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Transforming the delivery of chiropractic education through the strategic integration of educational technology in a chiropractic college program

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ABSTRACT

Objective: Chiropractic institutions face the challenging quandary of how to prepare future doctors for entry into a society completely transformed by technology. At an increasing rate, the incoming student profile is representative of a digital generation with a high affinity for technology use. The aim of this study was 2-fold: (1) outline the basic elements of a technology integration program at our institution and (2) determine if a potential relationship exists between ongoing training and acceptance of such a programmatic shift among faculty and students.
Methods: At each phase of technology integration, electronic survey instruments were deployed to participating students and faculty members. Survey instruments included question items assessed through Likert-type scales and open-ended questions to provide students and faculty members with a vehicle for providing specific feedback. To ensure anonymity of student and faculty survey respondents, the response collection source was a different department than the deployment of the survey emails. Participants were encouraged, but not required, to complete the surveys.
Results: Analysis of survey responses generally found increases in overall participant satisfaction and acceptance of the technology integration with the provision of ongoing support systems.
Conclusion: As suggested in similar scholarship in the field, the results of this study underscored the value of support systems for faculty members and students in an academic community. The systems that provided ongoing training and other support mechanisms seemed more accepted when tailored to myriad skill levels. Creating a culture in which faculty members and students felt adequately supported fostered the acceptance necessary for forward momentum of a campus initiative of significant change.

Key Indexing Terms: Pedagogy; Educational Technology; Mobile Devices; Chiropractic; Education

J Chiropr Educ 2023;37(2):106–115 DOI 10.7899/JCE-21-17

INTRODUCTION

Chiropractic education, like many programs in the higher education landscape, is grappling with the impact of technology on program delivery. "Millennials interact with technology like no other generation before them and it is affecting how they want to be taught in higher education."[1] Comparatively, the field of health care has witnessed the necessity of integrating varying levels of technology to meet the changing needs of patients. Wilson asserts, "The digital revolution has affected virtually every aspect of our lives, and health is no exception."[2] With technology as a significant driver of change in today's society, the question for our campus administration was how we could best prepare doctors of chiropractic for success in a technology-enhanced society? This question became the impetus for an initiative to shift our campus from paper-laden instructional methods to a technology-enhanced program for preparing future chiropractors for practice in today's society. This paper describes the process that we used to navigate this process.

First Published Online May 16 2023

METHODS

Programmatic survey instruments provide data on the experiences of participants to inform development decisions. The student survey instrument used in this study evolved over time, with variations in the question items, designed to begin with an assessment of the experiences in specific courses and shift to the general usage of a campus-issued mobile device and other educational technologies. Just-in-time review of the survey data allowed for ongoing programmatic changes as the technology initiative evolved. Similarly, an annual faculty survey was modified after year

2 in the program to represent the faculty growth in technology use from novice to some faculty even integrating technology use at an expert level.

The study was reviewed and approved by the Sherman College of Chiropractic institutional review board (TCE-TUTO 72921). The distribution and collection of the survey data from faculty and students was conducted in such a manner that participants could not be identified, directly or through identifiers linked to their responses, by any parties participating in the data analysis process. The research was conducted in an established educational setting, involving normal educational practices that examine the effectiveness of or the comparison of instructional techniques and curricula delivery through the integration of various instructional technology. Students and faculty received emails requesting their participation in the surveys, which outlined the value of their feedback to the ongoing programmatic development and improvement. Respondents were not coerced to participate.

Surveys

The survey process for this project was a collaborative effort between the Office of Institutional Effectiveness, responsible for campus-wide assessment and data collection, and the Center for Teaching and Learning, the project lead for the technology initiative. The Office of Institutional Effectiveness created the survey instruments using a web-based platform and shared the survey links with the director for the Center for Teaching and Learning for email distribution to students and faculty. The quarterly, course-specific student email distribution was a list of students who received a campus-issued iPad (Apple Inc., Cupertino, CA, USA) in the designated quarter. The student survey transitioned from a quarterly instrument to an annual campus-wide survey to gauge technology usage. Access to the web-based survey collection site was limited to staff in the Office of Institutional Effectiveness. The collection time frame for each survey was approximately 1 week. At the close of the survey, a staff member in the Office of Institutional Effectiveness disseminated survey results to the director for the Center for Teaching and Learning for analysis. All identifying information was removed from student and faculty surveys to preserve the anonymity of respondents. All technology survey data were secured by the Office of Institutional Effectiveness.

The 1st cohort of students in the iPad deployment, identified as the "pilot quarter," received a survey that focused on their experiences in specific courses each quarter during their 1st year of participation in the technology program. All students participating in year 1 of the program received this course-specific survey, which provided data for gauging overall usage and identifying potential issues requiring additional faculty support in technology integration. Questions focused on (1) the percentage of in-class mobile device usage, (2) the nature of in-class mobile device usage (ie, reading class materials, note-taking, research, in-class work, presenting to the class, and sharing information with fellow classmates), and (3) use of the mobile device outside of class. Two questions provided students with the opportunity to share their perceptions of the usefulness of the mobile device for their overall learning experience as well as its specific utility in each course for that quarter.

