Clemson University

TigerPrints

Publications	Education & Human Development

6-2023

HyFlex pedagogy: six strategies supported by design-based research

Emily Howell

Koti Lee Hubbard

Sandra Linder

Stephanie M. Madison

Joseph Ryan

See next page for additional authors

Authors

Emily Howell, Koti Lee Hubbard, Sandra Linder, Stephanie M. Madison, Joseph Ryan, and William C. Bridges

HyFlex pedagogy: six strategies supported by design-based research

Emily Howell, Koti Hubbard, Sandra Linder, Stephanie Madison, Joseph Ryan and William C. Bridges
Clemson University, Clemson, South Carolina, USA

Abstract

Purpose – This study investigates the following research question: What pedagogical strategies are necessary for the success of HyFlex course design? The findings to this question are based in new media literacies and help to further pedagogy in an emerging HyFlex model while also grounding in needed theorization.

Design/methodology/approach – This study uses design-based research (DBR) across two iterations and four doctoral, higher education courses, using mixed methods of data collection and analysis.

Findings – Six pedagogical strategies influential for HyFlex research are presented, each grounded in a new media literacy skill.

Originality/value – These six pedagogical strategies help practitioners grappling with the HyFlex or blended learning model merge traditional pedagogy with how this might be tailored for students entrenched in a participatory culture.

Keywords Design-based research, HyFlex, Higher education, New media literacies, Pedagogical strategies

Paper type Research paper

Higher education needs a metamorphosis, particularly related to preparing teachers. The coronavirus pandemic highlighted a need to transition from face-to-face instruction to virtual and a drive to do more with shrinking higher education budgets (Ensmenn *et al.*, 2020; Lakhal *et al.*, 2017; Wang *et al.*, 2017). Furthermore, amidst a national teacher shortage, a small share of teachers has access to professional development through university courses, often considered highly effective, valued, and essential to retaining current teachers and recruiting new ones (García and Weiss, 2019).

HyFlex is one reinvention currently underway to make higher education more accessible through combining online and face-to-face instruction and prioritizing student choice. HyFlex is a curriculum design in which students can choose between online asynchronous, online synchronous and face-to-face instruction (Beatty, 2019; Educause, 2010a; Howell, 2022). Thus, this design has the potential to reach more students who cannot halt life activities to make it to the elusive ivory towers of higher education campuses. Potentially, this increased access also comes at limited additional infrastructure costs to higher education (Lakhal *et al.*, 2017; Wang *et al.*, 2017). However, this model is relatively new and lacks research, implementation, and theorization (Howell, 2022). This focus on HyFlex aligns with this special issue of *Journal of Applied Research in Higher Education* investigating *Pedagogical Innovations in Higher Education* as the authors highlight six pedagogical strategies that emerged during two iterations of a design-based research (DBR) study exploring four doctoral classrooms in higher education implementing HyFlex design.

Theoretical perspective

Howell (2022) found HyFlex research is undertheorized, as only four of the 19 articles investigated in this comprehensive literature review examined a theoretical perspective. Regarding pedagogy, theory is needed to understand how learning occurs and what factors influence it (Schunk, 2020). Jenkins (2006) described how increasing technological access has defined a participatory culture rather than the previous era of digital divide, where the focus on technological use in education was whether students had access to digital tools. In a participatory culture, students participate in an accessible culture in which all members are active, socially connected creators. HyFlex environments may reflect such culture, in which mentorships are more informal and there is collaborative problem-solving through digital tools in online communities, which may have been previously prohibited by the confines of traditional face-to-face classrooms. Thus, this perspective is appropriate to analyze what skills are needed in such cultures and whether HyFlex accommodates such context.

Jenkins (2006) outlined 11 new media literacies, or skills needed for effective membership in the participatory culture of our current digital era. These skills include the following: play or experimentation, performance or taking on alternative identities, simulation or modeling, appropriation or remixing content, multitasking or moving among tasks, distributed cognition or how tools expand mental abilities, collective intelligence or collaboration, judgment or critiquing information, transmedia navigation or following a point across platforms, networking or finding and publishing content and negotiation or contemplating multiple perspectives. These skills, vital to participate with new media, are synonymous with those needed to participate with current digital tools or technologies in today's culture (Lin et al., 2013).

These new media literacies are especially important to consider in terms of HyFlex as education and culture today exist in a world in which digital tools or media often have their own language, function for different purposes and affect the learning created. New media literacy traces back to the invention of printing and later the radio, but today represents how literacy, or the ability to think, read, write and communicate, has changed in a fully online culture. New media literacies connect both formal and informal contexts of learning important to HyFlex as learning is occurring often simultaneously in classroom contexts, online and in informal contexts where the learner is connecting in online environments (Jenkins and Kelly, 2013). As Jenkins et al. (2016) describe the shifting concept of participatory culture, they highlight how this context no longer exists in just informal learning environments, but increasingly in cultural institutions, such as those of higher education, applicable here in the context of HyFlex. Understanding HyFlex in institutions such as higher education and the new media literacies it may invite is important as traditionally formalized school settings have not been as inclusive as informal contexts of acknowledging the forms of learning and participation of a participatory culture (Howell, 2022).

