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Comparing Learning Modalities: How Motivation and Learning Approaches Shape Academic Achievement

David Paulik
Cuyahoga Community College

Abstract

The hurried shift to online learning during the COVID-19 pandemic significantly disrupted traditional learning paradigms for students, methods of instruction for faculty, and measurement of student success for administrators. The adaptability of existing online learning approaches did not withstand the significant pressures of the pandemic-forced transition. Despite a growing interest and literature base in online learning before the pandemic, additional challenges were uncovered in the quick transition to online learning, reflecting gaps in equitable access to learning across modalities. This commentary serves two purposes: First, it describes the psychological underpinnings of effective learning, including motivational factors and cognitive factors underlying strategies employed by students for self-regulated learning. Second, this article provides examples of practical applications from the existing educational and psychological scholarship concerning the role of student motivation and student learning behaviors that promote learning achievement across modalities.

Keywords: educational outcomes, learning strategies, modality, motivation, face-to-face learning, online learning, self-regulated learning, student engagement, academic achievement

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The COVID-19 pandemic ushered in a new era in higher education by forcing colleges and universities to shift rapidly from predominantly face-to-face instruction to large-scale online and hybrid modalities (Aristovnik et al., 2023; Blizak et al., 2020). Faculty and students were forced to adapt without adequate preparation with effective online pedagogy or readiness for remote learning (Bailey & Lee, 2020; Wieland & Kollias, 2020). Despite the accelerated shift to online modalities and the increased enrollment in online sections since the pandemic, there remains a gap in understanding the most effective ways to promote student learning across multiple modalities. Addressing this gap is crucial to promote targeted interventions that ensure equitable learning experiences and improved academic success. For example, many instructors in STEM courses struggled with adapting laboratory sessions to virtual formats, contributing to higher levels of student disengagement (Allen & Barker, 2021; Hou et al., 2021; Wang et al., 2020).

This commentary starts by reviewing how the pandemic influenced instructional methods, then explores the psychological factors affecting learning, and concludes with practical recommendations for educators navigating both online and face-to-face classroom environments. For this commentary, online courses are defined as entirely asynchronous (i.e., no set meeting times on campus or virtually), while face-to-face courses are those that involve total instructional delivery occurring on campus. The benefits of hybrid modalities are also examined.

Data from the Integrated Post-Secondary Education Data Systems (IPEDS) indicates a gradual increase in online enrollment before the pandemic. Widespread COVID-19 shutdowns led to an unprecedented surge in online courses for colleges and universities nationwide. Enrollment trends in online courses remain elevated post-pandemic, reflecting increased student demand for flexible learning options. Table 1 presents online enrollment trends across public four-year and two-year institutions from 2018 to 2023, showing the significant increase in online enrollment in 2020. By 2021, as institutions reopened their campuses, the demand for online and hybrid course options remained higher than before the pandemic. The ongoing demand for online education suggests that remote learning options are no longer viewed as temporary but will remain a permanent modality in higher education.

Table 1
IPEDS Data Regarding Enrollment in Online Courses from 2018-2023

Year	Institution Type	Enrolled Exclusively Online	Enrolled Partially Online	Not Enrolled Online
2023	Public, 4-year college/university	19.4%	34.3%	46.3%
	Public, 2-year college	29.3%	27.3%	43.3%
2022	Public, 4-year college/university	19.5%	34.3%	46.1%
	Public, 2-year college	31.3%	26.6%	42%
2021	Public, 4-year college/university	23.1%	37.8%	39.1%
	Public, 2-year college	40.3%	25.3%	34.4%
2020	Public, 4-year college/university	46.3%	34.2%	19.5%
	Public, 2-year college	48.2%	21.4%	30.4%
2019	Public, 4-year college/university	12.3%	23%	64.7%
	Public, 2-year college	14.9%	21.6%	63.6%
2018	Public, 4-year college/university	11.5%	22.3%	66.2%
	Public, 2-year college	13.8%	20.5%	65.7%

Note. This table contains data collected from the Integrated Post-secondary Education Data Systems (IPEDS) maintained by the National Center of Education Statistics in the US Department of Education.

This commentary synthesizes fundamental educational and cognitive research on student motivation, cognitive strategies, and self-regulated learning to discuss how these psychological factors affect student success across various learning modalities. Specifically, this commentary aims to:

1. Examine the psychological underpinnings of effective learning, including motivation, self-regulation, and cognitive strategies.
2. Describe how student motivation and learning behaviors impact achievement in online versus face-to-face learning modalities.
3. Identify practical strategies for faculty and IHEs to support students in various instructional modalities.

