Atlantic Marketing Journal

Volume 12 | Number 2 Article 8

2023

The Impact of Technology, Engagement, and Student Readiness on Student Learning in Blended Synchronous Learning Environments

Kirsten Passyn
The Citadel, kpassyn@citadel.edu

Susan Wright
The Citadel, swright7@citadel.edu

The Impact of Technology, Engagement, and Student Readiness on Student Learning in Blended Synchronous Learning Environments

Kirsten Passyn, The Citadel, kpassyn@citadel.edu
Susan Wright, The Citadel

Abstract **-** The authors investigate technology, engagement, and student readiness as determinants of student learning in a blended synchronous learning environment. The experiment was conducted in two sections of a principles of marketing course where in-person and remote students simultaneously completed short concept quizzes using a mobile polling app. In-person students achieved higher quiz scores than remote students. GPA is a predictor of scores in both environments, and the effect is more pronounced for lower GPA students in remote locations. Student surveys identify focus and engagement as primary challenges to remote learning. Technology issues are secondary.

Keywords **-** Blended synchronous learning, Learning outcomes, Mobile polling, COVID-19.

Relevance to Marketing Educators, Researchers, and/or Practitioners **-** HyFlex teaching became normative following the COVID-19 outbreak. This research presents evidence of learning differences between in-person and video-conferencing students and provides instructor and student-based insights on how to improve this multi-dimensional learning format.

Introduction

The COVID-19 pandemic resulted in unprecedented educational and social disruption for educational institutions, students, and faculty. To help mitigate the spread of the virus, most institutions adopted multi-faceted strategies, including social distancing, masking, reduced class size, and a model of instructional delivery that included some form of online learning. As noted by Hamlin and Barney (2021), thirteen-hundred colleges and universities in the United States moved to a form of online instructional delivery. According to a higher education survey, eighty-seven percent of institutions planned a hybrid model combining in-person and virtual instruction for the 2020/21 academic year (Martel, 2020). The changes necessitated by COVID-19 resulted in a significant shift in higher education, a permanent transition to new instructional delivery models, and a massive boost in online learning in all its forms (Spais and Paul, 2021).

One such model is blended synchronous delivery combining in-person and remote students in one section. Although blended synchronous delivery has been available since interactive television in the 1990s, more research is needed to examine comparative student success in both modes (Lakhal et al., 2020). Given both the prevalence of blended synchronous

models during the pandemic (Martel, 2020) and the expectation of their increased use beyond the pandemic (Drea, 2021), an understanding of how an educational model that heavily incorporates blended synchronous learning impacts student engagement and learning is essential, especially given the increased probability of Zoom fatigue with increased usage of video conferencing.

Blended synchronous instruction is defined as any combination of traditional in-person and remote instruction via video conferencing (Bower et al., 2015). Other terms include: Hy-flex, Multi-access, and Simultaneous Bimodality (Lakhal et al., 2020). Blended synchronous courses were gaining popularity prior to the pandemic. Students in remote locations, with significant work or family obligations, engage in real-time with other students and faculty. The quality of the learning experience is enriched by enabling student-to-student and student-to-instructor interactions, especially when compared to asynchronous learning (Cunningham, 2014). In fact, a study conducted at the outset of the Covid-19 pandemic found that students' biggest dislike of the conversion to online was a lack of interaction with professors and classmates (Whiting and Hain, 2022). Synchronous sessions help address this concern.

A benefit of blended synchronous courses, especially compared to fully online asynchronous courses, is the opportunity for discussion. However, simultaneously managing in-person and remote student activity is challenging (Bower et al., 2015). Faculty require technology training and expertise in the theoretical design of blended courses (Lakhal et al., 2017). Even with training, faculty face challenges managing both types of students and have difficulty assessing remote students' non-verbal cues and understanding (Bower et al., 2014, 2015). Furthermore, due to the demands of additional technology, even experienced faculty can only cover about eighty percent of the material from traditional in-person courses (Grushka-Cockayne, 2020; Lakhani and Viceira, 2021). Teaching in a blended synchronous classroom is not the equivalent of simply recording a traditional in-person class (Basaran andYalman, 2020).