Literature review

The term HyFlex was introduced in 2006 and is largely attributed to Beatty and work done on course design at San Francisco State University (Beatty, 2019). This model of course design gives increased agency to students as they choose (the *Flex* of the term) from hybrid (the *Hy* of the term) learning including online synchronous and asynchronous and face-to-face learning. Here we discuss this evolving definition, its potential for higher education and the need for more specific teaching and learning practices within this definition.

HyFlex became increasingly popular during the coronavirus pandemic in which institutions of higher education struggled to accommodate increasingly flexible forms of learning as students attempted to retain learning from the classroom and home (Ensmann et al., 2020). However, HyFlex is a model that requires intentionality in course design from the

beginning rather than simply trying to adopt traditional face-to-face instruction for online contexts as an addendum (McGee, 2014; McGee and Reis, 2012; Raes *et al.*, 2019).

HyFlex is advantageous because it can expand the capacity of institutions to reach traditionally underserved students (Abdelmalak and Parra, 2016; Raes *et al.*, 2019; Wang *et al.*, 2017). Furthermore, HyFlex allows higher education to work within restrained budgets as it does not necessarily require additional infrastructure or faculty costs (Lightner and Lightner-Laws, 2016; Stewart *et al.*, 2011). These advantages seem to avoid negatively impacting student learning outcomes (Binnewies and Wang, 2019; Calafiore and Giudici, 2021; Miller *et al.*, 2013). However, there are still gaps in the research that need address such as influence on student engagement (Wang *et al.*, 2017) and learning preferences (Binnewies and Wang, 2019). Further, instructional practices specific to HyFlex need further research (Miller *et al.*, 2013). This need for increased focus on instruction must also account for the changing role of the learner in HyFlex, particularly their increased need for self-regulation due to their heightened agency through increased choice (Abdelmalak and Parra, 2016; Binnewies and Wang, 2019).

Research shows instructional practices need to be specific to HyFlex course design (Bell *et al.*, 2014; McGee, 2014), yet this specificity is often lacking from current research (McGee, 2014; Miller *et al.*, 2013). For example, Bell *et al.* (2014) found in a doctoral program featuring classroom and online synchronous instruction more emphasis needed in such courses on pre-course orientations, acquainting students with the course requirements and policies. While research such as McGee (2014), in a meta-interpretive analysis, attempts to discuss pedagogical strategies in such hybrid learning environments that have been effective, these often serve as a list such as using discussion and active learning. However, more context is needed giving detail not just to what works pedagogically, but how and when and what to do when failure is encountered. Thus, we describe here pedagogical strategies developed through trial and error in DBR, a method based upon modifying to capitalize on both success and failure. We focus on six pedagogical strategies that emerged from this work, defining pedagogy as that relating to the methods and practices of teaching to enhance learning (McGee, 2014) and strategies as a systematic plan to enact such pedagogy (Afflerbach *et al.*, 2008).

Method

DBR is a method driven by a need to solve real-world problems rather than those where variables can be isolated in laboratories (Brown, 1992). Some elements that define this method are a focus on a pedagogical goal, a design of an intervention and modifications to that intervention as a response of evaluating enhancing or inhibiting factors (Howell *et al.*, 2021; Reinking and Bradley, 2008). The intervention is often defined by essential elements, which are components crucial to its enactment (Howell *et al.*, 2021, Howell *et al.*, 2017; Reinking and Bradley, 2008). Modifications to the intervention are often made at the micro-level, within a phase or intervention and at the macro-level, between phases of the intervention (Reinking and Bradley, 2008). DBR uses mixed methods of data collection and analysis, which was implemented in this study, and is inclusive of an interdisciplinary team of researchers, also included in this study with a team of six researchers, each representing different disciplines within the education field (Brown, 1992; Collins, 1999). DBR methods are needed especially in new fields where interventions are not well-established as this method is inherently iterative and allows for modification especially with multiple variables often accompanying the innovative use of digital tools or online spaces (Reinking and Watkins, 2000). Ford *et al.* (2017) found these explorations regarding technological interventions are often conducted at the K-12 level of schooling and are needed, though missing, from higher education.

The goal of this intervention was to leverage the HyFlex model of instruction across courses in a college of education for more accessible, equitable education in the doctoral program. The intervention was defined by three essential elements: use of digital, multimodal

tools; equity of online and face-to-face environments; and engagement in community. These elements were the focus of the intervention because of the support from the literature of their value contribution to the intervention. Literacy and other new media literacy scholars have discussed the Internet as being a defining technology for the current age in which digital tools afford multimodality, or the ability to communicate via multiple modes or genres of expression, such as visuals, alphabetic text, gestures, (Cazden *et al.*, 1996; Jenkins, 2006) etc. Further, the second essential element was included as HyFlex literature shows a need to ensure students participating in varying classroom or online environments receive equitable learning and access to that learning (Beatty, 2019; Binnewies and Wang, 2019; Howell, 2022). Finally, engagement in HyFlex environments is sought by students (Howell *et al.*, 2023), but can at times be unequal across participant groups, online or face-to-face (Stewart *et al.*, 2011).

