MENTOR IN THE MIDDLE: REIMAGINING THE ROLES OF TEACHER AND LEARNER THROUGH MINDFUL TECHNOLOGY

Evangeline Marlos Varonis, Hiram College
Maria Evangeline Varonis, Novera Research Group
United States of America

Abstract

Though technology can isolate individuals, mindful use of technology can have profound positive effects on relationships and learning outcomes. This paper describes the first year implementation and preliminary results of a "Tech and Trek" 1-to-1-iPad initiative at Hiram College. We suggest that when coupled with appropriate professional development, mobile devices such as the iPad can liberate instructors tethered to the front of the classroom and allow them to act as "mentor in the middle." At the same time, students can also assume the mentor role, increasing their engagement in the learning process.

Introduction

As technologies are introduced and gain traction, they can deeply impact – or even disrupt – interpersonal dynamics at the same time they facilitate wider access to information. For example, the introduction of the TV and its integration into homes in the 1950s and 1960s led from families gathered around the fireplace or the radio in the evening to families lined up facing a television set, and home decorating followed suit: "By the early 1950s, floor plans included a space for television in the home's structural layout, and television sets were increasingly depicted as every-day, commonplace objects that any family might hope to own" (Spigel, 1992, p. 39). The model of family members gathered around a single TV morphed in many families to individual family members viewing their own TVs, e.g., in individual bedrooms, the laundry room, the kitchen, or the study. However, the more recent explosion of mobile devices may have driven a return to the TV as focal point in a common room, with a twist: "families are once again gathering around the main television set, but they are bringing their tablets and smartphones with them" (Garside, 2013, para. 2).

Just as TVs – and mobile devices – are impacting social dynamics in the home, emerging learning technologies can impact the relationships among instructor and students, driving innovation in teaching and learning practices, and a rethinking of traditional interactions among instructors and students. This is especially true of mobile technologies like the iPad. These technologies can liberate both instructors and students.

They can liberate instructors from the front of a technology-enhanced classroom, where for decades they have been cabled to a panel or directly to a projector in order to display multimedia course content. Instead, the instructor is freed from the shackles of the technology and able to move among the students, viewing and discussing their work, providing feedback, adjustments, and support, much as a yoga instructor does when assisting a student into a yoga posture.

Similarly, mobile technologies can liberate students from the traditional role of "receivers" of information, since students as well as instructors can utilize technology to share content from where they are sitting. The notion of student as teacher is not new, but current technologies facilitate and expand that role in a way that has not previously been possible.

Conceptual Framework: Models of Pedagogy

A preference for inquiry, dialogue, and debate over lecture and memorization has been documented at least since the time of Socrates. He based his educational practices on asking questions, prompting his circle of students to demonstrate critical thinking and ownership of their own learning as he led them to answer those questions for themselves. A direct statement of this philosophy can be found in Xenophon's *Oeconomicus* when Socrates comments: "Can it be that questioning is a kind of teaching, Ischomachus...You lead me by paths of knowledge familiar to me, point out things like what I know, and bring me to think that I really know things that I thought I had no knowledge of" (1923, pp. 507-509).

Socrates' emphasis on the interactive nature of education has been supported in the last century or so by others, worldwide. American educational philosopher John Dewey explicitly comments on the importance of social interaction when he states, "The only true education comes through the stimulation of the child's powers by the demands of social situations in which he finds himself" (1897, p. 77). Similarly, French educational theorist Jean Piaget (1954) asserts that individuals construct new knowledge from their interaction with the environment, and such interaction includes social experiences: "Step by step with the coordination of his intellectual instruments [the child] discovers himself as an active object among other active objects in a universe external to himself" (p. 352). And Brazilian philosopher Paolo Freire (1970/2000) criticizes theories of education that hold "knowledge is a gift bestowed by those who consider themselves knowledgeable upon those whom they consider to know nothing" (1970/2000, p. 72) and that consider students empty buckets waiting to be filled. Instead, he argues, "Education emerges through dialogue between teacher and student: the problem-posing educator constantly re-forms his reflections in the reflection of the students" (p. 80).