Researchers continue to debate the relationship between a student's attitude toward the classroom learning community and the type of learning space (Young, Young, and Beyer, 2017; Clarke, Nelson, and Gallagher, 2020). Classroom community relates to feelings of belonging and engagement (Clarke, Nelson, and Gallagher, 2020). Student engagement is a key attribute of academic success (Skinner et al., 2008). Engaged students are excited, committed, and take pride in getting good grades and understanding course material (Newmann, 1992).

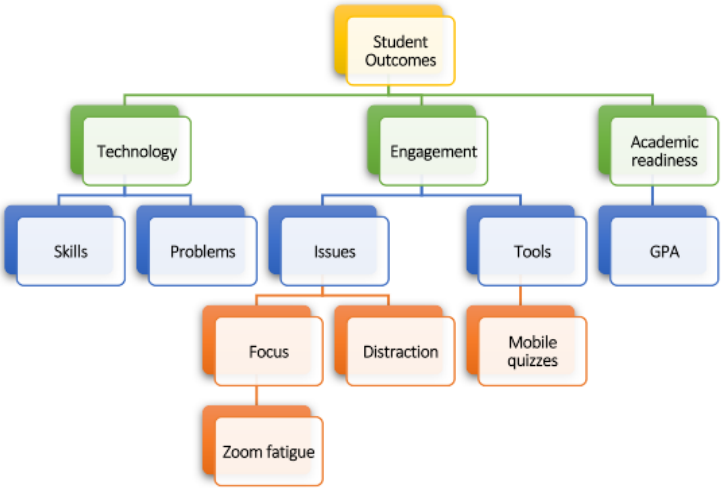
Cunningham (2014) finds that blended synchronous learning models strongly suggest improvements in student engagement and learning outcomes compared to asynchronous models, and that real-time discussion and immediate feedback have benefits. Differences in learning for blended synchronous learning models and synchronous learning models are less clear (Lakhal et al., 2020). Furthermore, to our knowledge, no study has examined engagement and learning in an environment of extensive video conferencing, making this research's findings unique.

In the present study, we seek to provide additional evidence of student learning outcomes in a blended synchronous learning environment. We conducted an experiment to examine student perception of technology and engagement in a blended synchronous environment and the impact of student readiness on student learning outcomes for remote and in-person students.

Literature Review and Hypotheses

Figure 1 depicts a framework for organizing three main factors of student learning outcomes in blended synchronous learning environments. The first factor is technology, the second is engagement, and the third is academic readiness.

Figure 1: Framework for Organizing the Factors of Student Learning Outcomes in Blended Synchronous Learning Environments



Technology

Research on blended synchronous models has identified two key technology issues for remote students attending synchronous sessions: technical skills and technical problems (Muilenburg and Berge, 2005). Technical skills relate to the learners' attitudes, comfort, and ease with the relevant technology (Sun et al., 2008), and include the ability to interpret non-verbal cues (Cunningham, 2014), discomfort in front of a camera (Bower et al., 2014, 2015), and concerns with how to interact across classroom formats with virtual classmates (Francescucci and Foster, 2014). Over time technical skills improve with experience as students grow comfortable with the technology and learning environment (Muilenburg and Berge, 2005). Technical problems are typically related to connection issues resulting in problems with hearing, especially when students speak, as well as video lagging or lost connection (Bower et al., 2014; Francescucci and Foster, 2014). Technical problems persist, given the high connectivity demands. Research has found that both in-person and remote students in blended synchronous courses report technical problems, including technical glitches that interrupt the course and the audio/visual challenges that make it hard for students in both formats to see and hear each other (Bower et al., 2014, 2015; Szeto, 2014). Thus, we hypothesize:

> H1: Remote students self-report issues related to technical problems but not issues related to technical skills.

Engagement

Focus, Zoom Fatigue, and Distractions Issues

Focus and distraction are key issues remote students identify during synchronous sessions (Francescussi and Foster, 2014). Remote students often feel excluded and lonely, have challenges staying focused, and are less likely to speak, all negatively impacting engagement and learning (Knipe and Lee, 2002; Lakhani and Viceira, 2021). Research focused on the conversion of face-to-face classes to online classes in response to Covid-19 found that participation engagement, emotional engagement, skill engagement, and performance engagement all declined when courses were shifted online (Whiting, 2022).