Before the COVID-19 pandemic, online education emerged as a favorable option for nontraditional students needing to balance work and family commitments that limited their ability to attend in-person classes (e.g., Jaggars, 2014; Kim et al., 2005). However, the rapid shift to online learning for a larger segment of the student population led to mixed results. While some students thrived in the online environment, others struggled to achieve academic success, resulting in higher attrition rates compared to face-to-face courses (Lopez & Tadros, 2024).

Modality Influences on Academic Achievement

Research on student achievement in online versus face-to-face courses presents mixed findings, demonstrating the significance of contextual factors in determining academic success (Means et al., 2013). While some students excel in the online environment, others encounter

challenges that contribute to higher withdrawal and attrition rates compared to traditional face-to-face courses (Allen & Seaman, 2013; Bettinger et al., 2017; Ferguson, 2020; Smith & Ferguson, 2005). A critical factor influencing the discrepancies in success rates between online and face-to-face courses is student self-regulation. Online courses require stronger self-regulatory skills, including time management, monitoring, and learning strategies, which can be challenging for students needing autonomy (Yukselturk & Bulut, 2007). Research indicates that students with strong self-regulatory skills perform better in online courses than in face-to-face courses, while those who struggle with self-regulation tend to fall behind or withdraw (Means et al., 2013; Yukselturk & Bulut, 2007).

In addition to student-level characteristics, course-level factors and instructor characteristics also impact student success in online modalities. Courses with a clear structure, interactive elements, and regular instructor feedback are associated with higher engagement and academic achievement (Alquarashi, 2019; Fearnley et al., 2022). Regular, timely feedback, virtual office hours, and digital presence enhance the perceived instructor presence in online courses. A higher perceived instructor presence is linked to improved student retention and satisfaction (Alqurashi, 2019).

Student achievement is not the only indicator of differences between course modalities. In an analysis of a biology course, Bonney (2024) found varying student perceptions of learning experiences between online and face-to-face activities. Although Bonney (2024) did not find differences in exam scores across modalities, student attitudes toward specific learning activities did vary. Students reported that online lab activities were beneficial due to digital access to lab materials. They also placed a higher value on face-to-face discussions, emphasizing the importance of social interaction in education.

These findings align with existing literature on student engagement, indicating that course format influences learning outcomes and the perceived value of instructional activities (Fearnley et al., 2022). While online courses offer flexibility and greater access, course design, perceived instructor presence, and robust student support are crucial for enhancing student achievement.

Factors Influencing Student Learning

Student learning is influenced by both individual characteristics and instructional design elements. Research on student-level outcomes from online and face-to-face instruction has increased over the past 20 years (e.g., Castro & Tumibay, 2021; Darius et al., 2021; Soffer & Nachmias, 2018). The literature emphasizes two primary dimensions that shape student achievement across modalities: student-level factors (e.g., motivation, self-regulation, cognitive strategies) and course-level factors (e.g., structure, interaction, and support).

Student-Level Factors

Intrinsic motivation strongly predicts academic success, regardless of the learning modality. Students who learn for the sake of learning rather than for external rewards (e.g., grades) tend to adopt deeper learning strategies compared to those motivated by external factors (Deci & Ryan, 1985; Shillingford & Karlin, 2013). Intrinsically motivated students are also more likely to be effective self-regulated learners. Self-regulated learning (SRL) is a framework that

involves setting goals, managing behaviors, and evaluating the achievement of those goals (Schunk & Greene, 2017). Students who employ SRL strategies take greater responsibility for their learning. These elements contribute to increased academic achievement (Schunk & Greene, 2017). Students who struggle with self-regulation are at a higher risk of procrastination and disengagement, which can lead to poorer academic outcomes in both online and face-to-face courses (Yukselturk & Bulut, 2007).

The use of deep learning strategies (i.e., self-testing, elaborative rehearsal, distributed practice) is associated with higher academic achievement than surface-level strategies (i.e., rereading, highlighting) despite some variation due to student characteristics and discipline content (Broadbent & Poon, 2015; Hattie & Donoghue, 2016). Online learning environments often require students to possess stronger metacognitive skills to navigate the learning process with greater autonomy than face-to-face courses (Broadbent & Poon, 2015). Students who utilize effortful cognitive strategies achieve higher academic success in both online and face-to-face modalities, whereas those relying on surface-level approaches tend to struggle more in asynchronous online environments (Broadbent & Poon, 2015; Dunlosky et al., 2013; Neroni et al., 2019; Ruffing et al., 2015).

