education sciences

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Exploring Technological Challenges and Growth in Faculty Transition to Remote Teaching during the COVID-19 Pandemic: A Mixed-Methods Study

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Abstract: The COVID-19 pandemic forced institutions of higher education into an emergency remote teaching practice. In this study, the researchers utilized a convergent triangulation mixed-methods study design to investigate the technological challenges and growth that faculty experienced in seven schools at the University of Mississippi Medical Center as a result of the transition to emergency remote teaching during the COVID-19 pandemic. Quantitative data were collected through an anonymous online survey that asked faculty to rate their competency in each of the 14 technology-related tasks twice—once for the pre-pandemic period and once for the current period. Qualitative data were collected through semi-structured interviews conducted virtually or in person. One hundred faculty participated in the quantitative survey. A significant difference between faculty self-rated competency levels in the pre-pandemic period and the current period was observed, suggesting technology knowledge growth from the forced transition. Qualitative interviews of 19 faculty revealed five overarching themes: inconsistency in instructional support, pandemic-induced technological growth, power of togetherness, maintaining continuity through flexibility, and resilience against adversity. This study provided faculty with the experience to perform effective self-reflection and gain insights into their pedagogical practices. Future research should focus on professional development that can help faculty remain up-to-date on technology utilization and establish a contingency plan to better prepare for the unknown.

Keywords: COVID-19; emergency remote teaching; online education; technology; TPACK

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Citation: DeVaul, D.; Burrell, A.; Lyles, K.; Reulet, B.; Cole, K.; Reulet, C.L.A.; Dear, C.; Gordy, X.Z. Exploring Technological Challenges and Growth in Faculty Transition to Remote Teaching during the COVID-19 Pandemic: A Mixed-Methods Study. *Educ. Sci.* **2023**, *13*, 833. https://doi.org/10.3390/educsci13080833

Academic Editor: James Albright

Received: 25 May 2023
Revised: 4 August 2023
Accepted: 10 August 2023
Published: 16 August 2023

1. Introduction

The global pandemic known as COVID-19 forever changed the world in March 2020 [1]. The impacts of this pandemic were seen across society and at all levels of education as lockdowns and social distancing mandates spread across the globe leading to changes in how services and daily activities were performed. In an effort to prevent the spread of COVID-19, the Centers for Disease Control and Prevention (CDC) provided guidelines that suggested the prompt closure of schools, colleges, and universities, which resulted in most educators being forced to work from home and rely on technology to deliver curriculum [2]. Students also had to rely on technology to continue their education mid-way through the spring 2020 semester [3]. It is reported that approximately 90% of students enrolled in various levels of education across the globe were impacted due to the closure of educational institutions and the implementation of distance education [2].

Online education is not a new concept. However, teachers who had never taught distance education were not exactly prepared for its abrupt onset in 2020 [4]. Online education involves planning and utilizing effective strategies to provide educational opportunities to students in a virtual format [4]. Prior research indicates it may take over ten hours for

faculty to develop one hour of online instruction and student activities in a new course [5]. At the onset of the pandemic, educators who taught traditional face-to-face courses did not have the time needed to adequately prepare an online course for instruction. The quick response to the transition to distance education, while necessary, resulted in faculty being unprepared and overwhelmed. The challenges noted within institutions of higher education included but were not limited to a lack of institutional resources, insufficient access or availability to the internet, low student participation in the virtual learning environment, and social marginalization of students [6].

Addressing the challenges faced with the transition to an online learning environment led to the utilization of frameworks for the successful integration of technology into traditional programs [7]. The Technological Pedagogical Content Knowledge (TPACK) framework strongly influenced the design and implementation of virtual learning to encourage contextual knowledge of the subject matter for educators, specifically in the areas of research and scholarship, as stated by Mishra. The TPACK approach focuses on the idea that content knowledge, pedagogical knowledge, and technological knowledge are all important for the implementation of articulate teaching [8].

Digital competence implies digital literacy, which can be evaluated through self-reflection strategies and tools to determine the effectiveness of teaching. Digital competency involves not only computer-related skills but also knowledge and attitudes from individuals utilizing the digital tools [9]. Research conducted in 2021 by Ljerka Luic indicated most teachers consider themselves digitally competent; however, lack of access and availability to adequate resources resulted in barriers to implementation within traditional programs.