During the COVID-19 pandemic, Zoom was the most widely used technology-mediated learning platform (Wiederhold, 2020). The explosion of Zoom resulted in a condition called Zoom fatigue, or the tiredness and anxiety caused by overusing remote platforms (Marsh, Mitchell, and Adamczyk, 2010; Wolf, 2021). Video conferencing requires hyper-attention to produce and interpret nonverbal cues causing cognitive fatigue and impairing focus and attention. Furthermore, multitasking and distraction are prevalent during Zoom meetings, further dividing participants' focus (Fauville et al., 2021). Drea (2021) noted that poor-performing virtual undergraduate students reported higher levels of multitasking. Medical students reported unprecedented levels of multitasking while on Zoom (Samara and Monzon, 2021).

Faculty can help students focus by developing interactive lectures that incorporate breakout rooms for small group discussion and activities, short videos to illustrate points, and cold calling or assigned calling to promote student engagement (Basaran and Yalman, 2020; Grushka-Cockayne, 2020; Lakhal et al., 2020; Lakhani and Viceira, 2021). Chat and oral communication availability allows quiet students (Tsuji et al., 2012) and students from the digital generation who may be more comfortable with texting to participate and be heard (Francescucci and Foster, 2014). This helps accommodate different learning preferences (Lakhal, Bateman, and Bedard, 2017).

Given the extensive use of Zoom in this study and the high likelihood of Zoom fatigue, we hypothesize that cognitive engagement, or the amount of attention, focus, and concentration (Kahn, 1990), will be harder for remote students than for in-person students.

H2: Remote students' self-report focus issues while attending class on Zoom.
H3: Remote students’ self-report distraction issues while attending class on Zoom.

Tech-Tools

A strategy used by many faculty to improve engagement, participation, and discussion involves using clickers or mobile polling apps (Florenthal, 2018). Learning is improved with mobile polling apps by providing immediate feedback and an opportunity to review student responses (Hedgcock and Rouwenhorst, 2014; Kulik and Kulik, 1988). Kahoot! is a free mobile polling app/gamified pedagogical tool that is fast-paced and incorporates gameshow-like features that engage students while allowing teachers to monitor learning (Licorish et al., 2018). The gamified elements, like those in Kahoot! (vibrancy, music, and competition) have been shown to keep students engaged (Passyn, 2021; Lin, Ganapathy, and Kaur, 2017).

Academic Readiness

Nakos and Whiting (2018) found that using short online exams in a hybrid learning environment forces students to watch online lectures and engage with course materials resulting in significantly higher student performance. The improvement was not uniform across student groups; some benefitted more than others. Nontraditional students, students with higher GPAs, and male students experienced the largest increase in student learning outcomes. Drea (2021) also reported that poor-performing students (lower GPA) did worse when attending virtually than in-person. We propose that academic readiness will significantly impact remote student learning outcomes. Thus, we hypothesize:

> H4: Remote students' performance on mobile polling quizzes assessing concept understanding during synchronous sessions is lower than the performance of in-person students, and the effect is more pronounced for lower GPA students.

Method and Procedures

This study was conducted at an AACSB College of Business at a southeastern public university. Participants were business students, mostly juniors and seniors, in two independent sections of a required principles of marketing course. The same instructor taught both sections. Each section had twenty-eight or fewer students assigned to attend one day a week in-person and one remotely on Zoom©. All university courses during this period were delivered in this format.

Like other faculty teaching in blended synchronous environments, it was necessary to reduce the content of synchronous sessions compared to traditional in-person sessions. Some of the content was covered in asynchronous prep work, including readings, assignments, and discussion boards, and some, as suggested by others, was omitted (Grushka-Cockayne, 2020). A single classroom session typically started with a video, followed by a brief interactive lecture expanding on concepts from the pre-assigned reading. Small group discussions (using breakout rooms) and team reporting followed. The instructor shared the Zoom room at the front of the class to enable classroom-wide debate or to allow remote students to address everyone.