Course-Level Factors

Effectively designed courses incorporate clear organization, structured activities, and interactive elements, contributing to better learning outcomes (Means et al., 2013). Online courses, however, require more intentional scaffolding than face-to-face instruction due to a diminished instructor presence in the virtual classroom (Ferguson, 2020). As noted, evidence suggests that higher levels of instructor presence predict enhanced student satisfaction and retention in the online learning environment (Alqurashi, 2019). Peer interaction also fosters student engagement in online courses, but its impact is mixed. Some studies show no significant relationship between peer interaction and online academic achievement (Alqurashi, 2019), while others suggest that interactive discussions and group projects enhance student engagement (Fearnley et al., 2022).

Modality-Based Factors

When selecting courses to enroll in, students often prioritize personal demands, such as perceived course difficulty, time constraints, or family responsibilities, over consideration of how the chosen modality may impact their learning outcomes (Asarta & Schmidt, 2015; McPartlan et al., 2021; Nonis & Fenner, 2012). Other factors, including the COVID-19 public health crisis and the increasing political volatility, can influence these decisions. Some students may view online learning as a reprieve from the social pressures of traditional face-to-face classes (Harris & Martin, 2012).

While student and course-level factors impact learning in any modality, their impact in online and face-to-face courses varies. Online courses demand stronger self-regulation and awareness of effective cognitive strategies, making motivation and study behaviors more crucial for academic achievement. Face-to-face courses provide more consistent and obvious instructor guidance and peer interaction, which can buffer weaker self-regulation skills for some students. Hybrid learning models provide a unique balance, combining the flexibility of online learning with the structured support of in-person instruction (Larson & Sung, 2019).

Motivational Factors Influencing Student Learning

Motivation is critical to academic success, influencing how students engage with course materials, persist through various challenges, and regulate their learning behaviors (Schunk, 2020). Several theories provide insight into how motivation influences student learning, particularly in the context of instructional modalities. Research on the impact of educational motivation has been shaped by frameworks such as achievement goal theory (AGT; Dweck & Leggett, 1988), expectancy-value theory (EVT; Wigfield & Eccles, 2000), and models of self-efficacy (SE; Bandura, 1997) and self-regulation (SRL; Schunk & Greene, 2017).

Achievement Goal Theory (AGT)

Achievement Goal Theory (AGT) is a motivational framework that explains how different goal types influence academic achievement and learning. AGT proposes that the structure and orientation of goals affect students' learning behaviors, persistence, and achievement (Dweck & Leggett, 1988). AGT identifies two primary goal orientations, including mastery and performance goals. Mastery goals focus on deep learning and strive to master topics of interest. Students with a mastery orientation tend to view challenges as opportunities, persist through complex tasks, and use more effective learning strategies (e.g., self-testing, elaboration, distributed practice) (Pintrich, 2003). Students with a performance goal orientation tend to focus on grades, external validation, or comparative performance with peers. Performance goals are affected by avoidance and approach behaviors (Elliot & McGregor, 2001). Students with performance-approach orientation seek to demonstrate competence to validate their success, whereas students with performance-avoidance orientation seek to avoid appearing incompetent. Performance-avoidance orientations are linked to higher anxiety and procrastination, especially in online settings, where students lack immediate instructor feedback (Elliot & McGregor, 2001).

Online Courses

Online learning requires robust levels of self-regulation, intrinsic motivation, and autonomy due to the absence of immediate instructor and peer interaction (Broadbent & Poon, 2015; Shillingford & Karlin, 2013). Students with a mastery goal orientation fare better in online courses because they use effective learning strategies, such as self-testing, elaboration, distributed practice, and metacognitive reflection (Yeh et al., 2019). These approaches to learning help promote long-term retention, reduce cognitive load, and effectively monitor the efficacy of study behaviors. Students with performance-avoidance goals, however, struggle more in online courses due to the lack of external reinforcements that face-to-face interactions provide (Broadbent, 2017; Han et al., 2025). The absence of prompt instructor feedback and peer engagement may lead to increased procrastination, anxiety, and disengagement (Elliot & McGregor, 2001).