In the 2nd year of the study, quarterly surveys to student participants transitioned to a modified instrument with questions assessing their perceptions in the following areas: classroom engagement, impact on learning, extended learning environment (learning outside the classroom), and increased collaboration. An additional open-ended question offered a platform for students to provide their overall feedback of the technology initiative. In the last year of student surveys, a category focused on the electronic testing pilot was added to the student survey to assess their experiences in the shift from paper-based testing to electronic testing using the iPad.

Faculty began participation in an annual mobile device usage survey in the 1st year of the student distribution. The protocol implemented ensured that the anonymity of student responses was also applied to the data collection for the faculty surveys. Survey items gauged faculty perceptions in the following areas: frequency and comfort with using technology in the classroom, types of educational technologies used in the classroom, and perceived strengths and weakness in their use of the campus-assigned mobile device. One question prompted faculty to rate, using a Likert-type scale (*strongly agree* to *strongly disagree*), their perceptions of the level of impact the integration of the mobile device had on innovation, creativity, organization, and collaboration. The final open-ended question provided faculty with an opportunity to share their requests for additional support to ensure a greater level of preparedness in the use of the mobile device or other instructional technology in their classroom teaching. Faculty were encouraged to include self-identifying information in the open-ended question so their specific development needs could be addressed.

The faculty survey instrument evolved with program growth just as with the student survey. The 2 significant factors affecting the modifications to the surveys were the distribution of mobile devices to every student on campus and the faculty's perceptions of comfort with the use of the iPad. Annual faculty surveys included items to assess the early adoption of the college-issued iPad. Another question removed from the faculty survey beginning in 2018 gauged faculty readiness to use the iPad in classroom instruction ("How would you rate your current level of readiness to use the iPad in your classroom?"). By this stage in the project, all faculty members were using the iPad and other technology in classroom instruction.

In addition, the question item used to assess the faculty perceptions of the iPad on their teaching in the areas of innovation, creativity, organization, and collaboration was modified in the 2018 survey to include questions regarding the overall use of technology in teaching. It was important that the survey instruments evolved with the changes to the technology initiative to adequately assess the experiences of all participants. For example, as faculty members became more proficient in their use of various forms of

educational technology in their teaching, their survey instrument was slightly modified to reflect their growth.

Participants

The pilot group began with 43 students. The pilot group responses were tracked as a separate group for the purpose of identifying specific feedback from their open-ended questions. In the following quarter, students enrolled in all 9th-quarter courses were added to the technology program as well as continued with the next group of students enrolled in 4th-quarter courses for a total of 76 new students added to the program. The process of adding students enrolled in 4th- and 9th-quarter courses continued through the end of year 2 for a total of 432 study participants. Beginning in the 2nd year of the program, we began to issue the campus mobile device to incoming 1st-quarter students during orientation.

Faculty Development

Before the 1st iPad deployment to students, faculty participated in a year-long training and preparation period led by the director of teaching and learning with the newly established Faculty Council on Educational Technology (FCET). The FCET, with the inclusion of some senior faculty, consisted of early adopters with various levels of technology use in their current classes. The duties of the FCET team included course evaluations to recommend the addition of new educational technologies for courses in the initial iPad deployment to students, serving as a faculty team leader for faculty involved in the iPad deployment, participation in faculty development sessions, and collaboration with the teaching and learning director. The FCET team was incentivized with a modest stipend for their duties during the 1st year of deployment to students. Friel et al[3] outlined a similar model for training faculty with faculty trainers similar to our FCET team.

The Center for Teaching and Learning serves as the hub for faculty development in the areas of the design, use, and management of instructional technology as well as support in areas relating to pedagogy. Faculty are afforded the benefit of ongoing development focused on research-based pedagogy combined with the "how-to" of strategically incorporating technology. At the start of each quarter, faculty participate in required large-group development sessions, and throughout the quarter, optional small group sessions and 1-on-1 meetings are available to faculty. Opportunities are available for faculty to attend technology and/or teaching conferences, and in turn, these faculty are required to conduct development workshops back on the home campus.

Simultaneous to the year-long faculty preparation, the director of teaching and learning collaborated with the Office of Academic Affairs to develop a plan for selection of the quarter courses to be the 1st selected for iPad distribution. Two key factors contributed to the decision to deploy iPads to all students enrolled in the 4th-quarter courses. One was the skill level of the faculty teaching 4th-quarter courses and the potential for high usage of technology in these courses. The 2nd was the decision to deploy to a single quarter of students and progressively adding additional groups created a manageable schedule that resulted in deploying devices to incoming 1st-quarter students a year out from the initial student iPad distribution.