Mobile Polling and Kahoot!

Mobile polling was incorporated into synchronous sessions to engage and confirm students' understanding (Drea, 2021). Kahoot! was chosen as it was the school’s most used mobile polling app, and training was available to all faculty. Kahoot! allows for summative assessment in the free subscription, and students are motivated by earning points on quizzes (Hedgcock and Rowenhorst, 2014; Drea, 2021). The course instructor occasionally gave out rewards to the Kahoot! winners, everything from bonus points to Taco Bell Gifters, to cash (Bechkoff, 2019).

The final Kahoot quiz was announced forty-eight hours in advance. The inclusion of an announced Kahoot! quiz enabled the researchers to rule out quiz-based technology issues as a source of difference among groups.

Teacher and Student Training

The fall of 2020 marked the instructor's first blended synchronous course; this study was conducted in the spring of 2021. In response to the COVID-19 outbreak, the institution opted to rely on a blended synchronous model for undergraduate students and offered remote and in-person faculty training. The faculty member participated in six campus workshops and attended two Zoom© and Swivel© training sessions. Students participated in Zoom© and Swivel© training. During the fall of 2020, the faculty member attended a three-day HBS seminar focused on teaching in a blended model. The training and the fall semester experience ensured that faculty and students were prepared for blended synchronous courses.

Study 1

Study 1 investigates students' self-reported challenges and concerns with blended synchronous courses.

Sample, Data, and Methodology

Forty-six of the fifty-four students enrolled in the course completed an anonymous survey about the course experience. The first question was open-ended: *Please detail any issues you had while attending class remotely. Then discuss what we could do to improve your virtual class experience. If you have suggestions for how to do this better, or comments on how other professors are better using the technology, please also share these here.* The open-ended responses were coded into three categories: technology issues, focus issues, and distraction issues. Two blind coders independently identified and coded all eighty-seven distinct free-response thoughts. Inter-coder agreement was eighty-nine percent, disagreements were resolved by discussion.

The second question was a close-ended question designed to assess the challenges of Zoom© attendance. The question stated*: Please indicate any/all the reasons you may feel that attending class on Zoom is more difficult than in person*. There were four categories:

1. It was hard to pay attention/focus/engage on Zoom
2. I am easily distracted/doing other things while on Zoom
3. I have connection issues
4. I don't have any difficulties on Zoom

Results and Discussion

Eighteen percent of students identified technology (problems rather than skills) as the second most important concern. As expected, due to previous experience with technology, students did not report technical issues using the technology. However, connection issues were reported by twenty percent of students in both open-ended and close-ended formats. Thus H1: Remote students self-report issues related to technical problems but not issues related to technical skills is supported.

Open-ended coding revealed that thirty-nine percent of students identified focus as the primary concern related to remote learning. Students identified a broad range of focus issues while attending synchronous sessions. Fifteen percent of students identified generic focus issues,

thirteen percent identified issues engaging with others, seven percent identified issues assimilating course materials, and five percent expressed feelings of exhaustion. Zoom© fatigue likely contributed to focus issues as students had multiple Zoom© sessions, sometimes occurring sequentially during extended class periods (Fauville et al., 2021). Focus issues are exemplified in the following student comments:

> I struggle to pay attention virtually.
>
> It is harder for me to learn virtually; I tend to doze off.
>
> I believe with virtual learning being able to interact with the class and stay focused is an issue.

Thus, Hypothesis H2: remote students self-report focus issues while attending class on Zoom, is supported.

Despite a strong correlation between focus and distraction, r = .87, there was little evidence of distraction. Eight percent of students admitted to distraction issues. Thus, H3: remote students self-report distraction issues while attending class on Zoom is not supported.

STUDY 2

Study 2 investigates student performance on Kahoot! concept check quiz scores for in-person and remote learning locations, term exam scores, course grades, and GPA.

Sample, Data, and Methodology

Sample descriptive statistics, independent t-tests of remote and in-person quiz scores, and linear regressions assess student performance on quiz scores across remote and in-person locations, term exam scores, course grades, and GPA.

