READY, SET, CLICK! EXPLORING ONLINE LEARNING IN AGRICULTURE STUDENTS BY CLASS FORMAT, GENDER, AND ACADEMIC LEVEL

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Abstract

This study examines students' perceptions of their online learning readiness, with a focus on interactions between in-person and online course formats, gender, and academic level. Utilizing the Online Learning Readiness Scale (OLRS), which measures computer/internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy, this study aims to understand students' perceived preparedness for the evolving online learning environment. The study was conducted with 79 undergraduate students enrolled in an online and in-person agricultural education, leadership, and communication course from Fall 2023 to Spring 2024. Self-directed learning emerged as a perceived strength, while learner control was identified as a potential area for improvement. Gender differences were observed, with females scoring higher in self-directed learning, motivation for learning, and online communication self-efficacy. Additionally, the interaction between academic level and course format had a significant impact on scores for self-directed learning and learner control. These findings suggest the importance of tailoring online courses to address learner control issues, recognizing gender-specific needs, and adapting courses based on student level and delivery format. These considerations will help educators foster a more inclusive, effective, and supportive online learning experience for all students.

Keywords: online learning readiness, agricultural education, virtual classroom, self-directed learning, learner control

Online learning is instruction meant to support learning and delivered via a digital device with access to the Internet (Clark & Mayer, 2023; Hoi et al., 2021). To comply with the social distancing measures of the COVID-19 pandemic, many higher education institutions shut down their campuses and transitioned to online learning to continue offering educational services (Toquero, 2020). During this troublesome time, online learning became popular due to its ability to offer more flexible access to material and teaching at any time, from any location, and a feasible alternative to combat the lack of resources, facilities, and equipment in higher education institutions (Castro & Tumibay, 2021). The unexpected and unprecedented transition from in-person to online learning was rough, and the ease of this transition became a measure of organizational agility (Tribble et al., 2022).

The transition to online learning exposed resource shortages and student marginalization as limited internet access and outdated technology hindered responsiveness and engagement (Zhong, 2020). Higher levels of computer and communication skills and motivation are needed for online learning than for traditional classroom learning (Cuadrado-García et al., 2010; Hartnett, 2016; Sun et al., 2020), making it a challenge for many students. It is not correct to assume that all Gen Zers—people who were born between 1990-2010 that make up around 32% of the world's population—(Bulanda & Vavrecka, 2019; Van der Bergh & Behrer, 2016; Van der Bergh et al., 2024), are proficient with technology. Despite Gen Z being the first generation to grow up with constant access to the internet (Seemiller & Grace, 2016), it does not imply that Gen Zers are automatically prepared for online learning.

Academic institutions are under more pressure to update their curricula, and implementing innovative teaching techniques and tactics must be a top priority (Toquero, 2020). Therefore, measures must be developed to assess students' readiness for this changing learning environment (Chung et al., 2020). Mailizar et al. (2020) urged upcoming researchers to assess how students view online learning, identify the difficulties they encounter, and, above all, amplify their voices on a matter that directly impacts students. In other words, Mailizar et al. (2020) referred to students' online learning readiness, the capacity to communicate with peers, and technical proficiency in word processing and Learning Management Systems software (LMS) (Morrison, 2003; Yu, 2014).

There is a dearth of literature regarding students' online learning readiness (Tang et al., 2021), especially for agriculture majors. Evaluating online learning readiness can help instructors create better online courses and direct students toward rewarding online learning experiences (Demir Kaymak & Horzum, 2013). In-person classes cannot solely be digitalized for online learning; these classes need to be redesigned to promote students' individual and collaborative learning with activities specifically designed for virtual platforms (Tang et al., 2021). A crucial aspect of achieving an efficient and successful online learning environment is to measure students' online learning readiness and design the course considering their strengths and weaknesses (Hung et al., 2010). This study assessed students' online learning readiness to ascertain which areas students struggle with the most and how their level of preparedness is influenced by class format, gender, and academic level.