In the quarter before each student iPad deployment, the director of teaching and learning collaborated with specified faculty members to evaluate and redesign course content to create a technology-rich learning environment. Members of the FCET served to support faculty to implement various technologies into their revised course curriculum. The standard course redesign strategy focused in the following areas: transform the traditional course notes (PDFs formally available to all students on a Google Drive; Google LLC, Mountain View, CA, USA) to iBook (Apple Inc, Cupertino, CA, USA) format, organization of course content in newly adopted learning management system, and exploration of iPad applications to enhance specific course content or increase student classroom engagement. For example, a number of faculty members integrated the use of anatomy applications to enhance the visual representations of the human body in the classroom instruction.

RESULTS

The year 1 student surveys, focusing on course-specific technology use, evolved to an instrument in year 2 to assess the overall student responses to focus in the following 4 categories: classroom engagement, impact on learning, extended learning environment (ie, learning outside the classroom), and increased collaboration. Qualitative items provided a platform for students to share specific feedback. This general student survey was piloted to 374 students in the spring 2018 quarter and to 397 students in spring 2019. Response rates for these annual student surveys ranged from 49% to 50%, with 189 respondents in 2018 and 193 in 2019.

In the survey category of classroom engagement (Fig. 1), the data reflect an increase in the student perception of opportunities to participate in class with the use of technologies included the campus-issued mobile device, based upon the question, "The use of technology, other than the iPad, provides more opportunities for me to participate in class." Another question in the same category, focused on classroom instruction: "Classroom instruction is more engaging with the use of the iPad." The number of respondents who answered *strongly agree*/*agree slightly* increased in this same category in 2019. Eighty percent of the survey participants believed that the campus-issued mobile device, paired with classroom engagement applications, fostered a heightened level of engagement for students.

For the category identified as impact on learning (Fig. 2), the same percentage of students in 2018 and 2019 believed the eBooks were helpful for understanding course content. There was a 7% increase in *strongly agree*/*agree* for the question, "I am able to learn more content in more meaningful ways by using the iPad." Most respondents believed the use of technology in teaching improved their learning experience. The most significant gain in this category focused on the student perceptions of the impact

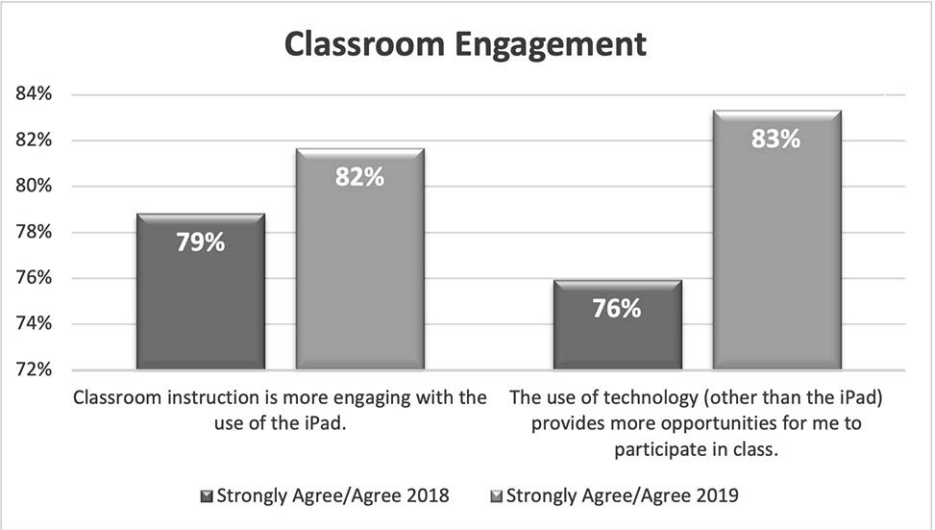

Figure 1 - Bar chart comparing student *strongly agree* and *agree* responses from 2018 and 2019 Student iPad Usage survey questions in the category of "Classroom Engagement" ($n = 189$).

for their learning style/preference ("The iPad is useful to meet the needs of my particular learning style").

The extended learning environment category (Fig. 3) provides an examination of how the students believed the iPad extends learning beyond the scheduled classroom periods. There was a slight increase in perception that, "The iPad is useful for extending my learning outside of the scheduled classroom time." Perceptions associated with the impact of the iPad on study time was the same for 2018 and 2019.

The highest percentage change (10%) was in the "Increased Collaboration" category (Fig. 4). Most participants believed the iPad increased opportunities for collaboration with other students. Students generally ranked an improvement in their perceptions that the iPad contributed to an increase in opportunities to collaborate with their instructors. The lowest increase in this category was seen in the question, "The iPad is an important tool when studying with my classmates/study partners."