Results

The sample characteristics are described in Table 1. Kahoot! Quiz scores averaged fifty-four percent. Remote quiz scores averaged forty-four percent, while in-person quiz scores averaged sixty-four percent. Remote scores have the greatest variability (largest coefficient of variation). Term exam scores averaged seventy-six percent, and final course grades averaged eighty percent. The average GPA of students in the sample is 3.06 (min = 2.04 and max = 4.0).

Table 1: Sample Characteristics (n = 54 students)

	Mean	Mode	Median	SD	Coef. Of Variation	Min	Max	Kurtosis	Skewness
Kahoot! Quiz	54.07	62.58	54.79	14.49	26.8%	17.60	81.19	(0.167)	(0.197)
In-person Quiz	64.24	51.67	64.75	17.59	27.4%	21.67	93.33	(0.110)	(0.359)
Remote Quiz	44.09	37.50	43.83	17.45	39.6%	-	76.50	(0.062)	(0.444)
Term Exam Scores	76.12	71.00	78.00	11.01	14.5%	42.00	95.00	1.921	(1.092)
Final Course Grades	80.02	74.00	80.00	8.15	10.2%	59.00	81.19	(0.113)	(0.348)
GPA	3.06	3.16	3.01	0.47	15.4%	2.04	4.00	(0.551)	(0.065)

Sample independent t-tests are described in Table 2. Each Kahoot! quiz score is examined by student location during the quiz. Most in-person student quiz scores are statistically higher than remote quiz scores (exception of quizzes 6 and 7). The coefficient of variation was largest for remote learners indicating greater variability in student success while attending remote sessions.

Table 2: Differences in quiz scores between in-person and remote learners

Variable	Condition	t-stat	Mean	StdDev	Coef. Of Variation	F	df
Quiz 1	In-person	2.21*	33.33	36.67	110.02%	4.91*	53
	Remote		*14.81*	*23.27*	*157.12%*		
Quiz 2	In-person	3.28**	56.46	31.06	55.01%	10.80**	52
	Remote		*29.63*	*28.37*	*95.75%*		
Quiz 3	In-person	3.37**	79.63	17.39	21.84%	10.80**	53
	Remote		*62.50*	*19.92*	*31.87%*		
Quiz 4	In-person	3.47**	78.46	18.70	23.83%	11.87**	52
	Remote		*56.30*	*27.20*	*48.31%*		
Quiz 5	In-person	3.23**	61.11	22.29	36.48%	10.44**	53
	Remote		*41.67*	*21.93*	*52.63%*		
Quiz 6	In-person	1.95	71.00	19.33	27.23%	3.80	53
	Remote		*59.44*	*23.98*	*40.34%*		
Quiz 7	In-person	0.08	72.23	14.61	20.23%	0.01	49
	Remote		*72.58*	*16.66*	*22.95%*		

*****p< .05, **p<.01

Linear regression results are described in Table 3. Four regressions examine Kahoot! quiz scores for remote and in-person students, term exam scores, course grades, and GPA. In-person students attending the Tuesday session scored an average of 18 points higher than remote students and scored an average of 14.5 points higher for GPA. Remote students attending the Thursday session scored an average of 24 points lower than students attending in person and scored an average of 15.5 points higher for GPA. Kahoot! quiz scores and GPA are both significant variables in predicting overall course grades and average term exam scores. Our findings are consistent with previous findings that poor-performing remote students score below 50 percent and that lower GPA students struggle more than higher GPA students (Drea, 2021). Thus, H4: Remote students' performance on mobile polling quizzes assessing concept understanding during synchronous sessions is lower than the performance of in-person students, and the effect is more pronounced for lower GPA students, is supported.