Constructivist frameworks such as these that insist on the critical importance of interaction, in particular social interaction, pull away from authoritarian, teacher-centered models of education that envision the instructor as a "sage on the stage" who imparts wisdom on students below (King, 1993). King describes this archetypal persona personifying a traditional model of education

as “the one who has the knowledge and transmits that knowledge to the students, who simply memorize the information and later reproduce it on an exam—often without even thinking about it” (p. 30).

She called instead for a move from the one-way sharing of information to a student-centered approach that encourages students to construct knowledge through actively engaging with information, “making meaning for themselves” through discussion and connecting new information to previous experience (p. 30). Such a model calls for the instructor to move from “sage on the stage” to “guide on the side,” still responsible for presenting course material but also facilitating “students' interaction with the material and with each other in their knowledge-producing endeavor” (p. 30).

Yoga practitioners of course experience a teacher-student relationship that might begin and end with the instructor at the front of the group, but often includes the instructor moving purposefully among students during the class. In a sense, the yoga instructor is a “mentor in the middle,” in a very physical sense providing hands-on direction, adjustments, and support to students as they attempt new poses or try to refine those they have tried before. According to longtime yoga student, instructor, and author Mark Stephens, facilitating yoga in the classroom combines two philosophical concepts: *parinimavada* (the idea that change is a continual and inherent part of life) and *vinyasa karma* (the act of arranging in a particular way, including physical yoga postures, syncopated breath, etc.). Stephens notes, “For a teacher, this means letting go of the preconceptions about students and classes in favor of observing where they are and offering guidance based on that observed reality” (2012, pp. 15-16). This further plays into the idea that teachers must orient themselves among their students in the classroom in order to truly observe and understand students’ comprehension at that moment. “The basic idea is to start from where students are and guide them to move consciously – in a special way – as they progress from simpler to more complex practices, gradually refining [their practice]” (Stephens, 2012, p. 329). The successful yoga teacher will have general goals for the design of a class but will also be able to adjust during delivery. As Stephens points out, “It also means crafting and teaching sequences that make sense in terms of the students actually in a class rather than teaching a preconceived sequence that could be too easy, too hard, too complex, or otherwise inappropriate for that particular class on that particular day” (2012, p. 15).

While the practice of yoga does not demand technology, the popularization of the practice in western culture has for many created a deep connection of music to practice. According Derek Beres, longtime yoga instructor, author, and founder of Mosaic Method and Flow Play – an initiative that binds neuroscience, music, and yoga – “nothing, in fact, affects as many regions of your brain as music” (Beres, 2018, para. 2). Beres explains that music is the only non-essential evolutionary tool that has remained a constant element in human life, and that this innate connection lends itself to the use of music during yoga practice. With this, yoga instructors often use technology to amplify music and sound to foster the build of sequencing. This additional element to learning can encourage or enhance momentum (flow) through up-

beat syncopation, or to help settle the mind and lower the heartrate with low-tempo rhythm. According to Beres, sitar music – a yoga favorite – is the only tested and proven genre to lower cortisol levels in a listener's blood, which helps to repair tissue in the human body and increase relaxation. Knowing this, instructors can use music to aid their instruction and benefit their students.

Most instructors stream music through apps such as Spotify or Pandora directly from hand-held technologies. The ability to have control over this educational tool as they move around the classroom allows instructors to shift gears based on the needs of their students. When observation of students dictates they need a breath, or stillness instead of movement, a simple thumb click can shift gears musically and invite or encourage students to find a resting posture, like child's pose, based on their needs at that moment. In this way, students are active participants in the sequencing and instruction of their own learning.