Context and participants

Across the two iterations of this intervention, we included four courses and sixty students, shown in Table 1. All participants gave informed consent, and institution review board protocols were followed for all data collection and analysis. As the college instituted HyFlex, the definition evolved as Beatty (2019) discussed this term does vary depending on its implementation at an institutional level; however, students were allowed to choose between online and face-to-face instruction with asynchronous elements included at the instructor's discretion. The college moved from a definition that allowed students to choose on a class-by-class basis between face-to-face instruction and online synchronous instruction to their current definition of this choice being made on a semester basis.

Data collection and analysis

Qualitative and quantitative data included student pre- and post-surveys, observations, a research log and student grades. The qualitative data were coded using apriori initial codes dovetailing with the defining elements of DBR: Inhibiting and enhancing factors, modifications made, unanticipated outcomes and progress toward the goal. This qualitative coding was then examined with quantitative data. Two questions were analyzed on the survey responses for their pre- and post-survey change, asking about the level of interaction students hoped for with their colleagues and then experienced in their course and how they would rate their current knowledge of the content of the course. The statistical analysis of the interaction and knowledge questions included two steps. The first step used statistical graphics to visualize individual student pre-post changes in the question answers and the overall mean pre-post changes. The second step was a paired *t*-test (with individual students defining a pair of answers) to determine if the overall question means demonstrated a statistically significant change from pre to post. Grades were examined

Iteration	Doctoral courses	Participants
One	One method and one theory and literature review course	37 students who gave informed consent to participate and out of those who self-identified ($n = 36$) for their race and gender, there were 27 White females, two White males, six Black females and one female identifying as Asian or Pacific Islander
Two	One literacy and one early childhood	23 students, six Black females and 17 White females

Table 1.
Iterations, doctoral courses and participants

Source(s): Author's own work

categorically to see if students maintained the high expectation of graduate level grade point average of a 3.0 or higher. The data were analyzed iteratively throughout the intervention and holistically in a retrospective analysis whether progress was being made toward the educational goal (Gravemeijer and Cobb, 2006; Reinking and Bradley, 2008). Then, the data were reexamined specifically for pedagogical strategies answering the following research question: What pedagogical strategies are necessary for the success of HyFlex course design?

Findings
Six pedagogical strategies arose in answer to the research question: chat as backchannel discussion, flipping the classroom, effective use of asynchronous time, scaffolding with protocols, intentional grouping and consideration of classroom space. As HyFlex is an undertheorized model (Howell, 2022), we will discuss each pedagogical strategy in terms of the relevant new media literacy skill enhanced (Jenkins, 2006).

Chat as backchannel discussion
In the literacy course, chat, a feature allowing students to send messages privately or publicly, became more utilized as the semester progressed as a modification in response to several inhibiting factors based upon both observation and student survey data. One inhibiting factor was the classroom technology. The camera in the classroom often failed to swivel in the direction of the speaker; the sound system did not amplify student voice and the computer connecting to these systems was sluggish. Chat became a feature that was easy for students and their instructor throughout the course to communicate. In addition, the instructor in the course discussed online it was challenging to pick up on informal communication typical of traditional classrooms with visual cues or in casual conversations: "Typically, I can look out and see nods, looks of confusion, students glancing at each other, etc. to get a feel for how they are receiving the content." The instructor used chat and reactions in Zoom to have students use nonverbal communication such as emojis to communicate their understanding. The chat became so "lively" as one student wrote, the teacher began to stream it on the main projection screen. The instructor explained:

> Another thing about engagement, the chat feature in Zoom has been used weekly! . . . The in-person students actually felt left out! So we now put the chat box up on the screen for the remainder of class so everyone can see the behind-the-scenes comments.

A student reflected on why chat became such a vital tool in the course and attributed its use to the instructor legitimizing the chat feature as a "second discussion space," often a setting where quieter students had a voice in the classroom. This place of engagement may be especially important as the pre- to post- survey showed a negative mean change in the second iteration and no change in the first, though in both iterations this change was not significant, in the level of interaction students wanted in the pre-survey with how much they actually interacted in the post-survey. The mean in the first iteration stayed the same at 2.75 in the pre- and post-analysis ($n = 28$) and in the second iteration decreased from 2.84 to 2.53 ($n = 19$), both not statistically significant at $p > 0.05$. Chat was a feature that helped students get engagement they were seeking as one student explained.