This study aimed to utilize a mixed methods study design to investigate technological obstacles and growth experienced in seven schools on the medical campus of the University of Mississippi Medical Center as a result of the transition to distance education during the COVID-19 pandemic. A Qualtrics survey was disseminated to faculty in all seven schools to identify participants engaged in teaching during the pandemic. Additionally, qualitative interviews were conducted to collect qualitative data regarding faculty experiences. This project provided faculty with the experience and information to perform effective self-reflection, stimulate professional growth, and gain insight into themselves and their pedagogical practices.

2. Materials and Methods

This study (2021-1068) was reviewed and approved by the Institutional Review Board at the University of Mississippi Medical Center.

2.1. Setting

This study took place at the University of Mississippi Medical Center. The medical center houses seven schools—School of Dentistry (SOD), School of Graduate Studies in Health Sciences (SGSHS), School of Health Related Professions (SHRP), School of Medicine (SOM), School of Nursing (SON), School of Pharmacy (SOPhar), and School of Population Health (SOPH). The research team's recent publication explored the impact of COVID-19 on the technological knowledge development of faculty within the SHRP only, which restricted the ability to capture a broader range of faculty perspectives [10]. Therefore, in this follow-up research, the authors extended the target population to all faculty at the institution—approximately 1200 in total.

2.2. Study Design

The current study utilized a convergent triangulation design in which both quantitative and qualitative data were collected and analyzed. The results were then compared to see if one validated or contradicted each other [11]. With this design, priority can be distributed evenly between the two sets of data.

In this study, quantitative data were collected through an anonymous online survey (Appendix B) adapted from Archambault and Crippen's TPACK instrument designed

originally for K-12 online learning educators [12]. This TPACK instrument encompassed four different domains of knowledge: technological knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge. Similar to our first study, the survey included four demographic questions, fourteen technology-related questions, and one question recruiting interviewees for qualitative data collection. The demographic questions were created to collect data regarding education level (Bachelor's, Master's, or Doctoral Degree), years of teaching experience (1–2 years, 3–5 years, 6–10 years, 11–15 years, 16–20 years, 20 or more years), whether having received formal training in online teaching prior to COVID-19 (Yes, No), and teaching setting (in-person only, in-person and online, or online only). The teaching setting question was built with skip logic. If a participant selected "online only", the survey concluded. The rationale was that COVID-19 did not alter how online faculty delivered instructional materials, therefore they did not make significant adaptations in course delivery. For the technology-related questions, the participants were asked to rate their competency in each specified task on a 5-point Likert scale (very poor, poor, average, good, excellent) twice—once for the pre-pandemic period and once for the current period. The pre-pandemic period refers to the time prior to the onset of COVID-19 in Mississippi in March 2020. The current period refers to the timeframe during which the survey was taken by the participants, spanning from March to June 2022. The last question asked participants to enter an email address if they were interested in being interviewed on their teaching experiences during the pandemic.

Qualitative research is known for its ability to capture rich and detailed descriptions of the participants' lived experiences, feelings, and opinions, which could help achieve deeper insights into the subject matter under investigation [13]. In this study, the qualitative data were collected through semi-structured interviews adapted from an earlier study by Gordy et al. [3]. The interviewee list was obtained from the quantitative survey mentioned above. The interviews consisted of 14 questions (Appendix A). These questions provided faculty with an opportunity to reflect on the adaptations they made during the pandemic and illuminate future teaching directions.

2.3. Participants

The inclusion criteria for this study were: (1) the participant was a faculty at the University of Mississippi Medical Center; and (2) the participant taught in-person prior to COVID-19 and had to shift from in-person to online teaching during COVID-19. Faculty in online programs were excluded as they did not modify their delivery methods due to COVID-19. In total, 129 out of 1451 (response rate of 9%) faculty at the University of Mississippi Medical Center responded to the survey. After eliminating five online faculty and 24 incomplete surveys, a total of 100 faculty were included in the survey analysis. Among the survey participants, 24 indicated a willingness to be interviewed. However, due to unresponsiveness or scheduling difficulties, only 19 were interviewed—two from SHRP, two from SOD, seven from SOM, five from SON, one from SOPhar, and two from SOPH.

2.4. Data Collection and Analysis

The quantitative data collection for the current study began in March and ended in June 2022. The anonymous online survey was sent to all faculty through institutional emails. The qualitative data collection was conducted from July to August 2022. The interviewees were contacted through emails or phone. These interviews were conducted either in person or virtually based on the preference of the interviewees. The study intended to collect both sets of data concurrently. However, due to logistical reasons, one set of data collection was completed prior to the other. Nevertheless, the data analysis for each set of data was performed simultaneously.