Table 3: Regressions

	Regression	r2	y-variable	x-variable 1	x-variable 2	Intercept	x-variable 1	x-variable 2
1	Tuesday average quiz score depends on student location and GPA	0.557	Tuesday average Kahoot! score	Dummy 1 = in-person, 0 = online	GPA	-0.615	17.708 ***	14.511 **
2	Thursday average quiz score depends on student location and GPA	0.679	Thursday average Kahoot! score	Dummy 1 = in-person, 0 = online	GPA	20.599	-23.532 ***	15.480 **
3	Term exam scores depend on Kahoot! quiz scores and GPA	0.738	Term exam score	Kahoot! Average Score	GPA	43.180 ***	0.200 **	8.513 ***
4	The final grades depend on Kahoot! Quiz scores and GPA	0.608	Final course grade	Kahoot! Average Score	GPA	37.143 ***	0.281 **	7.791 *

*****p< .05, **p<.01, ***p< .001

Limitations

This study makes a solid contribution to the literature but is limited by several factors. First, the sample size is small, limited to just the spring semester, and to a single course that is part of the required core curriculum. Participants are from a mix of business majors, which may impact the sample consistency as it relates to the level of interest in the subject. Second, the sample was primarily male. Results may differ if the sample were larger and composed of students from multiple disciplines and demographics. Third, student interest may be a missing variable in the study (Abrantes, Seabra, and Lages, (2007). Other missing variables that would strengthen future research include internship experience, major, and learning disabilities (Clarke, Nelson, and Gallagher, 2020).

For Study 1, the open-ended question format allowed for free-form responses but made coding and the analysis more challenging. Future studies would benefit from using a more systematic approach for assessing student perceptions of instructional design, such as Rovai's (2002) classroom community scale, which measures attitudes toward classroom social interactions, and/or Mitchell and Olsen's (1981) semantic differential scale which measures student attitudes toward classroom instruction methods (Clarke, Nelson, and Gallagher, 2020). For Study 2, the r^2 values may indicate potential missing variables such as major (an indicator of interest), learning disabilities, and other demographics.

The students in this research were not given a choice between in-person and remote attendance. Instead, they were assigned to an in-person and remote day. Previous research has found benefits to a choice model to reduce anxiety, especially important during the COVID-19 pandemic when students' stress levels were high. However, choice model research has also found that the poorest performing students admitted to distraction issues and persisted in attending

remotely even when confronted with performance concerns (Drea, 2021). As blended synchronous learning becomes more prevalent, research on the benefits of each model for each type of student is needed. Certainly, as suggested here, there are limitations to the extensive use of a blended synchronous model.

Recommendations and Concluding Remarks

This study finds that students struggle with technology problems and the ability to remain on-task during remote synchronous sessions. As evidence, quiz scores are significantly lower for remote students, and the difference is more pronounced for students with lower GPAs. Best practices were incorporated to encourage cognitive engagement: chunking lectures with break-out rooms, videos, Kahoot! quizzes, cold-calling, and assigned calling. However, sustaining engagement for an hour and fifteen minutes, especially as students took multiple courses in this format, was too demanding. Zoom fatigue negatively impacted students' ability to focus.

According to recent research on best practices for Zoom, meetings should always be kept under an hour, ideally 30 minutes or less (Chang, 2021; Butler, 2021). The frequency of meetings also impacts Zoom fatigue and breaks between meetings are necessary. Planning for 50- or 20-minute meetings with a 10-minute break between meetings is a best practice in a high video conferencing environment (Chang, 2021). Furthermore, there should be a maximum of three hours of Zoom time a day, ideally under 2 hours (Butler, 2021). University administration must recognize the time restrictions required for effective synchronous sessions and ensure that students have no more than 2 hours of video conferencing a day, less for non-traditional students and MBAs who often engage in video conferencing at work. This will necessitate unique course scheduling in programs with extensive remote synchronous requirements.

Although much has been learned by studying student performance and student perceptions of blended synchronous learning, much more must be studied to understand the impact of blended synchronous learning environments fully. Researchers in the future may want to replicate our study by increasing the sample size and the diversity of students. Larger samples of diverse students will add to the robustness of our findings and the generalizability of the results.

References

Abrantes, J. L., Seabra, C., and Lages, L. F. (2007). Pedagogical effect, student interest, and learning performance. *Journal of Business Research,* 60(9), 960-964.

Basaran, B., and Yalman, M. (2020). Examining university students' attitudes towards using web-conferencing systems in distance learning courses: A study on scale development and application. *Knowledge Management and E-Learning, 12*(2), 209 – 230.