At the time of the annual student survey in 2019 (193 respondents), students had been introduced to electronic testing on the iPad to shift testing from the paper-based model. In this category, "Electronic Testing," students were provided with 3 statements for which they were prompted to rank using a Likert-type scale (*strongly agree* to *strongly disagree* with *N*/*A*). The largest percentage of student respondents (87%, $n = 168$) responded *strongly agree*/*agree* to the item focused on eTesting providing instant grade feedback, "Instant grade feedback is a valuable element of electronic testing." Seventy-nine percent ($n = 151$) viewed the opportunity to take practice eTests before major exams as important. In the item to assess views on electronic test security, 78% ($n = 148$) responded *strongly agree*/*agree* to the statement, "The

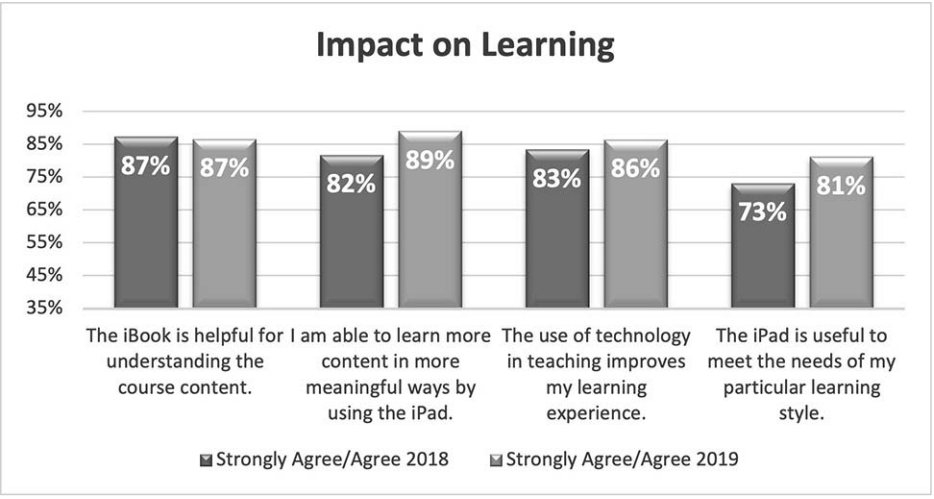

Figure 2 - Bar chart comparing student *strongly agree* and *agree* responses from 2018 and 2019 Student iPad Usage survey questions in the category of "Impact on Learning" ($n = 80$).

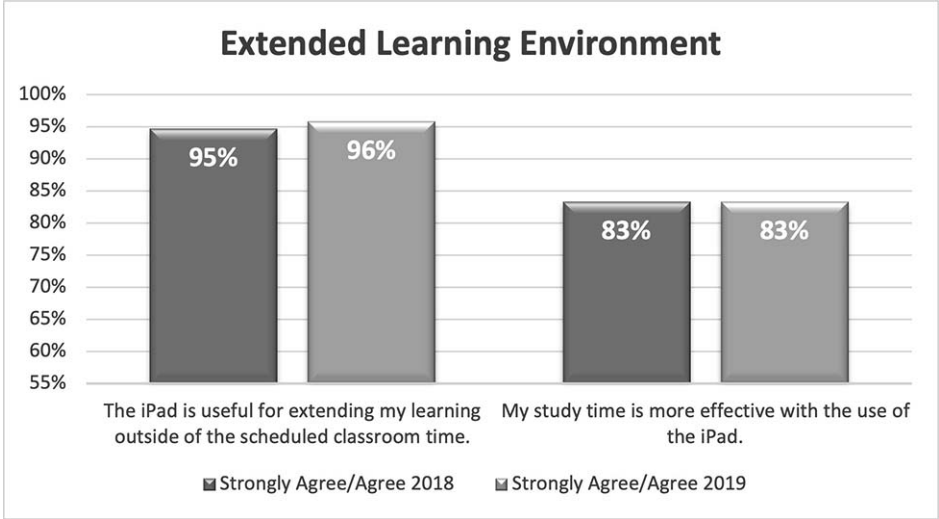

Figure 3 - Bar chart comparing student *strongly agree* and *agree* responses from 2018 and 2019 Student iPad Usage survey questions in the category of "Extended Learning Environment."

LockDown Browser [Respondus, Inc, Redmond, WA, USA] application, used to secure eTesting, has reduced the level of cheating."

We distributed the Faculty iPad Usage Survey annually beginning in 2016. The response rate each year ranged from 85% to 96%, except for 2017, where we encountered an anomaly with a faculty survey response rate of 40%. There were no apparent underlying conditions to account for the reduction in faculty response rate for 2017. Figure 5 shows results for the faculty survey. One series of questions consistent across the 4-year survey period guided the faculty self-reflection in the impact of the iPad on improving their teaching in the areas of innovation, creativity, organization, and collaboration with their colleagues. The greatest level of growth was associated with survey item, "I believe the iPad may contribute to my being a more organized teacher." Another area of growth for faculty over this 4-year period was in the area of innovation: "I believe the iPad may contribute to my being a more innovative teacher." In contrast, the survey area reflecting the lowest level of increase was that of collaboration.