For the quantitative data, reliability analysis was first performed and Cronbach's alpha was obtained to check the internal consistency of the survey [14]. Descriptive analyses were conducted to examine demographic characteristics of the participants. Paired *t*-tests

were then performed to compare the 14 self-rated pre-pandemic and current technological competency levels. In addition, ANOVA tests were performed to examine whether significant differences existed in each pre-pandemic self-rating among faculty with different education levels and years of experience. An independent *t*-test was conducted to examine whether significant differences existed in each pre-pandemic self-rating among faculty who received formal training prior to the pandemic and those who did not. The same tests were executed on current self-ratings.

A commonly used qualitative data analysis method, Constant Comparative Method (CCM), was applied to the interview data analysis [15]. With this method, data were analyzed manually through open coding, axial coding, and selective coding to generate themes. To ensure the trustworthiness of the research, data transcribed from the interviews were sent back to interviewees to check the accuracy, a process known as member checking [16]. Also, data were analyzed independently by three researchers to minimize researcher bias and increase interrater reliability [17]. The final themes were compared and agreed upon by all members of the research team.

Lastly, following the Good Reporting of a Mixed Methods Study (GRAMMS) framework by O'Cathain et al. [18], the qualitative and quantitative results were integrated to present a holistic picture and enlighten new insights.

3. Results

3.1. Quantitative Findings

The demographic characteristics of the 100 faculty included in the survey analysis are shown in Table 1. The majority of participants (87%) hold a doctoral degree, while 11% hold a master's degree, and 2% hold a bachelor's degree. Years of faculty teaching experience ranged from 1–2 years (1%) to 20 or more years (29%). The majority of faculty had six to 10 years of teaching experience (30%). Prior to the pandemic, only 18% of faculty received formal training in online teaching while 82% did not. Also, about two-thirds taught in-person only (67%), and one-third (33%) taught in both in-person and online settings.

Table 1. Survey Participant Characteristics.

Participant Characteristics	Categories	*n*	Percentage (N = 100)
Education level	Bachelor's degree	2	2%
	Master's degree	11	11%
	Doctoral degree	87	87%
Years of teaching experience	1–2 years	1	1%
	3–5 years	16	16%
	6–10 years	30	30%
	11–15 years	12	12%
	16–20 years	12	12%
	20+ years	29	29%
Received formal training	Yes	18	18%
	No	82	82%
Pre-pandemic teaching format	In-person only	67	67%
	In-person and online	33	33%

Cronbach's alpha value for the 14 survey items was 0.931 (Appendix C), suggesting the items were highly correlated and internal consistency was excellent (Taber, 2018). Paired *t*-tests were performed to compare the 14 tasks on the survey regarding faculty's self-rated pre-pandemic and current technological competency levels (Table 2).

Table 2. Paired *t*-Test Results to Compare Faculty Self-rated Pre-pandemic and Current Technology Competency Levels.

Domains	Survey Item	Faculty Self-Rating			
		Mean Pre-Pandemic	Mean Current	t-Stat	*p*-Value
Technological Knowledge	Q1. Troubleshoot technical problems associated with hardware	3.26	3.70	−6.911	<0.001 ***
	Q2. Address computer issues related to software	3.38	3.69	−5.057	<0.001 ***
	Q3. Assist students with troubleshooting technical problems	3.23	3.42	−4.293	<0.001 ***
	Domain total	9.87	10.82	−6.960	<0.001 ***
Technological Content Knowledge	Q4. Use technological representations to demonstrate specific concepts	3.49	3.88	−5.378	<0.001 ***
	Q5. Implement program curriculum in online environment	3.45	3.84	−3.885	<0.001 ***
	Q6. Use various courseware programs to deliver instruction	3.40	3.87	−6.199	<0.001 ***
	Domain total	10.35	11.60	−6.503	<0.001 ***
Technological Pedagogical Knowledge	Q7. Create online environment allowing students to build new knowledge and skills	3.42	3.66	−2.409	0.018 *
	Q8. Implement different methods of teaching online	3.21	3.60	−3.682	<0.001 ***
	Q9. Moderate online interactivity among students	3.37	3.62	−2.317	0.023 *
	Q10. Encourage online interactivity among students	3.26	3.43	−1.642	0.104
	Domain total	13.27	14.31	−2.876	0.005 **
Technological Pedagogical Content Knowledge	Q11 Use online student assessment to modify instruction	3.48	3.77	−3.387	0.001 ***
	Q12. Use technology to predict students' skill/understanding of topic	3.21	3.45	−3.440	<0.001 ***
	Q13. Use technology to create effective representations of content that depart from textbook knowledge	3.42	3.68	−3.934	<0.001 ***
	Q14. Meet overall demands of online teaching	3.29	3.61	−2.959	0.004 **
	Domain total	13.37	14.48	−4.173	<0.001 ***
All Domains	Total	43.67	51.49	−10.473	<0.001 ***