Conceptual Framework

Warner et al. (1998) first introduced the concept of online learning readiness (OLR) (Figure 1) in Australian vocational education, defining it as a preference for online delivery, skill in using online tools, and ability to engage online as effectively as face-to-face. Building on this, Hung et al. (2010) developed the Online Learning Readiness Scale (OLRS) with five constructs: computer/internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy. These constructs reflect students' abilities and attitudes toward technology use, autonomous learning, managing online distractions, motivation, and online interaction comfort (Hung et al., 2010).

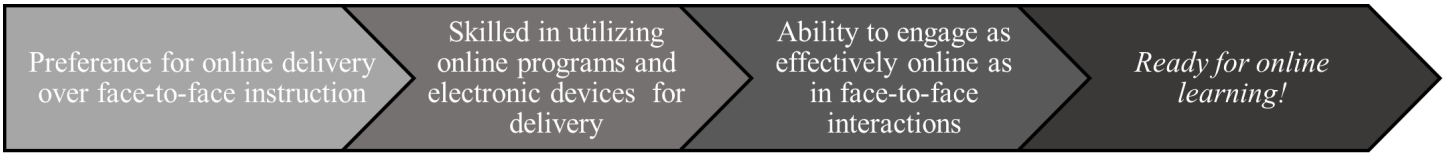
Hung et al. (2010) found that Taiwanese college students rated computer/internet self-efficacy highest and learner control lowest, with seniors showing greater confidence in several areas. Gender differences were not significant. Similarly, Chung et al. (2020) in Turkey reported comparable findings, with students most confident in computer/internet self-efficacy and least confident in learner control, though some differences emerged by student level. Most Turkish students preferred face-to-face learning but showed interest in training to improve online readiness (Chung et al., 2020). Hergüner et al. (2020) examined the relationship between Online Learning Attitudes (OLA) and OLR, finding a positive correlation and suggesting these may be generational rather than dependent on academic major or institution. Forson and Vuopala (2019) reported generally positive attitudes toward online learning among virtual learners in Ghana.

Contrasting results came from Sakal (2017) and Rafique et al. (2021). Sakal found males had higher online communication self-efficacy and that major influenced scores, though some OLRS dimensions showed low reliability. Rafique et al. found motivation for learning highest, gender differences favoring males in some constructs, and that age, GPA, and enrollment level affected readiness. These findings conflict with those of Hung et al. (2010), Chung et al. (2020), and Hergüner et al. (2020), who observed no significant gender or major differences, suggesting possible cultural influences (Rafique et al., 2021; Sakal, 2017).

The existing literature highlights key dimensions of online learning readiness and reveals some variations based on student demographics and cultural contexts (Chung et al., 2020; Hung et al., 2010; Rafique et al., 2021). However, gaps remain in understanding how these factors specifically influence agricultural education students, particularly across different class formats, genders, and academic levels. The following section presents the research questions that guided this study.

Figure 1

Conceptual framework for online learning readiness (adapted from Warner et al., 1998)



Research Questions

This study aims to understand students' perceived preparedness for the evolving online learning environment using the OLRS instrument. The following research questions guided this study.

1. Using the five components of the online learning readiness scale, to what extent do undergraduate students within the AELC major/minor degree program perceive themselves to be prepared for online learning?
2. How do the five components of the online learning readiness scale differ between class formats (in-person and online) among undergraduate students within the AELC major/minor degree program?
3. How do the five components of the online learning readiness scale differ according to gender and academic level among undergraduate students within the AELC major/minor degree program?

Methods

This study utilized the 18-item Online Learning Readiness Scale (OLRS) developed by Hung et al. (2010), which comprises five validated constructs: computer/internet self-efficacy (3 items), self-directed learning (5 items), learner control (3 items), motivation for learning (4 items), and online communication self-efficacy (3 items). The OLRS has been validated across multiple international contexts, including Taiwan (Hung et al., 2010), Malaysia (Chung et al., 2020), Turkey (Hergüner et al., 2020; Sakal, 2017), and Pakistan (Rafique et al., 2021).

The instrument was adapted to an online Qualtrics survey optimized for smartphones, computers, and tablets. The survey was distributed via email and the Canvas LMS platform to undergraduate students enrolled in AELC courses during Fall 2023 (n = 27), Winter 2023 (n = 4), and Spring 2024 (n = 48), yielding a total sample of 79. Data collection occurred during the third and fourth weeks of each semester. Responses were measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), and results were scaled to 20 points.