We argue here that mobile technology can allow instructors of any discipline to act as "mentor in the middle"; they can "read the room" just as a yoga instructor does by moving among their students, responding to challenges, providing just-in-time adjustments, and encouraging collaboration and sharing. In turn, the physical proximity of an instructor who is not tethered to the front of the classroom can encourage interaction with students shy about asking questions or making comments in front of the whole class. Similarly, opportunities for group work enabled by devices that each student possesses can increase interaction, brainstorming, and creative responses to assignments both during and outside of class time. In addition, the democratizing nature of 1-to-1 access to devices for all students can help avoid perpetuating the digital divide that occurs as a result of unequal access to technology.

The Hiram College Tech and Trek Initiative

Hiram College is a small, private liberal arts institution of higher education in northeast Ohio with a long history of innovation in teaching and learning. A notable graduate is James Garfield, who later became teacher and principal there before becoming President of the United States in 1881. Hiram College includes both a Traditional College, composed of traditional students (18-24), 80% of who live on campus and 40% of who participate on athletic teams, and a Weekend and Evening College, offering education to adult students with careers and families. With a long history of curricular innovation (Miller & Varonis, 2017), the college is currently involved in an academic redesign, updating its curriculum to reflect the "new liberal arts" (Varlotta, 2017, para. 4). This approach affirms the importance of a liberal arts education while cultivating "the 21st-century competencies associated with increasingly global communities and workplaces" (para. 3). The biggest technological piece of that redesign has been the introduction of the "Tech and Trek" initiative, a 1-to-1-iPad initiative introduced in Spring 2017 and funded through a generous donation from a member of the Hiram College Board of Trustees and his wife. By August 2017, all full-time faculty and staff received a new iPad Pro for use in teaching and administrative responsibilities, and all full-time students in the Traditional College were issued an iPad Pro and hiking boots to emphasize the

importance of balancing technology with other pursuits. As described in *InsideHigherEd*, the hiking boots became part of the initiative because "the college doesn't want students to use technology as an excuse to become more engrossed in their phones and computers" (Tate, 2017, para. 8). A previous iPad initiative in 2013, limited to a handful of faculty in the Weekend and Evening College, did not include student adoption, offered limited professional development to faculty, and never gained traction.

The goals of the Tech and Trek initiative are symbolized in its logo, which includes a circle enclosing four key components (Figure 1): at the top, an iPad, representing mobile technology; on the right, a hiker, representing both a physical and intellectual "trek"; at the bottom, a light bulb, representing innovation; and on the left, a drop of water, representing mindfulness. The mindfulness symbol is explained by its creator, graphic designer Giedrius Cibulskis as "like a physical representation of present moment" with the vertical forms representing time, horizontal forms representing space, "And the one is always in the center – being here and now – perfect equanimity" (2017, para. 1). Simultaneously, the image depicts mindfulness as a water drop "which symbolizes time – past and future, both are illusions, no need to spend much time there, stay centered in the present" (para. 2). The four symbols represent four different and integral dimensions of the Tech and Trek program, which can be viewed as utilizing technology on both outward treks leading to creative and innovative interactions with the environment and inward treks leading to personal harmony and balance.

Figure 1. Hiram College Tech and Trek logo.

In early Spring 2017, before committing to adoption of the initiative, teams of Hiram College faculty and staff visited three colleges that had recently implemented 1-to-1 iPad initiatives in order to discuss with them their experiences. Shortly after, seven full-time members of the faculty and staff (including the first author) were invited to serve on an advisory committee known as the Transformers, charged with developing rollouts and professional development for their peers. Full-time faculty and staff were encouraged to apply for a role as an *Early Adopter*, which included receiving an iPad bundle (iPad Pro; keyboard; Apple Pencil) in late Spring 2017. The Early Adopters (EAs) committed to multiple professional development opportunities: completing eight Apple badges in the use of the iPad, participating in "Appy Hour" sessions on iPad apps led by Hiram College faculty and staff, attending

professional development sessions led by Apple facilitators, and completing an iTunes U course over the summer that had been designed by the Transformers and included opportunities for EAs to participate in discussion forums, complete assignments, and reflect on the application of mobile technology and universal design for learning (UDL) to their own courses. One measure of the level of engagement can be seen in quantifying interaction in the iTunes U discussion forums: in the UDL section of the course, EA created 103 posts in required discussions and spontaneously initiated six more discussion threads, totaling another 97 posts.