> Overall, I think my cohort has bonded in the last few months . . . We want to talk to each other, and many of us communicate by email/ text/ in-person outside of class. Maybe this desire for connection is greater for those of us who are virtual, and I think virtual people also used the chat as a replacement of the small talk that would happen before/after class in person.

The extension of the classroom space in chat illustrates the new media skill of multitasking. Jenkins (2006, p. 4) defined *multitasking* as "the ability to scan one's environment and shift

focus as needed to salient details." Jenkins described in a new media environment, attention is still critical; however, students often respond to competing information and the need to focus not by narrowing their lens, but by responding to multiple channels, sorting information and mapping where important information may arise. The increased demand in this course that led to the chat eventually being projected as a communication stream for all participants indicates chat was a vital source of information. Rather than label it a distraction, students and the teacher realized its value and therefore legitimized it as a discussion place.

Backchannel discussion is defined as a secondary digital conversation occurring at the same time as the lecture (Educause, 2010b). Two key practices of backchannel discussion can and did inform how the chat was used effectively in HyFlex course design. The instructor should validate the space. In this course, the instructor would often read relevant comments, build on those comments for discussion and answer questions arising in the chat. This validation may be challenging for instructors as they are multitasking, so they may want to assign an aide or another student to help them monitor the chat rather than ignore the chat when attention is elsewhere. Secondly, students should be openly invited to this space and have clear expectations for how it will be used. For instance, it should be clear to students how their chat is being displayed to the classroom audience and how to communicate if they would like to message privately. One of the downsides to backchannel discussion often voiced is the potential to "dilute audience focus" (p. 2). However, when considering new media literacies, chat may be a way to build community, foster conversation with all students and harness some informal conversation lost without face-to-face interaction in a way students are accustomed as they filter and focus in a new media landscape through multitasking.

Flipping the classroom

Across the iterations and the four courses, regarding students' answers to the knowledge question, there was an increase of the post mean over the pre mean. In the first iteration the mean increased from 2.93 to 3.93 ($n = 30$) and in the second iteration the mean increased from 3.26 to 4.16 ($n = 19$). The paired t-test indicated that each iteration increase was statistically significant (p-value <0.05). Students all received the highest grade for the courses, in keeping with typical doctoral expected high performance in the college. In looking through the qualitative data to analyze the reason for such academic success, one strategy seems to be the flipped classroom that was implemented in a method course. A *flipped classroom* is one in which the instructor varies from the traditional model of classroom instruction followed by practice at home; instead, students are often given learning outside of the classroom to be practiced and reinforced within the classroom typically through application of learning (Brewer and Movahedazarhouligh, 2018). The professor delivered pre-recorded lectures, students then completed quizzes on their learning in the modules and class time was devoted to group projects and working through questions and review of the material. In addition, the extra course time allowed students to apply their knowledge to the method of the class, working through how to conduct and apply observation data to their final projects of completing an academic manuscript. The classroom observations as well as both the pre- and post-survey student responses triangulated students appreciated this strategy for their learning. For example, one student commented in the post-survey: "Canvas with pre-recorded lectures were beneficial." Another student discussed how this strategy expanded their learning in the post-survey: "Course was rich with new and reinforced information." Students appreciated this strategy from the beginning of the course as a student commented on the pre-survey: "I love the flipped learning in this class." The flipped classroom did require modifications at times as one observation noted the quizzes had to be given more time to complete to account for quiz anxiety.

Flipped learning was coined in 2012 and has been a rising trend in higher education since (Brewer and Movahedazarhouligh, 2018); data indicate this strategy dovetails well with other

innovative classroom design, such as HyFlex. Research on the flipped classroom strategy has expressed concern it would not be appropriate for a whole class model, yet this data build on that research, suggesting it is not only appropriate for whole class, but those attending in varying modalities. In addition, this research supports this strategy as particularly well-suited for higher education. As HyFlex often means larger classroom sizes, the flipped classroom strategy may help instructors differentiate learning and give more personalized attention to learners as students are encouraged to engage outside of class and thus have more time to tailor the course material to their interests and questions. One of the key components of successfully implementing the flipped classroom is deciding what to have students pursue outside versus inside the classroom. In making this decision, instructors could use the new media literacy skill of *distributed cognition*. Jenkins (2006) discussed distributed cognition is the use of tools to heighten students' learning. When instructors think of flipping their classroom, they can think of distributed cognition and how they want students to use tools to expand their mental capacity and what people, context and practices can be best configured for this triangulation of resources. Instruction should be explicit on these resources and how they can best be utilized to optimize distributed cognition.

Effective use of asynchronous time

One of the distinguishing components of the HyFlex model is its use of both asynchronous and synchronous learning environments (Beatty, 2019; Howell, 2022). An inhibiting factor of increased class size in the literature review course led the teacher to make effective use of asynchronous learning time recorded in classroom observations. As they were leading a course that was writing intensive, with students new to the genre of academic writing, the instructor knew they would need time to conference with students about their writing. The instructor planned multiple asynchronous sessions to be one-on-one writing conferences between the instructor and each student. Thus, even with an expanding course size due to HyFlex, they still differentiated and tailored instruction and kept the traditional writing focus and personal nature especially of doctoral classes.