Note. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$. Q, question.

Faculty rated their pre-pandemic and current technology competencies significantly differently on 13 of 14 tasks asked in the survey, with the means related to the current technology competencies consistently higher than those in the pre-pandemic period. Faculty's ability in the technological knowledge domain including troubleshooting both hardware (Q1) and software (Q2) and assisting students to troubleshoot technical problems (Q3) improved significantly (Q1: M = 3.70 current, M = 3.26 pre-pandemic, t = −6.911, $p < 0.001$; Q2: M = 3.69 current, M = 3.38 pre-pandemic, t = −5.057, $p < 0.001$; Q3: M = 3.42 current, M = 3.23 pre-pandemic, t = −4.293, $p < 0.001$). The domain totals for the pre-pandemic and current period also differed with a statistically significant difference (M = 10.82 current, M = 9.87 pre-pandemic, t = −6.960, $p < 0.001$).

Similarly, faculty reported significantly different competency levels in the technological content knowledge domain for the two periods. The domain includes their ability to use technology in content delivery, such as using technological representations (Q4: M = 3.88 current, M = 3.49 pre-pandemic, t = −5.378, $p < 0.001$), to implement curriculum in an online environment (Q5: M = 3.84 current, M = 3.45 pre-pandemic, t = −3.885, $p < 0.001$),

and to use various courseware programs to deliver instruction (Q6; M = 3.87 current, M = 3.40 pre-pandemic, t = −6.199, $p < 0.001$). Expectedly, the domain totals for the two periods differed significantly as well (M = 11.60 current, M = 10.35 pre-pandemic, t = −6.503, $p < 0.001$).

In the meanwhile, faculty demonstrated superiority in the technological pedagogical knowledge domain in the current period as to their ability in online classroom management, such as creating an online learning environment (Q7: M = 3.66 current, M = 3.42 pre-pandemic, t = −2.409, $p = 0.018$), implementing different methods of teaching online (Q8: M = 3.60 current, M = 3.21 pre-pandemic, t = −3.682, $p < 0.001$), and moderating online activities (Q9: M = 3.62 current, M = 3.37 pre-pandemic, t = −2.317, $p = 0.023$). However, their self-ratings in encouraging online interactivity did not differ between the pre-pandemic and the current periods (Q10; M = 3.26 current, M = 3.43 pre-pandemic, t = −1.642, $p = 0.104$). Despite this insignificant difference shown in Q10, the totals for the two periods in this domain showed a statistically significant difference (M = 14.31 current, M = 13.27 pre-pandemic, t = −2.876, $p = 0.005$).

Significant improvements were also observed in the technological pedagogical content knowledge domain regarding faculty's ability to use online assessments (Q11: M = 3.77 current, M = 3.48 pre-pandemic, t = −3.387, $p = 0.001$), to use technology to predict students' skills or understanding (Q12: M = 3.45 current, M = 3.21 pre-pandemic, t = −3.440, $p < 0.001$), and to create effective representations of content that depart from textbook knowledge (Q13: M = 3.68 current, M = 3.42 pre-pandemic, t = −3.934, $p < 0.001$). Faculty felt their overall ability to meet the demands of online teaching improved significantly (Q14: M = 3.61 current, M = 3.29 pre-pandemic, t = −2.959, $p = 0.004$). For the domain, as anticipated, the totals for the two periods demonstrated a statistically significant difference (M = 14.48 current, M = 13.37 pre-pandemic, t = −4.173, $p < 0.001$).