While the faculty and staff were engaged in professional development to prepare them for utilizing the iPads, the IT team was involved in improving the infrastructure by expanding wireless access points and installing Apple TVs in highly-used classrooms. The Apple TVs made it possible for instructors to connect wirelessly with the projector in order to display what was on their screens from anywhere in the classroom. In this way, faculty could take full advantage of the new technology and avoid being tethered to a blackboard or an audio/visual control panel at the front of the classroom, instead moving in the middle of the class and among the students. And students could just as easily display their screens as well.

Though it was originally envisioned that a second round of iPad bundles would be distributed to non-EAs in spring or summer 2018, original donors Dean Scarborough and Janice Bini decided to make additional funds available in summer 2017, so remaining faculty and staff received them at the same time that students did. This provided for an unexpected comparison group for research purposes, since the second round of adopters had not participated in the intensive professional development afforded the EAs. There were additional opportunities offered in Fall 2017, though they were largely attended by the EAs. In total, entering fall semester there were 43 faculty EAs and 38 full-time faculty non-EAs.

Throughout the process of researching and implementing iPad adoption, a key question concerned integration of mindful technology into teaching and learning and the impact of iPad utilization in particular on learning outcomes. The primary aim of Tech and Trek was to teach *mindful technology* – encouraging students to creatively and critically use technology to enhance their learning on and beyond the campus. The “Tech” component promoted technology as an equalizer, as all faculty and students would have the same device. The “Trek” component was envisioned as promoting activity while enhancing experiential learning through off-campus experiences such as international study, internships, clinicals, and visits to the biology field station as well as encouraging “off-the-grid” time. Together, it was hoped that “tech” and “trek” would encourage students to think more critically and creatively and interact more with their environment, thus staying centered and finding balance during their challenging undergraduate years and preparing themselves to be lifelong learners. As articulated by Dean Scarborough (personal communication, July 28, 2017):

> I initially was focused more on learning outcomes, especially on using the technology to help students learn more efficiently and effectively. This dialogue is also focused on the "emotional intelligence" of our students, helping them not only learn, but to communicate and interact more effectively in today's world.

Results of the First Year of Implementation

Analyzing the impact of a technological innovation on learning outcomes is not an easy task. For the first year, both quantitative and qualitative data were collected from faculty, staff, and students in an attempt to document the effect of iPad implementation related to both education and administrative processes.

Fall 2017 Surveys

In the first semester of implementation, Fall 2017, anonymous surveys were administered to all faculty, staff, and students who had been issued iPads at the beginning of the semester, and repeated in the middle and end of the semester. Likert questions focused on iPad use and attitudes but were not formulated to directly ask about changes in classroom practices such as those we focus on in this paper. Only the student and faculty surveys will be considered here.

Student surveys. Students were surveyed on their use of the iPad and their attitudes towards its impact on their learning on a 5-point Likert scale. The highest agreement scores are summarized in Table 1, averaged over the three checkpoints.