This distinction of when and how teachers should use asynchronous versus synchronous time has been shown as a need to "upskill their digital skill" (Badiozaman *et al.*, 2022, p. 11). As seen in this example, this instructional decision making is not always a choice of digital tool but instead a negotiation of how to use tools in a new way. For instance, here the instructor was re-envisioning Zoom for conferencing rather than whole class instruction. The students discussed in their pre-survey responses for this course their approval of this asynchronous instruction not only for the use of time, but also because a traditional time frame in a synchronous online session may not be suitable. For example, one student described in another method course, "Zoom is a difficult format for a full two-hour lecture." However, with the use of Zoom for both synchronous class time paired with asynchronous instruction via conferencing, a student in this course described, "Adding the asynchronous portion to reduce meeting times is great." These data were from the pre-survey, but data from the post-survey also triangulated student approval of the use of asynchronous time. One student in the literature review course commented on the post-survey they "enjoyed the work time built into the schedule in place of class time." Thus, this strategy was supported by multiple forms of data including observations and student surveys.

This strategy of when and how to use asynchronous time is considering how students will use the new media skill of *negotiation*. Jenkins (2006) defined negotiation not only in terms of students needing to understand multiple perspectives, but also being able to participate in alternatives to their normal classroom situations. Classes that were once dichotomous – synchronous versus asynchronous and online or in-class – are now fluid. Thus, establishing a purpose for the use of each modality helps students understand and engage with the class structure.

Scaffolding with protocols

Scaffolding, defined as assisting students with processes to carry out learning, has been shown to have statistically significant effects on learning outcomes in higher education online learning environments (Doo *et al.*, 2020). However, research on scaffolding, particularly using multimodal practices in online environments, is needed (Howell, 2018). In the early childhood course, the inhibiting factor of students not engaging through conversation led the teacher to modify to include increased scaffolding specifically for discussion. The instructor noted students would discuss in their small groups conducted in breakout rooms in Zoom; however, when they would come back to whole group discussion, students would appear lost and quiet. Further, we noted in observations even though students engaged in conversation in breakout rooms, they were often unclear as to protocols to follow once away from the instructor, even if clear directions had been given prior to assigning the students to these rooms. Thus, the instructor decided to scaffold the discussion in the breakout rooms with the 4A's protocol (from schoolreforminitiative.org) that asks students to note their assumptions, agreement, argument and aspirations. The instructor found the protocol helpful for students to ground their whole group conversation in their previous small group discussion. A future modification was noted to scaffold the conversation further by first having students do an annotation of their reading, perhaps using a collaborative annotation tool such as Perusall (perusall.com), to help students collaboratively gather ideas for their class discussion. Student survey data indicated this "great discussion" was pivotal to meeting learning goals.

The scaffolding needed here to transition from whole group discussion to breakout room, small group discussion and back again and even the movement between annotation and discussion in online environments speaks to the new media literacy skill of *transmedia navigation*. The students had to participate in the flow of ideas across modalities and mediums as they moved from talking whole group with their instructor and often viewing a presentation to talking and writing in small group breakout room settings. This flow of information and its comprehension can be challenging for students as "each medium has its own affordances, its own systems of representation, its own strategies for producing and organizing knowledge" (Jenkins, 2006, p. 47). Due to this challenge, scaffolding may be particularly important to help students navigate the multiple platforms and modes of HyFlex environments.

Intentional grouping

One of the distinctive features of a world increasingly digitally connected is "everyone knows something, nobody knows everything, and what any one person knows can be tapped by the group as a whole" (Jenkins, 2006, p. 39). Thus, *collective intelligence*, or the ability to gather information from different groups is a source of capital needed to be competitive toward common priorities in a digital world. Grouping has always been instrumental in higher education (Burke, 2011), yet in HyFlex grouping must be purposeful in integrating face-to-face as well as online students. This collective intelligence is apparent in HyFlex in how groups are formed and utilized, and this study showed both heterogenous and homogenous grouping are needed but for varying purposes; thus, grouping must be intentional.

Often, the students participating in differing modalities varied in the contribution to the courses. A student in the literature review course, student survey data noted, "I found the online students don't participate in discussion as much as the in-person students, so I often spoke up in the silence." However, the need for different groups was most apparent in the methods course observation data where the instructor had groups in the same modality participate in homogenous groups. For example, a student described, they "worked only with the students in-person or those in my in-person group that could not

attend for the session in a virtual format." This homogenous grouping had advantages. For example, those who were in-person could access data first-hand in observations in a study occurring at the university while online students had to be given data. The in-person students found this experience worthwhile: "Being in-person, having a hands-on [experience] with the research was the best part of the course."