Online instructors can foster mastery goals by using regular, formative activities to help students track their learning without the consequences of summative assessments (Xu et al., 2023). Instructors should also provide regular and personalized feedback using automated quizzes, discussion boards, and instructor meetings to help students maintain a consistent level of engagement (Yang & Park, 2012). Peer interaction and collaboration can also promote learning

by minimizing the effects of isolation (Zhou et al., 2022). Digital badges, certificates, and other achievement recognition can also help students with performance-approach goals engage in learning (Balci et al., 2022; Fanfarelli & McDaniel, 2019 Katz-Vargo & Benita, 2024).

Face-to-Face Courses

In traditional classroom settings, social and environmental cues help facilitate student motivation. Students with performance-approach goals may be more engaged in face-to-face learning because of competitive drive, instructor feedback, and accountability for earned points and grades from attendance and class discussions. Performance-avoidance goals are associated with lower levels of achievement (Broadbent, 2017). Students who fear failure may avoid class participation or rely on surface-level learning strategies prioritizing remote memorization rather than deep learning (Pintrich, 2003).

Instructors in the face-to-face modality can promote student engagement by including regular discussions and in-class activities that allow students to demonstrate their understanding in a formative manner (Asadi et al., 2017; Hughes et al., 2020). Formative assessments help strengthen mastery and performance-approach goals while minimizing the effects of performance-avoidance behaviors (Barron & Harackiewicz, 2003; Hansen & Ringdal, 2018). Frequent formative quizzes, practice exams, and discussions can offer short-term extrinsic motivation while reinforcing long-term mastery goals.

Expectancy-Value Theory (EVT)

Expectancy-Value Theory (EVT) provides a valuable framework for understanding how expectancy beliefs, perceived value, and cost assessments impact student motivation and goal pursuit (Wigfield & Eccles, 2000). According to EVT, expectancy beliefs reflect students' confidence in their ability to succeed in a particular learning task, and task value is determined by how meaningful or useful the student perceives the learning activity to be. Expectancy beliefs and perceived task value are buttressed by the required costs of the activity, such as required effort, time investment, or risk of failure (Flake et al., 2015; Jiang et al., 2020; Perez et al., 2019). Students who expect success, perceive high value in a task, and assess low costs experience higher levels of motivation and engagement (Wigfield & Eccles, 2000). Students who perceive low task value and higher costs are likelier to disengage from learning (Dietrich et al., 2017; Robinson et al., 2019).

Research has linked social interaction to perceived task value (Dong et al., 2015; Perez et al., 2019). Face-to-face courses naturally offer social reinforcement more readily than online courses (Hambali et al., 2022; Lee & Lim, 2023). Peer discussions, group activities, and regular instructor feedback help students recognize the relevance and purpose of learning tasks (Lee & Lim, 2023). Online courses often have higher perceived social isolation, making it difficult for students to see the value in activities such as asynchronous discussions (Loh, 2019). Instructors can increase task value in online courses by incorporating more robust peer collaboration, instructor-led discussions, or explicitly connecting content and real-world applications (Fuzi et al., 2023).

Self-Efficacy and Self-Regulated Learning

Self-efficacy has been extensively studied in psychological and educational research (Bandura, 1997). Higher self-efficacy has been linked with stronger motivation, persistence, and academic achievement, while low self-efficacy is associated with disengagement and procrastination (Bandura, 1997). The literature suggests that self-efficacy is critical in student success by mediating the relationship between motivation and achievement (Honicke et al., 2020; Luo et al., 2023). Studies have shown that students with higher self-efficacy tend to engage in deep learning strategies and persistence behaviors (Habib et al., 2023; Shofiah et al., 2023; Yang & Park, 2012). Self-efficacy is also associated with increased participation and task completion, which promotes student achievement in academic settings (Luo et al., 2023; Meng & Zhang, 2023; Xu et al., 2023). Social interaction has also shown a crucial relationship to self-efficacy by improving adjustment to the college environment (Liu & Huang, 2023).

Students with high self-efficacy are also more likely to engage in self-regulated learning (SRL), which involves setting clear goals, managing time effectively, and monitoring and adjusting learning behaviors (Schunk & Greene, 2017). SRL is especially critical in online courses where students must manage their schedule and learning pace without consistent instructor interaction. Research suggests that students with strong SRL skills perform equally well in online and face-to-face settings with adequate instructional support. In contrast, those lacking requisite SRL skills struggle in online classes, especially without instructional support (Zhou et al., 2022).