Bechkoff, J. (2019). Gamification using a choose-your-own adventure type platform to augment learning and facilitate student engagement in marketing education. *Journal for Advancement of Marketing Education, 27*(1), 13 – 30.

Bower, M., Kenney, J., Dalgarno, B., Lee, M. J.W. and Kennedy, G.E. (2014). Patterns and principles for blended synchronous learning: engaging remote and face-to-face learners in rich-media real-time collaborative activities. *Australasian Journal of Educational Technology, 30,* 1, 261 – 272.

Bower, M., Kennedy, G.E., Dalgarno, B., and Lee, M. J. W. (2015) Design and implementation factors in blended synchronous learning environments: outcomes from a cross-case analysis. *Computers and Education,* 86, 1 -17.

Butler, C. (2021). How much Zoom is too much? *Matchpace, https://www.matchpace.net/blog/how-much-zoom-is-too-much-virtual-meeting-tips*

Chang, M. (2021) Zoom best practices: 7 tips for hosting efficient Zoom meetings. *Mitty Chang, https://mittychang.com/zoom-best-practices-7-tips-for-hosting-efficient-zoom-meetings/*

Clarke, T.B., Nelson, C.L., Gallagher, S.R. (2020). The influence of traditional and modern learning spaces on pedagogical affect, classroom community, and learning outcomes for marketing students. *Journal for Advancement of Marketing Education,* 2(1), 37-47.

Cunningham, U. (2014). Teaching the disembodied: Othering and activity systems in a blended synchronous learning situation. *International Review of Research in Open and Distance Learning. 15(6),* 343 – 51.

Drea, J. (2021) Online? In person? The power of letting students choose. How course delivery models should evolve post-pandemic. *Harvard Business Publishing Education.*

Fauville, G., Luo, M. Queiroz, A. C. M., Bailenson, J. N. and Hancock, J. (2021). Nonverbal mechanisms predict Zoom fatigue and explain why women experience higher levels than men: https://ssrn.com/abstract=3820035

Florenthal, B. (2018). Student perceptions of and satisfaction with mobile polling technology: An exploratory study. *Journal for Advancement of Marketing Education, 26*(2), 44 – 57.

Francescucci A. and Foster, M. K. (2014). Virtual interactive real-time instructor-led (VIRI) learning: the case of synchronous blended learning in introductory undergraduate course. *Journal of Higher Education Theory and Practice,* 14(2), 36-45.

Grushka-Cockayne, Y. (2020). How to design and teach a hybrid class: The dos and don'ts of blended curriculum design – and a sample course plan. *Harvard Business Publishing Education.* https://hbsp.harvard.edu/inspiring-minds/how-to-design-and-teach-a-hybrid-class

Hamlin, A. R., and Barney, S.T. (2021) Understanding the Impact of COVID-19 ON College Student Academic and Social Lives. *Research in Higher Education Journal,* 4, 1-20.

Hedgcock, W. H. and Rouwenhorst, R. M. (2014). Clicking their way to success: Using student response systems as a tool for feedback. *Journal for Advancement of Marketing Education, 22*(2), 16 – 25.

Kahn, W. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal,* 690, 724 – 235.

Knipe, D., and Lee, M. (2002) The quality of teaching and learning via videoconferencing. *British Journal of Educational Technology, 33*(3), 301 – 311.

Kulik, J. A. and Kulik, C. C. (1988). Timing of feedback and verbal learning. *Review of Educational Research, 53*(1), 211-232.

Lakhal, S., Bateman, D. and Bedard, J. (2017). Blended synchronous delivery mode in graduate programs: A literature review and its implementation in the master teacher program. *Collected Essays on Learning and Teaching, 10*(1) 47-60.

Lakhal, S., Mukamurera, J. Bedard, M.E., Heilporn, B. and Chauret, M. (2020). Features fostering academic and social integration in blended synchronous courses. *International Journal of Educational Technology in Higher Education, 17*(5), 1-22.