However, students also craved interacting heterogeneously to develop relationships. One student noted, "Meeting online has its advantages and disadvantages. One advantage was timing of class. One disadvantage was not building relationships with others in the class." Thus, homogenous groups were needed to develop community as one student in the early childhood course commented: "Yes. We were a community . . . small group discussions allowed development of comfortability with classmates during class time and beyond." Yet, heterogenous groups were needed to build engagement with others and bridge perspectives. For instance, one face-to-face student seemed to miss not interacting more with others online: "I'm an introvert. I don't really know most of the people online." Jenkins (2006) discussed collective intelligence as a defining skill for a media age that allows students to pursue their interests into expertise, yet this skill is often untapped by school communities used to regulating students to be responsible for their own work. Thus, differentiating grouping in a HyFlex environment may be a step toward making education align with the problem-solving students will need in the future. Homogenous grouping, allowing for each member to specialize in a role and heterogenous grouping, forcing students to negotiate multiple perspectives while building community, both serve a purpose.

Consideration of classroom space
The physical space of a classroom in a HyFlex model is often a challenge for varying reasons and so must become an intentional instructional strategy (Bell *et al.*, 2014; Howell, 2022). In this study, a modification was made and noted in the research log between iterations to transition from classrooms with a camera providing a top-down view that had to be manually adjusted with a remote to the person speaking to conference room spaces utilizing a Meeting Owl inclusive of a camera, microphone and speaker that automatically adjusts to the person speaking and gives those online a view of the speaker as well as those in the room (owllabs. com). This modification was made in response to inhibiting factors of problems with technology in the classroom. Further, doctoral classes typically had a small number of in-person students attending each course session.

The course that implemented the smaller classroom environment and the Owl camera was the early childhood course. The instructor noticed in observation data an increased participation and appreciated the chance to pick up on nonverbal cues from students but expressed the need to continue to work on pedagogical strategies and demeanor within this smaller environment:

> Another minor issue was that because most students were online, I still looked at the Zoom screen for most of the night. I tried to make sure I was periodically glancing up at my face-to-face group, but it felt like most of what was happening was via Zoom.

This adaptation of traditional classrooms is illustrative for both the teachers and the students of the new media literacy skill of *play* or testing one's surroundings as a form of learning. This play may include experimentation with roles in learning, but also spaces and resources. Understanding the use of collective bodies and their use of space is both under researched and undervalued in research, often due to a focus on text, even in research attempting to understand multimodality (Leander and Boldt, 2013). Thus, in HyFlex, teachers and, in turn, their students should play with both their physical and digital classroom environments.

Discussion

Missing from HyFlex research is the theorization that helps us ground this emerging model of instruction in sound pedagogical strategies (Howell, 2022). We address the research question *What pedagogical strategies are necessary for the success of HyFlex course design?* with six strategies that merge the theory of new media literacies, the research of DBR and the practice of four courses in higher education. In this special issue *Pedagogical Innovations in Higher Education*, we merge this theory, research and practice to give guidance to an emergent model of course design. We hope by grounding each practice in the new media literacy it fosters, we give practitioners struggling to balance increasingly convergent online and physical spaces, the solid ground of basing their practices on the skills students will need to be successful in a participatory culture (Jenkins, 2006). As new media literacies do not abandon traditional literacy, but build upon it, we also begin with practices familiar to practitioners, but that need to be re-envisioned and distinctly cultivated for a digital culture. We discuss what formally was known as informal conversations in classrooms and expand it to chat and emojis. We build upon the notion of distributed cognition, such as using scratch paper for math problems (Jenkins, 2006), and extend it to flipped classrooms. Making use of classroom time should include multiple dimensions, synchronous and synchronous. While the notion of scaffolding with discussion protocols is not new, using these to merge asynchronous and synchronous contexts may be. Grouping used to include scooting chairs together, but now must connect in-class and online students. Finally, the classroom holds, yet use of this space must become more intentional and intimate. We aren't reinventing the wheel but finding new ways for higher education to steer in changing digital environments.

References

Abdelmalak, M. and Parra, J.L. (2016), "Expanding learning opportunities for graduate students with HyFlex course design", *International Journal of Online Pedagogy and Course Design (IJOPCD)*, Vol. 6 No. 4, pp. 19-37.

Afflerbach, P., Pearson, P.D. and Paris, S.G. (2008), "Clarifying differences between reading skills and reading strategies", *The Reading Teacher*, Vol. 61 No. 5, pp. 364-373.

Badiozaman, I.F.A., Leong, H.J. and Wong, W. (2022), "Embracing educational disruption: a case study in making the shift to a remote learning environment", *Journal of Applied Research in Higher Education*, Vol. 14 No. 1, pp. 1-15.

Beatty, B.J. (2019), "Hybrid-flexible course design: implementing student-directed hybrid classes", *EdTech Books*, available at: https://edtechbooks.org/hyflex/Acknowledge.