Participation was limited to U.S. residents aged 18 or older. The study received Exemption Determination (IRB-23-340) from the Institutional Review Board at Mississippi State University. Participation was voluntary, with bonus points offered in AELC courses to encourage responses. Descriptive statistics, MANOVA, and factorial MANOVA analyses were conducted using IBM SPSS v.29, with significance set at $p \leq 0.05$. Descriptive statistics also summarized the demographic characteristics of respondents.

Results

Demographics

Seventy-nine students completed the survey, of which nine survey responses were incomplete. Of the 79 students that completed the survey, 74 answered the gender question, most of whom were females at 53% (f = 39) with the remaining being males at 45% (f = 33), and other at 2% (f = 2). However, these two cases were treated as outliers and were excluded from the rest of the analyses to mitigate their impact. Seventy-four students provided their age, of which 95% were between the ages of 18-24 years old (f = 70) and 5% were 25 years old or older (f = 4). For the academic level, 73 participants responded, and 51% identified as juniors (f = 37), 35% as seniors (f = 26), with the remainder either as freshmen (7% or f = 5) or sophomores (7% or f = 5). Due to the limited numbers of freshmen and sophomores, these two groups were consolidated for analysis. For class format, 72 participants responded with 78% enrolling in in-person classes (f = 56) and 22% in virtual classes (f = 16).

Research Question 1

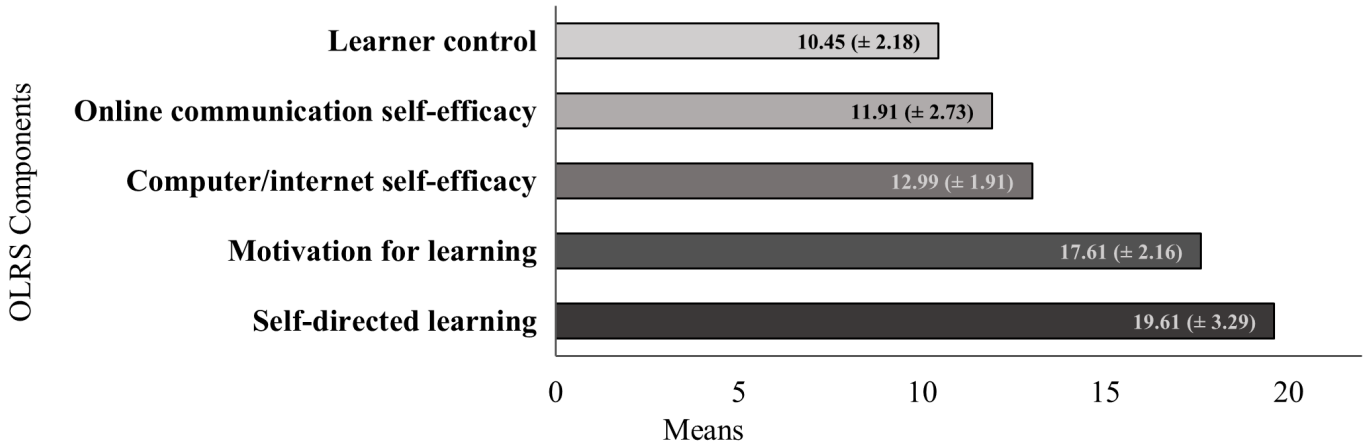
Research question one sought to determine the extent to which undergraduate students within the AELC major/minor degree program perceive themselves to be prepared for online learning. Descriptive statistics (means and standard deviations) were used to determine respondents' ratings of each of the five components of the OLRS instrument—computer/internet self-efficacy (M = 12.99, SD = 1.91); self-directed learning (M = 19.61, SD = 3.29); learner control (M = 10.45, SD = 2.18); motivation for learning (M = 17.61, SD = 2.16); and online communication self-efficacy (M = 11.91, SD = 2.73). Cronbach's alpha was used to determine reliability over all items, and the test value was 0.74, which suggests an acceptable reliability level (Fornell & Larcker, 1981). Figure 2 illustrates that self-directed learning was the component students perceived themselves to be most prepared for, followed by motivation for learning, computer/internet self-efficacy, online communication self-efficacy, and learner control being the ones they agreed the least.