Collectively, a statistically significant difference was observed between the totals for all domains in the pre-pandemic and current periods (M = 51.49 current, M = 43.67 pre-pandemic, t = −10.473, $p < 0.001$). The current self-rated competency overall score is significantly higher than that of the pre-pandemic period.

To examine whether faculty of different education levels and years of teaching experience might have rated themselves differently, ANOVA tests were performed on all pre-pandemic survey items, and no significant differences were observed. The same tests were conducted on all current survey items, and also no significant differences were found. Additionally, independent *t*-tests were run to explore whether having received formal training in online teaching had any impact on how faculty self-rated themselves. No significant differences were revealed either.

3.2. Qualitative Findings

A total of 19 faculty across campus were interviewed. The years of teaching experience ranged from 5 to 37 with a mean of 15 years. The themes that emerged from the interviews included: insufficiency in institutional support, pandemic-induced technological proficiency, power of togetherness, maintaining continuity through flexibility, and resilience against adversity.

3.2.1. Inconsistency in Instructional Support

Participants shared the need for an institutional support system to enhance their ability to serve their students. Faculty, particularly those faculty who were new to online teaching, needed a clear avenue to redesign face-to-face courses for online delivery. This required designated personnel for instructional needs and readily available digital platforms for delivery.

> *"I was not trained on education... So, educating the educators is extremely important. We're in a transition right now. We don't have an instructional designer, and I was telling my admin I'm feeling very overwhelmed because my courses start in three weeks. And I like to have everything ready for my course before it starts, and I'm struggling to*

get there without that help. So that's just the biggest thing. You've got to have adequate resources and support for faculty. If you want to accomplish these things, that's why you did a lot of the sage on the stage approach to education. We don't have the time or the resources to help us move to the next generation of learning."—Participant E

"We did use zoom, which unfortunately the school doesn't support. Most of other academic institutions use zoom, because it's so much easier to set up things, but we don't do that. So I did use it because some of our external speakers in the medical side actually would set a zoom appointment and that's what they use, so I had to do that so. Big Blue button worked fine, but I think it had a limit of 100 people online at once, which we didn't really break that too much. But I think I've heard that it will shut down. People have trouble with it shutting down if it went over 100. We only bought 100 licenses at one time or per session."—Participant F

"We have an excellent it team that really, I feel like blew out of the water, this transition flip, they made videos, they had, you know, WebExes where they went step by step. They made canvas courses for us. I don't know how they did it and whipped it out so fast, but they really were a phenomenal, and then they're really a phone call away."—Participant M

"It may have been an online event, but we had [instructional design team], who would help us understand, you know, really how to go online and if I remember correctly, they allowed us to come to a classroom where we could as a whole ask questions and be trained in how to move forward when we were fully off campus."—Participant A

3.2.2. Pandemic-Induced Technological Growth

Participants shared how the sudden change became a new reality where they discovered teaching tools that they had never used before and new ways of using synchronous and asynchronous classroom time. These developed skills have equipped faculty with innovative instructional methods both inside and outside the classroom.

"I think we did see positive effects for us and our students, and it's because of the pandemic. I think we had become more savvy with technology. The students had to become more technologically savvy as well. So, that has been a benefit. We have started telemedicine more as a result of that and looking for ways to incorporate telemedicine in our curriculum after the pandemic. We have now gone to simulation at the medical school every semester for our students. Some of that simulation includes telemedicine, and so I think that has been a really big help."—Participant L

"I adopted an inverted classroom style. I would pre-record my lectures…ask the students to watch the video and take the quizzes before they came to class. Then in the classroom…we would have a higher level of discussion with some real-world examples from the material they had learned in the online video…We started with only my section…the students love it and they asked us to change so the next year all the instructors changed to the flipped classroom."—Participant D

3.2.3. Power of Togetherness

Participants shared both benefits and challenges of networking with their colleagues during this time. However, it was evident that group communication and togetherness, face-to-face or virtual, are essential to the success of all educational endeavors.