The addition of new question items shifted focus to the faculty perceptions of the transformative impact of the technology in their courses as well as their level of comfort/confidence using the technology in their classroom teaching (Fig. 6). There was an increase in the percentage of faculty members for whom that technology had created a positive transformation in courses. As well, there was an increase in faculty members feeling confident about using the iPad in their classroom. Although lower than other elements in this category, there was a slight increase in the number of faculty respondents who reported a high level of comfort using the technology in their classroom.

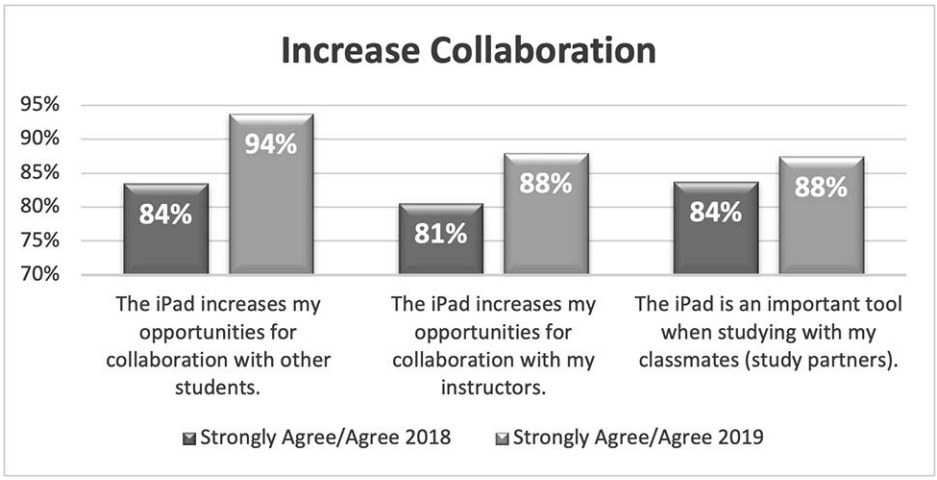

Figure 4 - Bar chart comparing student *strongly agree* and *agree* responses from 2018 and 2019 Student iPad Usage survey questions in the category of "Increased Collaboration".

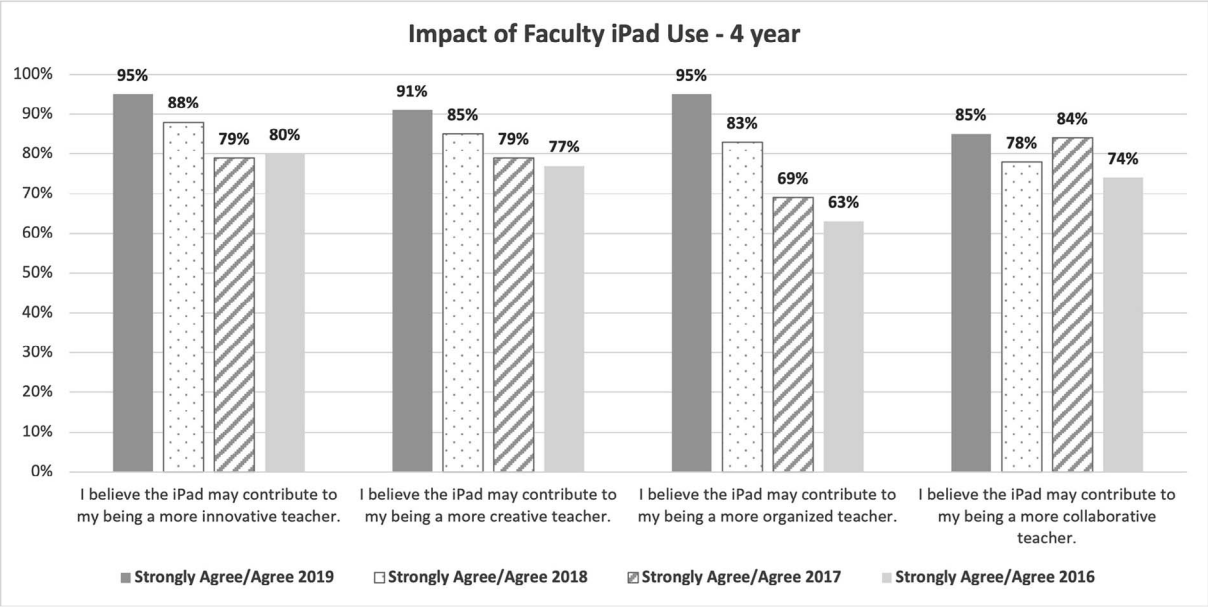

Figure 5 - Bar chart comparing faculty *strongly agree* and *agree* responses from 2016 to 2019 (4-year period) Faculty iPad Usage survey questions focused on 4 areas of potential impact on their teaching.