Research Question 2

Research question two sought to examine what differences, if any, existed between class formats (in-person and online) regarding the five constructs of the OLRS instrument. This analysis treated class format (in-person (f = 56) and online student (f = 16)) as the independent variables. The dependent variables were the scores of the five constructs of the OLRS instrument. A MANOVA analysis was conducted, and Wilkes' Lambda was used to determine if any significant differences were present. The results demonstrated that there was no statistically significant difference in the OLRS components based on in-person and online students, F (5, 64) = 1.70, p > 0.05; *Wilk's* Λ = 0.884, partial $\eta 2$ = 0.12.

Figure 2

Means of OLRS components from least to most prepared



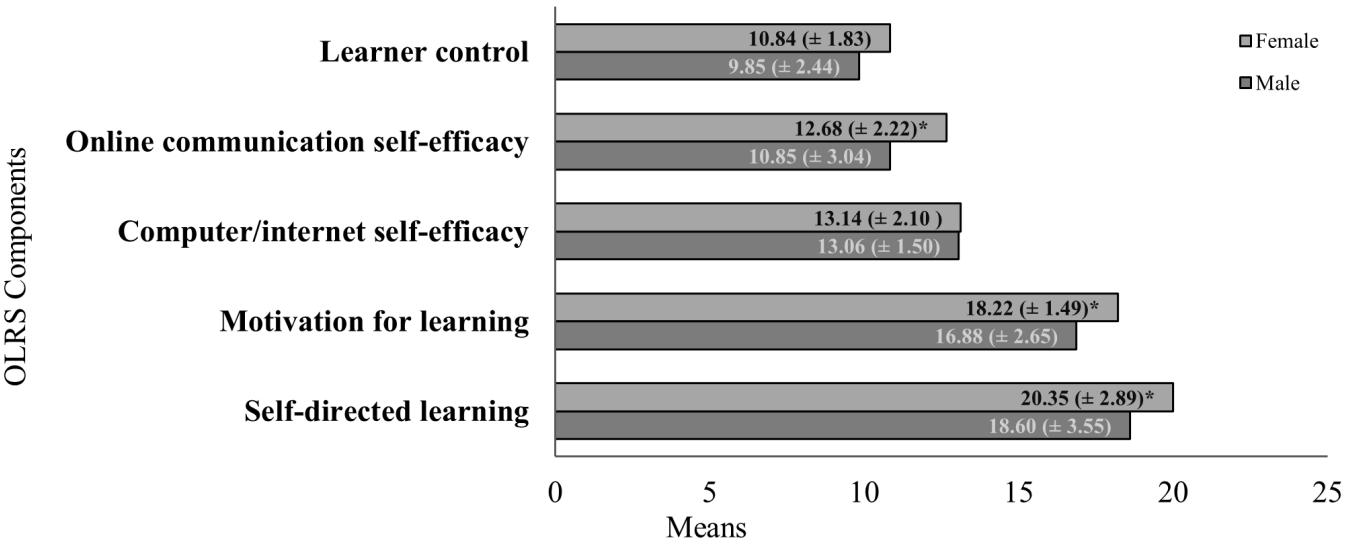
Research Question 3

Research question three examined potential differences in perceived online learning readiness among gender and academic level. This analysis treated gender (male, *f* = 33; female, *f* = 39) and academic level (freshmen/sophomore, *f* = 10; junior, *f* = 37; and senior, *f* = 26) as the independent variables. Furthermore, this analysis considered in-person freshmen/sophomore (*f* = 7), virtual freshmen/sophomore (*f* = 4), in-person juniors (*f* = 35), virtual juniors (*f* = 3), and in-person seniors (*f* = 18), virtual seniors (*f* = 10). To address this question, two additional MANOVA analyses were used where gender and academic level were the independent variables and the five constructs of the OLRS instruments were the dependent variables.