"I really and truly believe that we have grown skills in being able to seek out resources that we never would have done pre-COVID…I found networking with other professors in other states and I probably would not have done that [pre-COVID]."—Participant A

"It let me see the importance of my team members…I don't know how anybody could have done this without a good team on their side…So if anything, it showed us the importance of my team and being able to ask for help. We had a team at this school that launched some educational modules in Canvas for our school. During that, our instructional designer and [faculty] got together and made us some resource training so that we could know

what resources we had available to us, how to use it . . .[It] was so helpful and I saw the value of learning from others and learning knowledge of others, or calling on other people when I need it."—Participant K

"I've learned to work better with my colleagues. I laugh about it, but I'm one of those, my way or the highway kind of people. I have learned so much from those who have been in academia longer than I have and how to act as opposed to react. I think COVID just kind of helped that, and so it's helped me not to react to students."—Participant J

3.2.4. Maintaining Continuity through Flexibility

Participants realized the value of flexibility to maintain continuity in the delivery of curriculum and the pursuit of expected program outcomes. Although times of frustration and doubt arose, success amid the pandemic depended on changing perspectives and being willing to adapt. To do this, faculty and students both had to park perspectives and be willing to stretch themselves.

"The biggest lesson I learned is to be flexible. You know, in healthcare professions, it's so rigorous, and you're so used to being a stickler about every little thing: you gotta be here at this time, you gotta show up, you gotta do this you gotta make a 90% if you know it's everything. But, what I've learned is: patience is a virtue, but flexibility and not just flexible with students. I mean with yourself. You gotta be able to be flexible and still have the same rigor. You don't have to compromise the rigorousness just because you were accommodating."—Participant H

"I think the biggest lesson is being able to give more grace to people. Understanding that things are very unpredictable and they can change and will change at any time. I think in order not to become a dinosaur, we would have to be very flexible. You have to be able to adapt, right?"—Participant B

"I think the students will realize that they can be flexible, that they can adapt. But the most important thing is, I think that maybe they realize they could be autonomous learners and really be self-directed and manage their time the way they should, because they had to or they would not have succeeded. You know, I mean, it would have been very easy for somebody to have just dropped the ball and failed. But it looked to me like they were willing to dig their heels in and really give it what they had to give it."—Participant A

"I feel like this pandemic forced us all to be flexible. And so I am seeing students. . .being more flexible. . .We had a group that started online, but then we came back in person. . .they were just so grateful, so willing to learn hands-on, really engaged. And I think that that isolation of everyone really kind of made this face-to-face more meaningful. . . nurses are required to be flexible. . .I think I see a little bit more flexibility in our students." —Participant M

3.2.5. Resilience against Adversity

Participants shared their concerns regarding student outcomes but were surprisingly pleased with students' resilience through the varying changes and requirements throughout the pandemic. Students showed elevated resilience, allowing little disruption in educational goals and continuity of learning. The resilience of faculty enabled little interruption in the support of student learning and identifying students who required additional support.

"I think we were worried. . .have they gotten enough information? When you're kind of self-directed at home, do you really dig deep?...we worried about that. But, as far as our pass rate, I don't think our pass rate changed, maybe changed 1% or 2%. . .it means that students were giving all they could. . .. as faculty members, we constantly supported them. You know we sent out study guides, we sent out anything we could send as a resource to those students."—Participant A

"The students had a lot not going for them during the pandemic and they for the overwhelming majority really took it in stride and did that was good for my mad teacher heart

to see as a nursing professor because you know, being in healthcare, that resilience is such a huge part of what they're doing."—Participant K

"I would say kind of overall we learned a great deal of resilience... we learn pretty quickly that we can adapt and do things differently when we need to do...We've got a model that worked, yes, it does probably need tweaking, but we were able to keep education flowing even though we weren't able to be in person so I think that was something that we learned that we can do if we need to."—Participant I

When considering both qualitative and quantitative findings as a whole, in qualitative data, especially the second theme—pandemic-induced technological growth, faculty explicitly expressed that they became savvier with technology utilization and more comfortable with technology integration in course development and instructional delivery. This cross-validated and substantiated the quantitative finding that faculty rated themselves significantly higher for the current period than for the pre-pandemic period. Overall, the pandemic presented unique challenges and opportunities, and faculty demonstrated remarkable adaptability, flexibility, and resilience in the face of the new normal.

4. Discussion

Following the onset of COVID-19, educational institutions across the world made the transition from face-to-face teaching to distance education with little time to prepare. Researchers in this study investigated technological obstacles and growth experienced by faculty at seven schools at the University of Mississippi Medical Center as a result of the transition to distance education during the pandemic. Prior research indicated that educators making the online transition reported one of their primary needs as assistance and support with technology [19]. Results from the current study suggested an inconsistency in the perception of institutional support at the individual schools at UMMC. Some faculty felt they lacked adequate support from the institution early on because they lacked training both as educators and in utilizing web conferencing software to confidently deliver an online course. Others suggested their schools' instructional designers were readily available from the onset of the transition. Faculty at this institution are mostly content experts and are not formally trained educators. In fact, over 80% of the faculty in this study indicated they had received no formal training as educators. This fact led to faculty feeling overwhelmed as they transitioned courses to an online format because they seemed to lack the educational background and resources to help facilitate this transition. These findings align with previous studies which have noted the importance of external support for faculty to facilitate distance education [20].