DISCUSSION

Observations From the Data

Survey data analysis from the students in the 1st year of the program offered information to guide ongoing programmatic improvements including, but not limited to, (1) addressing technology usage in specific courses or lack thereof, (2) working with individual faculty to development technology integration plans, and (3) assessing the usefulness of specific applications such as the student note-taking application included on all mobile devices. Questions gauging students' perceived benefit of the technology integration program were valuable for assessing the level of support during the implementation. Providing students with an opportunity for feedback fostered continuous improvement in the program, which further increased the level of support as students witnessed immediate modifications based on their constructive feedback. Similarly, the faculty survey data indicated an increase in their confidence in the use of the campus-issued mobile device. The analysis of open-ended items provided information necessary for connecting with specific faculty for supporting their individual skill deficiencies as well as collaborating to develop individual instructional plans to more strategically integrate technology to enhance specific course deliveries.

As more faculty required the use of the iPad in their classroom instruction, student survey feedback began to

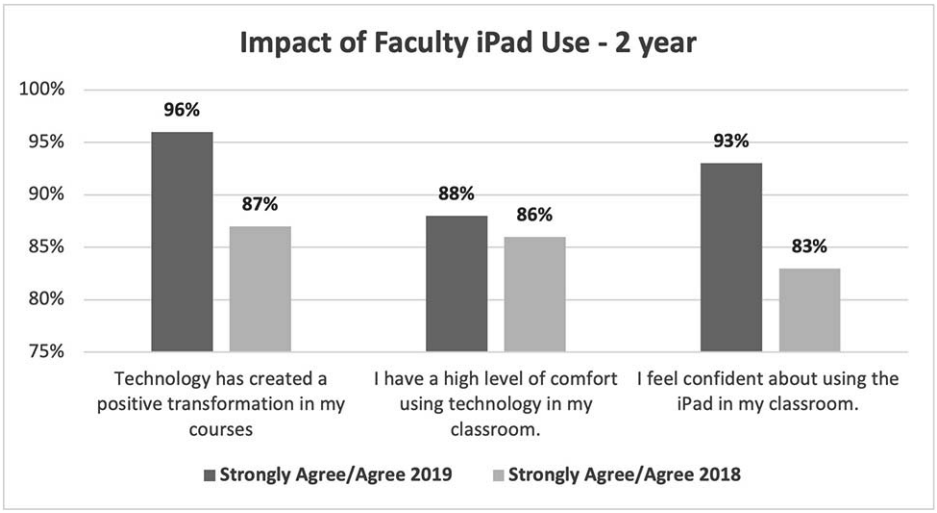

Figure 6 - Bar chart comparing faculty *strongly agree* and *agree* responses from 2018 and 2019 (2-year period) Faculty iPad Usage survey questions focused on their general feelings with using technology.

reveal the need to address device-charging issues. The full-day use of the device often necessitated a charge before the end of the day for many students. Our efforts to address this student concern involved equipping classroom tables with charging units and distributing a power bank USB charger to all incoming students.

The open-ended question responses revealed a consistent level of student insecurity with the use of technology and even more specifically with use of the iPad. We recognized that the value of students' comfort with the use of the technology was important for a meaningful learning experience in the program. For this reason, students are now encouraged to seek the support necessary for the efficient and effective use of technology in their courses. Addressing the individual needs of students in the use of campus technology grew to a monumental daily task. To extend the support system for students, an Introduction to Campus Technology session was added to our new student orientation. This session is composed of an overview of the instructional campus technologies as well as an overview of other technology tips to support the students. In addition to this session for all incoming students, a resource site was created in the college learning management system with electronic resources on all campus educational technologies. Daily interaction with students and the need to provide technology support has significantly decreased with the integration of these student support systems. These systems create a solid foundation for students to begin the program with a comfort level for successfully using the iPad and other associated technology to enhance their learning experience.

The results from the "Classroom Engagement" category of the student survey indicated that the iPad increased opportunities to participate in the classroom setting. In a review of open-ended feedback, we largely attribute these responses to the faculty use of polling apps such as Kahoot! (Oslo, Norway) and Nearpod (Aventure, FL, USA) in their classes. Using the campus-issued mobile device with various classroom engagement applications led to enhancements in student learning. It is noteworthy to reiterate that the iPad is only one of the many tools for transforming how faculty and students engage in the process of teaching and learning. The integration of various applications, for use with the iPad, was cited throughout the data as a key element for positive change in program delivery.