The second MANOVA analysis demonstrated that there was a statistically significant difference in the OLRS components based on gender, F (5, 64) = 2.44, $p < 0.05$; *Wilk's* Λ = 0.840 partial $\eta 2$ = 0.16, specifically for self-directed learning, motivation for learning, and online communication self-efficacy. Figure 3 shows that females scored significantly higher for these three constructs. The third MANOVA analysis demonstrated that there was no statistically significant difference based on academic level, F (15, 168) = 0.901, $p > 0.05$; *Wilk's* Λ = 0.808, $\eta 2$ = 0.68).

Figure 3

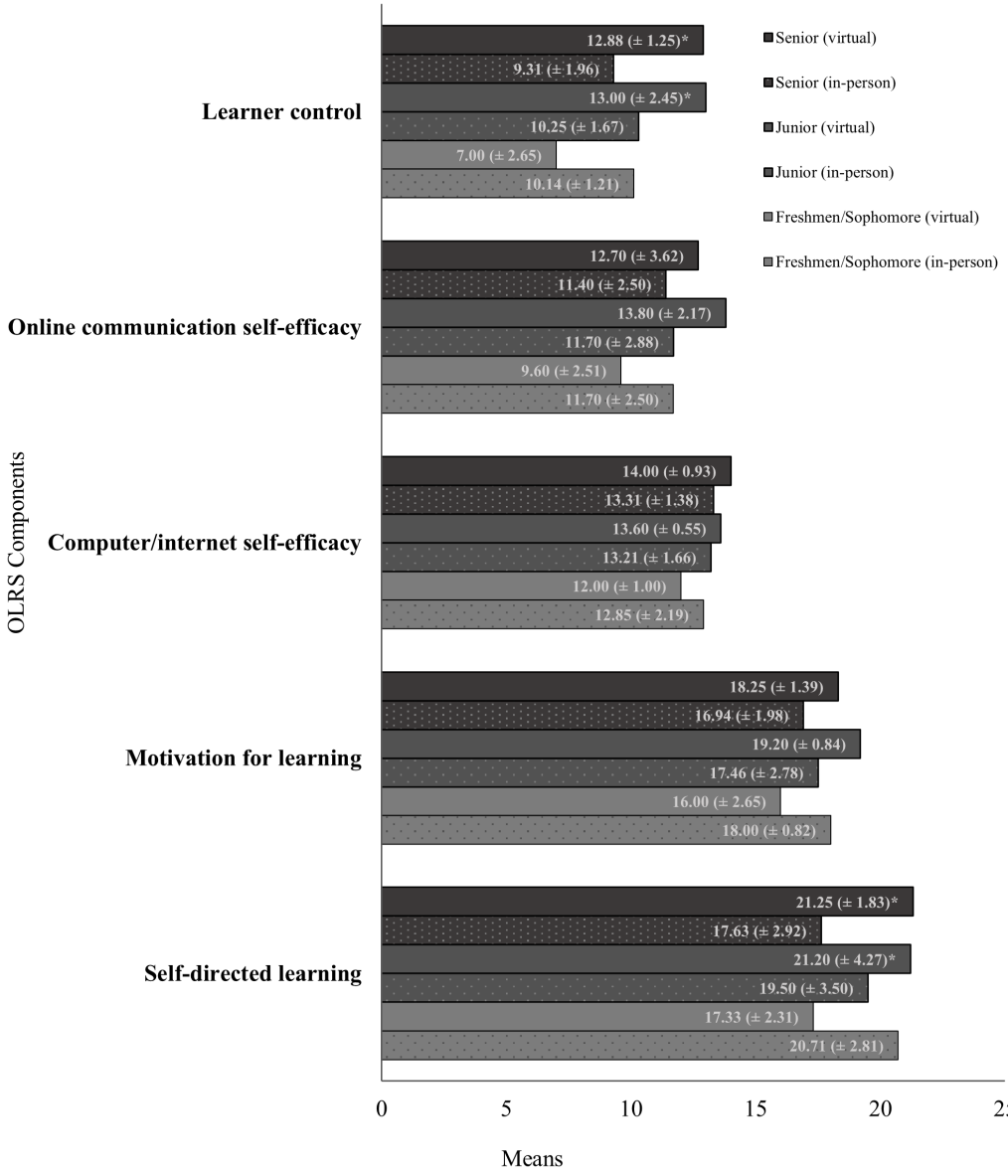
Means of OLRS components based on gender, from least to most prepared