Learning Differences Due to Modality

The impact of instructional modality on student achievement is contested. While some research suggests comparable learning outcomes between face-to-face and online instruction when controlling for instructional design and student engagement (Paul & Jefferson, 2019), other studies highlight modality-based discrepancies influenced by student characteristics, course design, and disciplinary content (Larson & Sung, 2019; Means et al., 2013). Students in STEM and courses requiring high levels of quantitative reasoning (e.g., economics, mathematics, engineering) tend to experience lower exam performance and higher failure rates than face-to-face courses (Arias et al., 2018; Xu & Jaggars, 2014). Online learning environments demand greater self-regulation and time management skills, which can lead to higher attrition and withdrawal rates for students lacking these skills (Yukselturk & Bulut, 2007). The absence of these skills can be buffered in the face-to-face setting more quickly. However, increasing perceived instructor presence and peer interaction can mitigate these limitations in online settings.

Despite a growing literature base, many studies examining differences in learning outcomes among course modalities have several methodological limitations. These include selection bias, course-level differences, and the impact of short and long-term outcomes. Because many studies investigating course modality include nonrandom sampling, students who choose online courses often have different learning preferences and life circumstances than face-to-face courses (Larson & Sung, 2019). These differences, rather than modality, may be driving the discrepancies in learning outcomes. Similarly, some studies fail to adequately account for course design variation, making it difficult to attribute differences in student achievement to modality or instructional quality. Finally, most studies use short-term assessments (e.g., grades,

test scores) to measure learning differences, and few studies assess long-term knowledge retention because of instructional modality.

The evidence from these lines of research suggests that modality alone does not determine student achievement. Instead, student characteristics, instructional design, and discipline-specific content significantly determine student learning. Student-level characteristics, such as self-regulatory skills, and instructor characteristics, such as perceived presence, can, however, mitigate any reduction in learning outcomes between online and face-to-face courses.

Student Satisfaction and Perceptions of Learning

Learning differences are not the only factor of interest when evaluating modality-based educational options. Research evaluating whether differences exist in student satisfaction with their learning experiences and their perceived level of learning gains has highlighted factors such as personal engagement with the content, the presence of the instructor in online courses, and their own self-efficacy beliefs to accomplish academic success were positively associated with both student satisfaction and perceived learning (Alarifi & Song, 2024; Alqurashi, 2019). Predictors of student satisfaction and perceived learning in online courses include both internal and external factors. Internal factors, including online learning self-efficacy (Alqurashi, 2019; Liaw & Huang, 2013; Rahman et al., 2022), learner-content interaction (Alqurashi, 2019; Fearnley et al., 2022; Rahman et al., 2022; Sahin & Shelley, 2008), and learner-instructor interaction (Alqurashi, 2019; Fearnley et al., 2022), significantly predicted student satisfaction. Fearnley (2022) found that while online self-learning efficacy contributed to perceived learning, it did not contribute to student satisfaction. Similarly, Rahman et al. (2022) did not find that learner-instructor interactions predicted student satisfaction using multiple linear regression, as Alqurashi (2019) found.

Interestingly, learner-learner interaction, a commonly held belief that students who interact in online environments enjoy courses more, did not significantly predict student satisfaction and the perception of learning gains in some studies (Alqurashi, 2019), while others produced significant differences (Rahman et al., 2022). External factors contributing to student satisfaction include technological issues and perceptions of inadequate pedagogical delivery negatively impacting student satisfaction (Fang et al., 2023). Studies using multiple linear regression procedures further indicate that control for external factors negatively affecting the learning process does not increase student perception of learning (Fang et al., 2023).

In summary, while internal factors, such as self-efficacy, play a crucial role in enhancing student satisfaction, external challenges, like technological issues, affect how students perceive their learning in nontraditional modalities.

Interaction of Student Characteristics and Modality Achievement Differences

In an increasingly competitive higher education landscape where many US states have implemented outcomes-based funding models, course and degree completion rates remain essential factors of consideration when evaluating course delivery options. Fischer et al. (2021) and Arias et al. (2018) demonstrate promising results for students completing online coursework, especially nontraditional students or students requiring enhanced flexibility while pursuing higher education. Online courses, in these situations, contribute to higher degree completion

rates. However, Xu and Jaggars (2014) present a conflicting view of online courses by suggesting that online education may contribute to achievement gaps, especially for students who lack sufficient academic skills. Additionally, Larson and Sung (2019) indicate that hybrid learning may bring the benefits of traditional, face-to-face learning with the flexibility of online, asynchronous courses to provide enhanced educational delivery modes for a diverse student population.