For example, the library facilitated campuswide subscriptions to applications to enhance teaching and learning with the iPad. The Draw It to Know It (Draw It to Know It, Creations, LLC, Carmel, IN, USA) application led to enhancements in content areas such as neuroanatomy and biochemistry. It is designed to support the learning preferences of the kinesthetic student by using lessons that require drawing structures, pathways, and processes to enhance their learning in these 2 content areas. Tutorial videos provide students with visual engagement to reinforce the lessons presented in the classroom lectures. Students use the flashcard feature of the application to supplement course materials for an enhanced study experience. The Visible Body (Visible Body, Inc, Boston, MA) mobile application suite for the iPad provides students and faculty access to a comprehensive system of 3D models, animations, and illustrations of the human body. This suite of applications not only enhances the in-class instructional delivery but also provides students with supplemental resources for improving their study experience outside of the classroom.

The portability of the iPad, containing access to more than 40 eBooks on a single device, was also cited as a positive factor associated with transitioning from a paper-based curriculum to the centralized nature of the single mobile device. In addition, the incorporation of video lecture resources in several courses allows students review time outside of the scheduled classroom period to learn at their desired pace. This use of technology allowed for delivery of the same content through various modalities and thus reaching more students in a manner that is meaningful for them. The strategic integration of educational technology has become the conduit for transformative change in how our students, with diverse learning styles and abilities, engage with the program curriculum.

Equally valuable to the student perceptions of their experiences through this program is that of the faculty. In alignment with our commitment to using data for programmatic improvements, faculty surveys were used to align faculty development programs with overall as well as individualized needs of the faculty. One of the open-ended questions in the survey directed faculty, who feel they require additional development, to include their name for the scheduling of individualized development sessions. The campus commitment to ongoing faculty development is a significant and central element of the institutional technology initiative. We attribute the high level of faculty buy-in on our campus to the ongoing training specifically tailored for building their skill-levels in the use of technology. Liu and Dempsey assert that "personal contact with faculty is the most effective strategy" for increasing faculty trust and buy-in for instructional design.[4]

The addition of the campus learning management system was another vital element in the institutional technology initiative. The adoption of the current campus learning management system created a centralized ecosystem for disseminating course content from any web-accessible device. The use of the learning management system transitioned from optional to required for all courses, which could certainly have attributed to the heightened sense of organization expressed by faculty respondents.

The ongoing review of survey data provided critical information for growing the campus technology initiative. The key elements for supporting the growth of this project include a commitment to ongoing faculty development, using the technology integration as an opportunity for faculty to review course curriculum, and staggering of the technology rollout to students over a year. A strategic integration of technology into the campus academic community has created a sustainable program for transforming the delivery of chiropractic education. The creation of systems and programs for ongoing support to

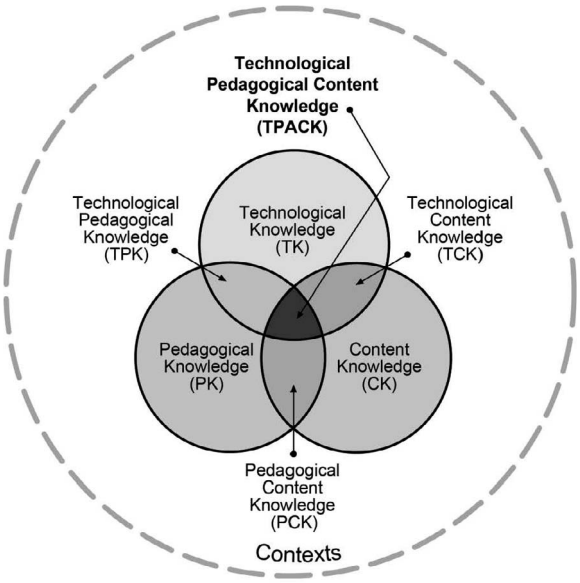

Figure 7 - Visual representation of the TPACK model depicting the 3 primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). The primary forms of knowledge in the TPACK model create a complex web of knowledge focused on content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK). At the intersection of these primary elements are Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK). This framework facilitates an effective technology integration that brings together various elements for each teacher, thereby recognizing that a technology initiative cannot be used as a one-size-fits-all campus-wide application. Reproduced by permission of the publisher, © 2012 by tpack.org.

participants is a vital element with such a significant culture change on any campus community.

The onset of the COVID-19 pandemic resulted in the interruption of these specific technology surveys for faculty and students. There are plans to integrate question items in the regular course evaluations to assess student perceptions of overall campus technology usage. A survey to assess overall teaching effectiveness, with the integration of educational technology, will be developed in collaboration with assessment personnel, the teaching and learning team, and appointed faculty representation.