Bell, J., Sawaya, S. and Cain, W. (2014), "Synchromodal classes: designing for shared learning experiences between face-to-face and online students", *International Journal of Designs for Learning*, Vol. 5 No. 1, pp. 68-82.

Binnewies, S. and Wang, Z. (2019), "Challenges of student equity and engagement in a HyFlex course", *Blended Learning Designs in STEM Higher Education*, pp. 209-230, doi: 10.1007/978-981-13-6982-7_12.

Brewer, R. and Movahedazarhouligh, S. (2018), "Successful stories and conflicts: a literature review on the effectiveness of flipped learning in higher education", *Journal of Computer Assisted Learning*, Vol. 34 No. 4, pp. 409-416.

Brown, A.L. (1992), "Design experiments: theoretical and methodological challenges in creating complex interventions in classroom settings", *Journal of Learning Sciences*, Vol. 2 No. 2, pp. 141-178.

Burke, A. (2011), "Group work: how to use groups effectively", *Journal of Effective Teaching*, Vol. 11 No. 2, pp. 87-95.

Calafiore, P. and Giudici, E. (2021), "Hybrid versus HyFlex instruction in an introductory finance course", *International Journal of Education Research*, Vol. 16 No. 1, p. 40.

Cazden, C., Cope, B., Kalantzis, M., Luke, A., Luke, C. and Nakata, M. (1996), "A pedagogy of multiliteracies: designing social futures", *Harvard Educational Review*, Vol. 66 No. 1, pp. 60-92.

Collins, A. (1999), "The changing infrastructure of education research", in Lagemann, E.C. and Shulman, L.S. (Eds), *Issues in Education Research: Problems and Possibilities*, Jossey-Bass, San Francisco, CA, pp. 289-298.

Doo, M., Bonk, C. and Heo, H. (2020), "A meta-analysis of scaffolding effects in online learning in higher education", *International Review of Research in Open and Distributed Learning*, Vol. 21 No. 3, pp. 60-80, doi: 10.19173/irrodl.v21i3.4638.

Educause (2010a), "Seven things you should know about Backchannel discussion", available at: https://library.educause.edu/resources/2010/2/7-things-you-should-know-about-backchannel-communication.

Educause (2010b), "Seven things you should know about the HyFlex course model", available at: https://library.educause.edu/-/media/files/library/2010/11/eli7066-pdf.pdf.

Ensmann, S.Y., Gomez-Vasquez, L., Sturgill, R. and Whiteside, A.L. (2020), "A pandemic case journal of one higher education institution", *Quarterly Review of Distance Education*, Vol. 1 No. 3, pp. 19-22.

Ford, C., McNally, D. and Ford, K. (2017), "Using design-based research in higher education Innovation", *Online Learning*, Vol. 21 No. 3, pp. 50-67, doi: 10.24059/olj.v%vi%i.1232.

García, E. and Weiss, E. (2019), "The role of early career supports, continuous professional development, and learning communities in the teacher shortage", *Economic Policy Institute*, pp. 1-42.

Gravemeijer, K. and Cobb, P. (2006), "Design research from a learning design perspective", *Educational Design Research*, Routledge, London, pp. 29-63.

Howell, E. (2018), "Scaffolding multimodality: writing process, collaboration and digital tools", *English Teaching: Practice and Critique*, Vol. 17 No. 2, pp. 132-145, doi: 10.1108/ETPC-05-2017-0053.

Howell, E. (2022), "HyFlex model of higher education: understanding the promise of flexibility", *On the Horizon*, Vol. 30 No. 4, pp. 173-181, doi: 10.1108/OTH-04-2022-0019.

Howell, E., Butler, T. and Reinking, D. (2017), "Integrating multimodal arguments into high school writing instruction", *Journal of Literacy Research*, Vol. 49 No. 2, pp. 181-209.

Howell, E., Linder, S., Ryan, J. and Bridges, W.C. (2023 Submitted for publication), "Reimagining higher education through HyFlex".

Howell, E., Perez, S. and Abraham, W.T. (2021), "Toward a professional development model for writing as a digital, participatory process", *Reading Research Quarterly*, Vol. 56 No. 1, pp. 95-117.

Jenkins, H. (with Clinton, K., Purushotma, R., Robison, A.J. and Weigel, M.) (2006), *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*, MacArthur Foundation, Chicago, IL.

Jenkins, H. and Kelley, W. (Eds) (2013), *Reading in a Participatory Culture: Remixing Moby- Dick in the English Classroom*, Teachers College Press, New York, NY.

Jenkins, H., Ito, M. and boyd, D. (2016), *Participatory Culture in a Networked Era: A Conversation on Youth, Learning, Commerce, and Politics*, Polity, Cambridge, UK.

Lakhal, S., Bateman, D. and Bédard, 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*, Vol. 10, pp. 47-60, doi: 10.22329/celt.v10i0.4747.