While the literature on modality-based learning differences is mixed, the research suggests that online and face-to-face learning can produce comparable learning outcomes. Additional work expanding on the role of student characteristics, such as self-efficacy, is needed to understand the level of comparability of academic achievement as moderated by course modalities.

Cognitive Effort

Motivational factors, such as self-efficacy beliefs, are not the only variables contributing to academic achievement. Other factors, such as cognitive effort, affect students' academic achievement. Cognitive effort is psychologically distinct from perceived effort, consisting of mental energy expended during a specific task (Dunlosky et al., 2020). Some earlier research suggests that time-on-task in K12 environments is associated with higher learning returns independent of the strategy used during the time-on-task (Caldwell et al., 1982). However, the review by Dunlosky et al. (2020) suggests that effort is not simply a function of time-on-task. Instead, the value of expended energy depends on the cognitive work related to strategies used during the learning process. This view is consistent with Cohen et al.'s (1955) and Cacioppo and Petty's (1982) concept of the need for cognition. The need for cognition is viewed as a primary driver in individuals to seek out cognitively stimulating tasks. A meta-analysis by Liu and Nesbit (2023) produced moderate but statistically significant correlations showing an association between the need for cognition and academic achievement and suggesting moderating effects from grade level (college-level students $r = 0.2$), geography (North America $r = 0.22$), and subject domain (social sciences $r = 0.17$ and comprehensive knowledge $r = 0.23$).

Research examining the interplay of cognitive effort with the selected learning strategies of students is more nuanced (Biggs & Tang, 2007; Diseth et al., 2010; Ramsden, 2003). Research suggests that the instructional context (Biggs et al., 2007; Ramsden, 2003) and the cognitive requirements of the learning strategy used (Diseth et al., 2010; Ramsden, 2003) contribute to overall academic achievement. Interestingly, Diseth et al. (2010) suggest that when using structural equation modeling techniques (SEM), the active encouragement of deep learning approaches is less significant than the intentional discouraging of surface-level learning approaches.

Learning Strategies

In the American education system, where standardized testing emphasizes the *what* of learning rather than the *how* of learning, few students receive formal training on learning during their K12 educational careers (e.g., Nahar, 2023; Welsh et al., 2014). In many college and university settings, this is further compounded by less contact time in the classroom and a high volume of content (Mulryan-Kyne, 2010; Stark, 2000). Many students find themselves in a "sink-or-swim" situation, which can harm their motivational states for learning (Sendziuk, 2010).

Research has shown that learning strategies are not created equally for all learning situations (Dunlosky et al., 2013). Moreover, specific learning strategies (e.g., distributive practice and self-testing) promote more cognitively meaningful learning than other strategies (e.g., rereading or highlighting) (Dunlosky et al., 2013; Hamm et al., 2017). Strategies that elicit minimal cognitive processing (i.e., surface-level learning) capture an individual's attention through sensory characteristics, such as highlighting or underlining text, but lack sufficient engagement to involve deeper levels of cognition (Karpicke & Roediger, 2008). Research concerning how learning strategy usage impacts student performance in different modalities is unclear. Fetter (2024) found that the differences in grades between nutrition courses delivered face-to-face and online alternated depending on the term the course was taken. During the fall 2019 semester, students in the face-to-face modality outperformed their online peers. This trend reversed in the spring 2020 semester, suggesting that modality effects are influenced by factors external to students' psychological processing.

Conclusion

The quick shift to online learning during the COVID-19 pandemic highlighted the complexities of instructional modalities and their influence on student success. This commentary examined the psychological underpinnings of effective learning, emphasizing the role of motivation, self-regulation, and cognitive strategies in shaping academic achievement in both online and traditional, face-to-face environments. The research indicates that students with strong self-regulatory skills and intrinsic motivation perform well in both modalities; online learning requires greater autonomy and discipline. The examined literature in this commentary highlights the critical role of instructional design and instructor presence during the learning process. These factors and assessment methods contribute to the student learning experience in both online and face-to-face modalities. By viewing instructional modalities through the lens of AGT and EVT, instructors can capture the benefits of mastery goal orientations, which promote student influence. Similarly, instructors will be positioned to help students generate more effective learning behaviors.

As post-COVID data trends continue to show increased online enrollment post-pandemic, additional research will be necessary to evaluate how motivational and cognitive factors interact. Additional research should uncover potential boundaries of modality with disciplinary content considerations and the impact instructional modalities have on long-term knowledge retention. Integrating evidence-based psychological and pedagogical approaches is crucial in fostering more effective learning experiences and promoting student success for all students across diverse contexts.

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