Connections to Literature

Our model focused on the integration of technology similar to the Technological Pedagogical Content Knowledge (TPACK) framework developed by Matthew J. Koehler and Punya Mishra of Michigan State University. With this model, the integration of technology into classroom teaching must be managed by individual faculty. Unfortunately, very few faculty members enter a campus technology initiative with a solid background in the knowledge of and competent pedagogical use of current technology. Koehler and Mishra assert, "Teachers often have inadequate (or inappropriate) experience with using digital technologies. . . . It is, thus, not surprising that they do not consider themselves sufficiently prepared to use technology in the classroom."[5] The commitment to providing individualized faculty support, at their various skill levels, equipped them with the knowledge and confidence to integrate technology into their classroom teaching.

The TPACK model (Fig. 7), built on Shulman's ideas of pedagogical content knowledge (PCK), includes the teacher's knowledge of technology for effective curriculum integration.[6,7] Shulman[7] challenged the dichotomy of the teacher's content knowledge and pedagogy by introducing PCK. Koehler and Mishra outlined the elements of the TPACK model in the *Handbook of Technological Pedagogical Content Knowledge (TPACK) for Educators*.[8]

The website tpack.org outlines the 7 components of the TPACK model. Although we did not integrate the universal TPACK model, the various elements were applied to the strategies used in our technology integration. The director of teaching and learning scheduled meetings with individual faculty members to discuss technology integration. The conversation included a discussion of their specific content knowledge and then led into the 2nd component (pedagogical knowledge), in which the director and the faculty member engaged in a sharing of processes and practices for effective delivery of the course. The next element was the director sharing various instructional technologies that could be used to enhance the learning experiences of students in course content. In the TPACK framework, technology knowledge is shared by the director with the faculty member, and the resulting adoption of the technology requires the necessary training and support designed to the skill level of the individual faculty member. PCK refers to the knowledge of pedagogy applicable for teaching specific content. For example, discussions with basic science faculty varied from those with faculty in chiropractic technique as the technology integration was not always applicable in the same manner. Technological content knowledge required an understanding of how technology has the potential to influence the content and how the content could affect what technology was best used.

Faculty were guided to conversations on how they could use specific educational technologies to transform teaching and learning in their specific courses. In this area of technological pedagogical knowledge, faculty members may not have a solid grasp of various elements of teaching pedagogy. These meetings provided personalized development for faculty members in various areas of teaching and learning, valuable for supporting clinician faculty members in personal evolution from practitioner to professor.

Finally, at the center of this framework, TPACK connects all the individual elements for the effective integration of technology. Koehler and Mishra assert,

> TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques

> that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.[9]

The integration of a technology initiative must be driven by the goal of enhancing teaching and learning through a strategic incorporation of technology after careful evaluation of what technologies can be used to enrich the specific course content.

Study Limitations

The goal of this study focused on 2 themes. One was chronicling technology integration to provide other campuses with key elements and strategies in our program. The 2nd goal was to align our study with the components of the TPACK framework to gauge and monitor ongoing training and support programs for faculty and students and the overall acceptance of such a widespread campus initiative. Although these 2 themes were examined, there are various key components missing from the study. A particular limitation to the study is the direct impact of the technology on student learning outcomes. This could lead to inquiries regarding the presence of significance between the chiropractic board scores of students prior to the technology integration compared to those with the full immersion in the use educational technology throughout their enrollment. The study failed to make any comparisons between the pilot student group and the remaining students in the program. The initial group to receive the iPad were surveyed each quarter of their 1st year using the device. All students after year 1 were surveyed annually. A more extensive examination of the student survey data may yield more significant findings than the cursory review outlined in this article. Another study limitation centered on the underlying assumption that all students possessed the same level of familiarity with and experience in using iPads. An associated assumption may be that all student experiences with educational technology were equivalent. Finally, because the survey was created for local quality assessment needs, the validity and reliability of the survey items can be considered a study limitation.

CONCLUSION

This study aligns with the body of research suggesting the TPACK framework is an effective model to guide campuses through the basic elements of technology integration. The primary component centers on creating a support system to meet the individual skill level of each faculty member. The survey data analysis of this study confirms a potential relationship of ongoing training/support for faculty and their acceptance of a technology integration program. Although the TPACK model focuses on the experiences of faculty in a technology initiative, this research produced similar evidence of student acceptance when programs were provided to foster a culture of ongoing support for meeting their individual skill levels. In addition, the implementation of a structure for gaining participant feedback, whether through surveys or focus groups, was valuable for programmatic evaluation, improvement and sustainability.

FUNDING AND CONFLICTS OF INTEREST

This research did not receive any specific grant from funding agencies in the public, commercial, or nonprofit sectors.

About the Author

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Author Contributions

Concept development: BGH. Design: BGH. Supervision: BGH. Data collection/processing: BGH. Analysis/interpretation: BGH. Literature search: BGH. Writing: BGH. Critical review: BGH.

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