	-0.12	**0.60**	**0.41**	-0.10	0.20	**-0.26**	-0.13	-0.07	-0.05	-0.22	1.00	-0.17	-0.20	0.07	**0.31**	**0.70**	0.08	**0.51**	**0.46**	**0.36**	0.10	**0.39**	**0.56**
Lurk3	-0.11	**0.58**	-0.02	-0.01	**0.56**	**0.38**	-0.17	0.04	**0.49**	0.09	**0.46**	**0.26**	**0.40**	**0.44**	**0.48**	-0.17	1.00	**0.56**	**0.54**	0.17	**-0.25**	0.14	-0.21	0.00	**-0.31**	-0.09	**-0.31**	-0.18
Lurk4	0.01	**0.70**	-0.07	-0.05	**0.67**	**0.55**	0.00	0.15	**0.72**	0.09	**0.34**	**0.33**	**0.40**	**0.52**	**0.54**	-0.20	**0.56**	1.00	**0.36**	0.13	-0.15	0.09	-0.12	0.03	**-0.35**	-0.17	**-0.28**	-0.12
Lurk5	-0.10	**0.34**	-0.03	-0.12	**0.43**	**0.37**	-0.07	-0.02	**0.31**	0.03	**0.29**	0.09	**0.29**	**0.42**	**0.23**	0.07	**0.54**	**0.36**	1.00	0.13	-0.09	0.05	0.05	0.09	-0.21	-0.10	-0.14	-0.03
Lurk6	0.14	0.19	**0.23**	-0.02	0.22	0.21	**0.32**	0.19	**0.29**	0.10	0.05	0.03	0.13	0.23	0.10	**0.31**	0.17	0.13	0.13	1.00	**0.29**	**0.27**	0.11	0.15	0.06	-0.01	**0.26**	0.15
Motive1a	**0.38**	-0.20	**0.39**	-0.17	-0.17	-0.10	**0.79**	**0.45**	-0.01	0.18	-0.15	-0.17	-0.14	-0.09	**-0.27**	**0.70**	**-0.25**	-0.15	-0.09	**0.29**	1.00	0.16	**0.49**	**0.44**	**0.52**	0.13	**0.48**	**0.50**
Motive1b	**0.33**	0.04	**0.31**	-0.12	0.08	0.14	**0.35**	**0.34**	0.14	**0.31**	0.21	0.17	0.03	0.16	0.11	0.08	0.14	0.09	0.05	**0.27**	0.16	1.00	0.16	0.18	0.12	**0.35**	0.16	**0.28**
Motive2a	**0.41**	**-0.30**	**0.53**	-0.05	**-0.25**	-0.14	**0.50**	**0.44**	-0.20	**0.23**	**-0.26**	**-0.24**	-0.20	-0.07	**-0.25**	**0.51**	-0.21	-0.12	0.05	0.11	**0.49**	0.16	1.00	**0.76**	**0.53**	**0.31**	**0.47**	**0.45**
Motive2b	**0.48**	-0.13	**0.40**	-0.08	-0.12	-0.09	**0.48**	**0.43**	-0.03	**0.27**	-0.07	**-0.27**	**-0.25**	-0.03	-0.16	**0.46**	0.00	0.03	0.09	0.15	**0.44**	0.18	**0.76**	1.00	**0.33**	**0.29**	**0.35**	**0.50**
Motive3	**0.39**	**-0.53**	**0.56**	0.09	**-0.47**	**-0.40**	**0.35**	**0.27**	**-0.35**	**0.28**	**-0.31**	**-0.33**	**-0.38**	**-0.37**	**-0.37**	**0.36**	**-0.31**	**-0.35**	-0.21	0.06	**0.52**	0.12	**0.53**	**0.33**	1.00	**0.37**	**0.66**	**0.51**
Motive4	**0.47**	**-0.28**	**0.48**	**0.33**	**-0.24**	-0.21	**0.30**	**0.41**	-0.15	**0.33**	0.07	**-0.25**	-0.17	-0.03	0.06	0.10	-0.09	-0.17	-0.10	-0.01	0.13	**0.35**	**0.31**	**0.29**	**0.37**	1.00	**0.29**	**0.48**
Motive5a	**0.39**	**-0.46**	**0.64**	0.17	**-0.43**	**-0.29**	**0.45**	**0.24**	**-0.24**	0.19	**-0.39**	**-0.36**	**-0.26**	-0.16	-0.20	**0.39**	**-0.31**	**-0.28**	-0.14	**0.26**	**0.48**	0.16	**0.47**	**0.35**	**0.66**	**0.29**	1.00	**0.47**
Motive5b	**0.41**	**-0.24**	**0.49**	0.19	**-0.25**	-0.13	**0.50**	**0.46**	-0.17	**0.54**	-0.16	**-0.23**	-0.12	-0.02	-0.05	**0.56**	-0.18	-0.12	-0.03	0.15	**0.50**	**0.28**	**0.45**	**0.50**	**0.51**	**0.48**	**0.47**	1.00

BOLD = $p < 0.05$

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