Additionally, a factorial analysis was performed to examine the following interactions: 1) OLRS and class format*gender, and 2) OLRS and class format*academic level. The first interaction was not statistically significant, F (5, 60) = 0.449, $p > 0.05$; *Wilk's* Λ = 0.964, partial $\eta 2$ = 0.36. Contrastingly, the second interaction was statistically significant, F (10, 114) = 2.216, $p < 0.05$; *Wilk's* Λ = 0.701, partial $\eta 2$ = 0.163, specifically for self-directed learning and learner control. Figure 4 shows that virtual juniors and seniors scored significantly higher for self-directed learning and learner control compared to virtual freshmen/sophomores and in-person freshmen/sophomores, juniors, and seniors. For the self-directed learning and learner control constructs, in-person means were significantly higher for freshmen/sophomores, whereas virtual means were higher for juniors and seniors.

Figure 4

*Means for OLRS components for the class format*academic level interaction*



Discussion

Student Perceptions

Learner control, the ability to interact with course content as students see appropriate (Scheiter & Gerjets, 2007; Bétrancourt & Benetos, 2018), was the online learning readiness component on which students perceived themselves to be the least confident. The results were consistent with previous research (Chung et al., 2020; Hung et al., 2010; Monil et al., 2022; Naji et al., 2020; Rafique et al., 2021). The greater the mean score obtained from comparing the five OLRS components, the more prepared the students felt they were for online learning (Hung et al., 2010). The biggest challenge that online learners faced was

distractions from other online activities, which deterred their focus from the course content (Chung et al., 2020). Discipline plays a key role in ignoring online distractions (Lin & Hsieh, 2001), which prompts the question if reinforcing discipline in the virtual learning realm can encourage learner control. Increasing learner control has been linked to higher levels of self-motivation and self-direction (Martin et al., 2020), but our findings showed that most participants perceived themselves as self-directed learners, despite a low rate of learner control. These findings contradict Hung et al. (2010). A possible explanation for this finding could be the strategy used to deliver the course content. If instructional videos are the main source of information delivery, then instructors run the risk of overloading students with limited working memory capacity, also known as the transient information effect (Yu et al., 2023). Providing students with the chance to actively engage with the course material may help them feel more in charge of their education and support their independent study.

Lastly, this study used Qualtrics exclusively for survey distribution, which may have influenced responses on computer/internet self-efficacy. Students with lower digital skills might have been disadvantaged by the online format. While mixed-mode surveys (online and paper) could reduce this bias, they were not feasible at the time of data collection due to logistical challenges. Future studies should consider alternative formats to address this limitation.

Class Format

Our study did not find any statistically significant results for the interaction between class format (i.e., in-person versus virtual) and online learning readiness. Therefore, we cannot suggest that students who enroll in online classes will be more prepared for online learning than those enrolled in in-person classes. However, Forson and Vuopala (2019) found that students enrolled in distance education had a positive attitude towards online learning. The AELC program at Mississippi State University does not offer a distance education route for undergraduate students but does for part-time graduate students. Distance learners are commonly referred to as adults who have work and study responsibilities and are not considered full-time students (Nasir et al., 2020). Our results suggest that class format is not an issue, in terms of online learning readiness for undergraduate students, but perhaps it might be for graduate students. Future studies can address this possibility.

Our study did not find any statistically significant results for the interaction between gender and online learning readiness. Contrastingly, the interaction between academic level and online learning readiness was statistically significant for self-directed learning and learner control. In-person means were higher for freshmen/sophomores whereas virtual means were higher for juniors and seniors for both OLRS components. These findings suggest that academic level (year of study) plays a significant role in learner control (Hung et al., 2010) and self-directed learning when it interacts with class format. Students tend to become more responsible for their learning as they advance in their programs (Hung et al.). However, when students are starting their academic programs, they may overestimate their learning capabilities which may explain why in-person means were higher for freshmen/sophomores. It is possible that these students are not aware of what they do not know yet. This possibility can be addressed in future investigations.