Lakhani, K. R. and Viceira, L. M. (2021) 5 Key Lessons from HBS's pandemic teaching transformation: And what learnings will stick moving forward. *Harvard Business Publishing Education* https://hbsp.harvard.edu/inspiring-minds/5-key-lessons-from-hbs-pandemic-teaching-transformation/?ab=top_nav

Licorish, S. A., Owne, H. E., Daniel, B., and George, J. L. (2018). Student perceptions of Kahoot! 's influence on teaching and learning. *Research and Practice in technology Enhanced Learning, 13*(1), Article 9. doi: 10.1186/s41039-018-0078-8

Marsh, H. W., Mitchell, N. and Adamczyk, P. (2010). Interactive video technology: Enhancing professional learning in initial teacher education. *Computer and Education, 54*(3), 742-748.

Martel, M. (2020) COVID-19 Effects on U.S. Higher Education Campuses. *IIE The Power of International Education. COVID*-19 Survey 3 Report WEBSITE.pdf

Mitchell, A.A. and Olsen, J.C. (1981). Are product attribute beliefs the only mediators of advertising effects on brand attitude? *Journal of Marketing Research,* 18(3), 318-332.

Muilenburg, L. Y. and Berg Z. L. (2005). Student barriers to online learning: A factor analytic study. *Distance Education,* 26(1) 29 –48.

Nakos, G. and Whiting, A. (2018). The role of frequent short exams in improving student romanceance in hybrid global business classes. *Journal of Education for Business,* Vol. 93, No. 2, 51-57.

Newmann, F.M., Wehlage, G.G., and Lamborn, S.D. (1992). The significance and sources of student engagement. In F. Newmann (Ed.), *Student Engagement and Achievement in American Secondary Schools* (pp. 11-39). New York, NY: Teachers College Press.

Passyn, K. (2021). Hellow are you there? Creating and measuring online student engagement. *Atlantic Marketing Journal,* 10(1), article 6.

Rovai, A. (2002). Development of an instrument to measure classroom community. *The Internet and Higher Education,* 5, 197-211.

Samara, O. and Monzon, A. (2021). Zoom burnout amidst a pandemic: Perspective from a medical student and learner. *Therapeutic Advances in Infectious Disease,* 8, 1-3.

Skinner, E., Furrer, C., Marchand, G., and Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology,* 100, 765-781.

Spais, G. and Paul, P. (2021). A crisis management model for marketing education: reflections on marketing education system's transformation in view of the COVID-19 crisis. *Marketing Education Review,* 31(4), 322-339.

Sun, P.C., Tsai, R. J., Finger, G., Chen, Y. Y., and Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers and Education,* 50, 1183-1202.

Szeto, E. (2014). Bridging the students' and instructor's experiences: Exploring instructional potential of videoconference in multi-campus universities. *Turkish Online Journal of Educational Technology, 13*(1) 64 – 72.

Tsuji, B., Pierre, A., Van Roon, P., and Vendetti, C. (2012). Web versus face-to-face tutorials: Why I didn't go to class in my pajamas. In T. Bastiaens and G. Marks (Eds.), *Proceedings of E-learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* 2012 (pp. 802 – 806). Chesapeak, VA; Association for the Advancement of Computing in Education (AACE)

Whiting, A. (2022). Investigating the impact on student engagement from converting face-to-face classes to online in response to Covid-19. *Atlantic Marketing Journal,* 11(1), article 9.

Whiting, A. and Hain, J. S. (2022). Student perspectives on mandatory conversion of online classes: A qualitative study. *Atlantic Marketing Journal,* 11(2), article 9.

Wiederhold, B.K. (2020). Connecting through technology during the coronavirus Pandemic: Avoiding "Zoom Fatigue". *Cyberpsychology Behavioral Society Network*, 23, 437–438.

Wolf, C. R. (2021). Virtual platforms are helpful tools but can add to our stress. *Psychology Today,* Sussex Publishers, www.psycholgoytoday.com/cablog/the-desk-the-mental-health-lawyer/202005/virtual-platforms-are-helpful-tools-can-add-ourstress

Young, K.E., Young, C.H. and Beyer, A. (2017). Does the classroom matter? How the physical space affects learning in introductory undergraduate science courses. *Journal of College Science Teaching*, 46(6), 80-87.