Leander, K. and Boldt, G. (2013), "Rereading 'A pedagogy of multiliteracies': bodies, texts, and emergence", *Journal of Literacy Research*, Vol. 45 No. 1, pp. 22-46, doi: 10.1177/1086296X12468587.

Lightner, C.A. and Lightner-Laws, C.A. (2016), "A blended model: simultaneously teaching a quantitative course traditionally, online, and remotely", *Interactive Learning Environments*, Vol. 24 No. 1, pp. 224-238.

Lin, T., Jen-Yi, L., Feng, D. and Ling, L. (2013), "Understanding new media Lliteracy: an explorative theoretical framework", *Educational Technology and Society*, Vol. 16 No. 4, pp. 160-170.

McGee, P. (2014), "Blended course design: where's the pedagogy?", *International Journal of Mobile and Blended Learning*, Vol. 6 No. 1, pp. 33-55, doi: 10.4018/ijmbl.2014010103.

McGee, P. and Reis, A. (2012), "Blended course design: a synthesis of best practices", *Journal of Asynchronous Learning Networks*, Vol. 16 No. 4, pp. 7-22.

Miller, J., Risser, M. and Griffiths, R. (2013), "Student choice, instructor flexibility: moving beyond the blended instructional model", *Issues and Trends in Educational Technology*, Vol. 1 No. 1, pp. 8-24.

Raes, A., Detienne, L., Windey, I. and Depaepe, F. (2019), "A systematic literature review on synchronous hybrid learning: gaps identified", *Learning Environments Research*, Vol. 23 No. 3, pp. 269-290.

Reinking, D. and Bradley, B. (2008), *On Formative and Design Experiments: Approaches to Language and Literacy Research*, Teachers College Press, New York.

Reinking, D. and Watkins, J. (2000), "A formative experiment investigating the use of multimedia book reviews to increase elementary students independent reading", *Reading Research Quarterly*, Vol. 35 No. 3, pp. 384-419.

Schunk, D. (2020), *Learning Theories: An Educational Perspective*, 8th ed., Pearson, Hoboken, NJ.

Stewart, A.R., Harlow, D.B. and DeBacco, K. (2011), "Students' experience of synchronous learning in distributed environments", *Distance Education*, Vol. 32 No. 3, pp. 357-381.

Wang, Q., Quek, C.L. and Hu, X. (2017), "Designing and improving a blended synchronous learning environment: an educational design research", *International Review of Research in Open and Distance Learning*, Vol. 18 No. 3, pp. 99-118.

About the authors

Dr. Emily Howell is faculty member in literacy at Clemson University. Emily has taught English and writing at the secondary and collegiate level and currently teaches pre-service teachers and graduate students in education. Her research interests include multiliteracies, adolescent literacy, writing instruction, English learners and digital tools. Emily approaches research through partnerships with teachers using methodologies such as DBR. Her research has been published in journals such as *Reading Research Quarterly, Journal of Literacy Research, The Reading Teacher and Professional Development in Education*. Emily Howell is the corresponding author and can be contacted at: esmothe@clemson.edu

Dr. Koti Hubbard is Lecturer of early childhood education in the Department of Teaching and Learning at Clemson University. Hubbard spent much of her career as a kindergarten teacher in rural schools in South Carolina. Currently, she teaches undergraduate and graduate early childhood and literacy education courses. Her research interests include early literacy development, early childhood social studies and pre-service teacher preparation.

Dr. Sandra Linder is Professor of Early Childhood Mathematics Education and Assistant Chair of the Department of Teaching and Learning at Clemson University.

Stephanie Madison, PhD is the Project Manager for Clemson University's Teacher Learning Progression, an initiative designed to match teachers with focused professional development. She also teaches in the College of Education's Literacy, Language and Culture doctoral program. Her research focuses on social justice integration in language classrooms and the relationship between language, literacy and power. She also participates in humanitarian and immigrant advocacy work and is the co-editor of the book *Flying Kites: Narratives of Prison Literacies in Essays and Art*. Her non-profit organization, *Education Ilimitada*, was designed to bridge her research and humanitarian efforts.

Dr. Joseph Ryan is Distinguished Professor of Special Education at Clemson University. He is the founder and Executive Director of Clemson LIFE (Learning is for Everyone), a nationally recognized post-secondary education program for young adults with intellectual disabilities. Dr. Ryan has over 100

publications and serves as Editor of the journal *Beyond Behavior*. His research interests focus on behavioral interventions and enhancing post-school outcomes for individuals with disabilities. He has been interviewed by Anderson Cooper, CNN, Headline News, *New York Times, USA Today, Wall Street Journal* and other leading periodicals and given two U.S. Congressional Briefings.

Dr. William C. Bridges is Alumni-Distinguished Professor in the Department of Mathematical Sciences at Clemson University. His primary professional interests involve the statistical aspects of research projects. He has collaborated extensively with colleagues across the University on the design, analysis and presentation of both survey and experimental data. He teaches both undergraduate and graduate level courses in statistical methods, statistical research design and data analysis.