Academic Level

Our study did not find any statistically significant results for the interaction between academic level (i.e., freshmen/sophomore, junior, and senior) and online learning readiness. This contradicts the findings of Hung et al. (2010), Chung et al. (2020), and Rafique et al. (2021). These researchers found that more experienced students perceive themselves to be better prepared for online learning, but our findings do not support this statement.

Gender

Our study suggests that females perceived themselves to be more prepared for online learning than males, specifically for self-directed learning, motivation for learning, and online communication self-efficacy. Martin et al. (2020), Chung et al. (2020), Hung et al. (2010), and Atkinson and Blankenship (2009) found no significant differences in gender, which contradict our findings. Distinctly, Asampana et al., (2024) conducted a study during the COVID-19 pandemic restrictions and found that males were more prone to adopt virtual learning than females. This suggests that perceptions of online learning changed because of the COVID-19 pandemic restrictions. However, in our study, a possible explanation for females' higher perceptions could be due to their higher learning engagement (Korlat et al., 2021), which could stem from their higher academic competence beliefs since their adolescence (Britner & Pajares, 2001). Similarly, females tend to be more comfortable and successful in conveying their thoughts through virtual media than males (Muhtar, 2021). According to Furumo and Pearson (2007), females reported higher trust in virtual communication than males, and thus, females tend to be more influential in virtual formats. However, the authors discussed that cultural backgrounds could also influence online communication self-efficacy. This conclusion coincides with the findings of Zhang and Juvrud (2024). Contrastingly, Sakal (2017) and Rafique et al. (2021) found gender differences that favored male students. Our study did not account for race, ethnicity, country of origin, or native language. We encourage future researchers to incorporate these factors.

Summary

This study used the OLRS instrument developed by Hung et al. (2010) to examine the perceived online learning readiness of undergraduate AELC students at Mississippi State University enrolled in either in-person or virtual sections of agricultural education, leadership, and communication courses. The findings suggest that in general, students within the sample population felt confident in their online learning readiness. These students felt they were self-directed learners but reported that they may lack control in an online learning environment, being possibly unable to resist distractions or establish a schedule to be successful in an online class. Future research should be conducted to determine what support, if any, instructors are using to promote learner control within online classroom settings. In-service instructors should consider providing resources or advice to online students about how to limit distractions while interacting with course material and tips for establishing a consistent schedule to interact with course content.

No significant differences were found between online and in-person students' perceived levels of online learning readiness, even when gender was considered, meaning the perceived levels of online learning readiness for in-person male and female students were consistent with the levels of their virtual peers. However, there were significant differences between the scores of males and females, regardless of class type. The findings show that females perceived themselves to be more prepared for online learning than their male classmates in the areas of self-directed learning, motivation for learning, and online communication self-efficacy. These findings are interesting considering the current body of work using the OLRS instrument because while two studies have shown gender differences favoring male students (Rafique et al., 2021; Sakal, 2017), none of the other previous studies have found significant differences favoring females.

While no significant differences in perceived online learning readiness were found along the lines of academic level, when class type (virtual or in-person) was also considered, a significant interaction was observed. This study found that in-person freshmen and sophomores rated themselves higher in the areas of self-directed learning and learner control. On the other hand, virtual juniors and seniors believed themselves more confident in both categories. Our other results show that there was no significant difference for class type or academic level when these factors were considered independent of one other. More research is needed to understand why the findings are significant when these factors interact.

Future studies may wish to add a qualitative component such as focus groups or interviews with outliers to help put this interaction into perspective. It is also possible that students' experiences with virtual learning during the COVID pandemic lockdowns are interfering with these results. The group of students that participated in this study has had more experience with online learning during their time in secondary education due to necessity. Future studies examining differences along the lines of academic level and class format may see different results as many secondary schools have returned to their pre-COVID educational norms. For practitioners, these results could indicate that in-person underclassmen would be successful should instructors wish to implement teaching techniques that require a higher degree of outside-of-class independent learning, such as the flipped classroom approach.

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