Table 1

Student Perceptions of iPad Use in Fall 2017

Student iPad Use	Score out of 5; 5 = “Strongly Agree”
Access entertainment	4.56
Collaborate more effectively	4.40
Study and complete homework	4.36
Be more creative	4.32
Communicate better	4.27
Overall, I feel the iPad helps me learn	4.25

Clearly students were utilizing their iPads to “Access entertainment,” and this was supported by IT reports of Netflix usage during the year. Reassuringly, however, they also affirmed use of the iPad for educational activities. As one student commented at Checkpoint 2 in response to an open-ended question,

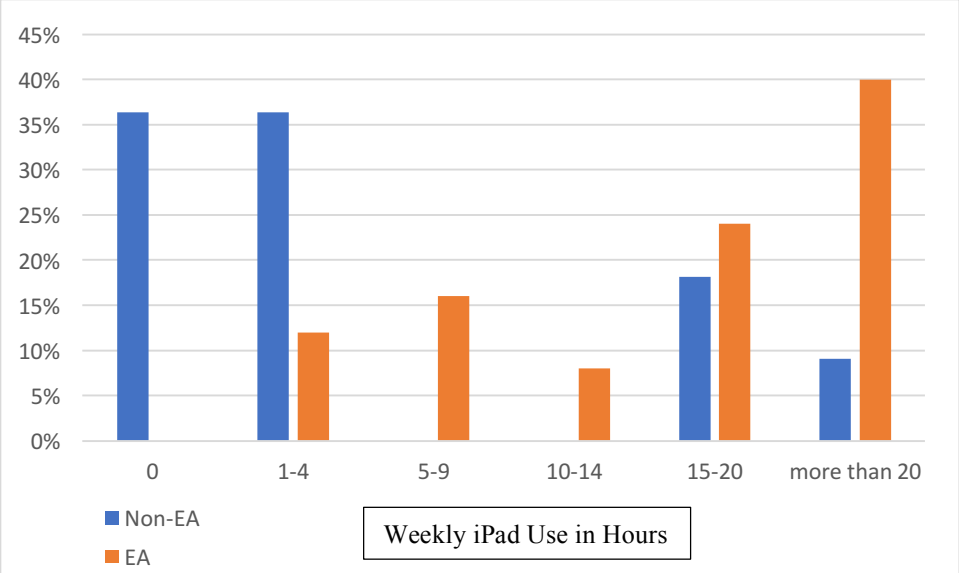
> I enjoy the cooperativity from everyone having the same type of device so there is similar functionality and it helps when working on projects. Also, I enjoy the interactive nature of all students being able to project their information on the projector to share with the class if it is relevant and necessary.

This comment anecdotally supports the concept of "mentor in the middle" that underlies this paper.

Faculty surveys. Faculty surveys were also administered, focusing on amount of usage, types of use, and attitudes towards use. A critical variable was whether the respondents were EAs, though it is difficult to distinguish whether the difference resulted from their desire to be EAs, or their professional development as EAs. The highest response rate was at Checkpoint 1 (36, representing 25 EAs and 11 non-EAs), which is the data summarized in this section. As Table 2 demonstrates, EAs utilized their iPads far more than non-EAs. For example, 40% of the EAs utilized their iPads more than 20 hours a week, but only 9% of the non-EAs did so; this trend continued at Checkpoints 2 and 3.

Table 2

Faculty Non-early Adopters (Non-EA) vs. Early Adopters (EA): Percentage of Weekly iPad Use in Hours at Checkpoint 1



In addition to hours of usage, attitudes towards the impact of the iPad on teaching and learning, as measured by a 5-point Likert scale, differed between the EAs and non-EAs. As Table 3 demonstrates, for every question except one, EAs agreed more strongly with statements about the impact of the iPad. The sole exception was the statement "I feel the iPad distracts me from the task at hand," where non-EAs (2.63) had slightly stronger agreement than EAs (2.56).

Table 3

Faculty Non-early Adopters vs. Early Adopters: Attitudes towards the Impact of iPad Use

	Early Adopters	Non-early Adopters
In general, I feel satisfied with my iPad's ability to help me:		
Access entertainment	3.72	3.38
Be more creative	3.80	3.38
Collaborate more effectively	3.72	3.38
Communicate better	3.48	3.13
Overall, I feel the iPad helps facilitate my intellectual growth.	3.48	2.67
I feel comfortable and proficient using my iPad.	3.84	3.25
I feel my iPad helps me connect with my community.	3.44	2.88
I feel my iPad helps me connect with nature.	2.36	2.25
I feel my iPad helps me to focus on the task at hand.	3.28	3.00
I feel the iPad distracts me from the task at hand.	2.56	2.63
I feel the iPad helps me to be more productive.	3.40	3.25
I feel I get the technical support I need for my iPad.	4.26	3.50

Challenges and barriers. An open-ended survey question explicitly requested faculty to share "challenges and barriers," and they did. Common concerns included unimproved infrastructure in some locations, the lack of an iPad filing system (before the release of iOS11), inability to print (before this was resolved), and the potential of iPads to distract students in the classroom. In addition, a number commented on their own ability to utilize the iPad effectively for teaching and learning. One EA commented, "I am still working on transitioning many of my class topics into formats that make full use of the iPad's capabilities. Time to make those changes is my biggest challenge. Not a barrier, but definitely a challenge." In contrast, a non-EA commented:

> I already know how to do what I need to do on my laptop. While the iPad may do similar things, it is not clear why I should invest the time in learning new ways to do what I'm already doing. The iPad may provide a DIFFERENT way, but so far I haven't seen that it is a BETTER way… I don't understand what they bring that I couldn't do before or what they allow me to do better than I'm already doing.

Best learning experience. A second open-ended question prompted faculty to discuss their "best learning experience" with the iPad. A recurring theme was enhanced participation from students through the technology; one non-EA commented simply, "Sharing screens for in-class group assignment reporting out," while an EA noted, "Students being able to project their work or what they have found on their iPad onto a screen has been awesome. I was also able to circumvent a problem with students uploading video assignments because they could air drop them to me." A number mentioned specific apps that they were successfully using, with a non-EA commenting,

> I love being able to have my students work on problems in Notability, rather than having to print off problems. This saves paper and allows me to generate learning tools on the fly in the classroom that can be immediately accessed by the students.

This same non-EA also applauded the ubiquitous availability of the device and its impact on teaching methods: "It is also wonderful that all students have an iPad – in years past, not all students had a laptop which inhibited use of technology in the classroom."

Personal Interviews with Faculty Early Adopters Fall 2017

All EAs were contacted by staff of the Office of Learning Technologies for personal interviews at the end of the fall semester 12-week session. Although these interviews have not been formally synthesized, there were many commonalities in terms of the impact of the iPad in and outside of class. Instructors commented upon their ability to:

- Display the solution of a problem in real time.
- Display their notes or annotations on instructional materials.
- Return to an image previously displayed (as opposed to writing on a board that had to be erased to make room for more writing).
- Utilize real-time surveys enabled by iPad polling apps to help them adjust their face-to-face lectures "on the fly."
- More easily implement problem-based learning methods.

Faculty also noted that the iPads afforded better opportunities for student-student collaboration; one commented "engagement was probably better because it was easier for them to work together and with me."

Other advantages for students that the faculty pointed out were:

- Note-taking
- Concept-mapping
- Annotating electronic course materials with their Apple Pencils during class
- Engaging in internet research on the fly
- Drafting written work through dictation as a way to avoid writer's block
- Enhancing small group "report back" sessions by projecting group-created documents
- Increased opportunities for students to help each other since they all had the same device.

In addition, the iPad afforded more opportunities for student creation beyond traditional essays or research papers. For example, they could create podcasts or videos to demonstrate achievement of learning objectives or for presentation in class.

The most common challenge that faculty related with respect to iPad use in the classroom was the increased potential for students to be distracted by their devices, e.g., by notifications of e-mail or social media posts. One strategy

was to ask the students to shut their iPads before a discussion, but this was "tricky," as one faculty member phrased it, as students were also using their iPads for note-taking. However, faculty noted that student smartphones provided the same distractions before iPad implementation.

Spring 2018 Data Collection

Data collection continued in the spring, with surveys administered to students, faculty, and staff. In addition, Early Adopters were asked to submit a year-end report summarizing their use.

Student Surveys. Short surveys administered to students in Spring 2018 included three open-ended questions about positive and negative outcomes of iPad use and suggestions for the future. There were 115 responses of approximately 800 students who had received iPads by the spring. Results have not been fully coded yet, but individual responses reveal positive attitudes about the iPad as a tool to facilitate student consumption and creation of content. Student iPad use in particular facilitated note-taking, annotating electronic documents made available by the instructor, creation of projects, presentations, collaboration with other students, and on-the-fly research. Many were very appreciative of an instructor who created iBooks with that "beautifully synthesized PowerPoints, readings, and questions."

Relevant to the concept of "mentor in the middle," students commented on their ability during class sessions to view others work, communicate with others, share documents (in particular through air dropping), and work on problems and share solutions. One respondent commented, "It allowed us to transition quickly between presenters." With respect to how they might be used in a future course, many students indicated greater use of "mirroring" to allow student presentations would be beneficial; others asked for greater interaction and collaboration.

At the same time, a number of students pointed out that iPad use could be a distraction during class, just as faculty had previously observed. One admitted, "I sometimes would not pay attention in class and go on social media on my iPad," though another commented, "There were no ways the iPad hindered my learning."

Early Adopter End-of-Year Reports. Early Adopter faculty were required to submit an end-of-year report summarizing their experience utilizing iPads for teaching and learning. Though not compiled yet, the reports provide support for the success of the first year of Tech and Trek. One EA had integrated a "major new and novel course activity," namely, a Protein Structure Scavenger Hunt, and frequently had students share their screens while in class. He reported, "increases in student curiosity and engagement" and "statistical evidence that the iPad integration improved learning" as student performance on the American Chemical Society Biochemistry exam increased by 20 – 25% over the previous year (Romberger, 2018, p. 2).

Conclusion and Next Steps

Some argue that technology can isolate people from each other as they immerse themselves in social media and have less time for those that share a physical space. As Turkle states in *Alone Together*, "These days, insecure in our relationships and anxious about intimacy, we look to technology for ways to be in relationships and protect ourselves from them at the same time" (2011, p. xii). However, technology when utilized mindfully can enhance relationships and liberate users, in particular with respect to teaching and learning. It can provide opportunities for instructors and students to interact in new and powerful ways by breaking down barriers created by traditional classroom architecture and infrastructure, to aid instruction and motivate students, just as music does in teaching yoga. Mobile technologies embrace and advance educational practices grounded in the social construction of knowledge, allowing both the instructor and students to assume the role of "mentor in the middle" in support of student achievement of learning objectives, in particular when all students have access to the same technologies and use them in a mindful way.

For the technology to be effective, however, and lead to improved learning outcomes, faculty and students must be prepared to use devices purposefully and effectively. Professional development for faculty, including formal and informal sessions, can help them become comfortable with new devices and encourage informed risk-taking when trying out new methods. At the same time, conversations about the dangers of technology use – including distraction and isolation – should be included in any orientation to new devices to help ensure they are used mindfully.

Clearly, more research is needed, and there is more to learn from data already collected. Can we find the right balance of professional development for faculty that will prepare them and continue to engage them? Can we isolate best practices that have the greatest impact on enhancing learning outcomes? Are students whose instructors practice "mentor in the middle" for themselves and for their students more engaged and excited about their learning that those who do not have that experience? How do we learn what works best and what we should avoid when implementing new technologies in a teaching/learning environment? We have learned much this year, and hope we can apply it to future implementation and evaluation of our efforts.

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Author Details

Evangeline Marlos Varonis

varonisem@hiram.edu

Maria Evangeline Varonis

maria@noveraresearch.com