The pandemic forced faculty to face their digital literacy deficiencies. Though faculty felt overwhelmed as they navigated the new world of distance education, this study revealed they might have emerged with a greater understanding of the technological tools available to them. Our findings suggested the adoption of new resources during the pandemic had led to a continuation of using online supplemental resources for students who had returned to the classroom. Girelli et al. [21] found similar results and suggested that the pandemic allowed teachers to engage in online resources they were previously unfamiliar with. Research also indicated that the success of an online course was heavily dependent upon its structure and its teacher's technological proficiency [22], a skill needed for teachers to continue using technology to supplement their in-person classes. As teachers strive to continue incorporating technology into their classrooms, it is important that they also continue to seek professional development opportunities and training to further enhance their knowledge surrounding best practices with technology in the classroom. Prior research has shown that professional development programs, such as STEMI, may be useful to encourage the continued use of technology [3].

A sense of community throughout the pandemic became essential, especially for educators trying to navigate uncharted territory. After relying heavily on each other during the pandemic, faculty expressed that they emerged with stronger relationships both inside the university and in their professional networks. Filho et al. [23] found that for some faculty, the pandemic created a renewed solidarity where faculty supported each other with challenges at work and at home. Other studies found that teachers who were able to collaborate with their colleagues and experience support outside of the school reported better overall well-being [24]. Prior research also suggested lessons learned from the pandemic should include continued collegiality and communication for faculty to maintain relationships across disciplines and in professional networks [25].

As faculty navigated the pandemic, they never lost sight of the importance of working with students and with each other to ensure that the learning process, though interrupted, was able to continue. Prior research indicated that one of the most appealing aspects of distance education was flexibility for both teachers and students [22]. Because faculty knew that the learning process had to continue, they were able to accommodate their students' individual situations while maintaining the rigor of a health care-focused program of study. Even with flexibility, our study found that faculty still struggled to actively engage with their students online. Students oftentimes left their cameras turned off during synchronous class sessions leading faculty to assume students were disconnected from the content or distracted by other responsibilities at home. It has been recommended that faculty use meaningful activities frequently to increase engagement and participation in online classes but to also consider shorter class sessions and frequent breaks to reduce the physical strain that may be caused by prolonged use of electronics [22].

While faculty were concerned about their student's ability to navigate the challenges of distance education, it was revealed that most students remained resilient and were able to meet their educational goals despite adversity. Resilience can be seen in one's ability to adapt quickly to changing situations [26]. Naidu [27] found that distance learners are typically more motivated and resilient than traditional students which aligned with faculty perceptions of student resilience in the current study. Although our students were not distance learners prior to the pandemic, it could be assumed that the support from the faculty and the university helped develop their resilience. The technological and individual obstacles faculty and students encountered as a result of the pandemic's impact on education may have worked to their benefit. Our findings agreed with others who found that university students who exhibited high levels of resilience were often more satisfied in their careers. High levels of resilience have also been shown to decrease work stress and result in higher levels of compassion which can be essential for healthcare workers as educators [27]. The resilience demonstrated by faculty and students can potentially benefit their future academic and professional endeavors.

5. Conclusions

Faculty were forced to navigate the quick shift from face-to-face teaching to online teaching due to the COVID-19 pandemic. This abrupt transition, and the opportunity for self-reflection, brought weaknesses and strengths to light both for the university and individual faculty. Faculty gained skills in technology platforms they had been previously unfamiliar with while noting the inconsistencies in instructional support from the university. Also, faculty became comfortable with the unknown to maintain the continuity of the curriculum to support student learning, resulting in stronger working relationships. Future research should focus on professional development that can help faculty remain up-to-date on technology utilization and establish a contingency plan to better prepare for the unknown.

Author Contributions: Conceptualization, X.Z.G.; methodology, X.Z.G.; software, X.Z.G.; validation, D.D., A.B., K.L., B.R., K.C., C.D., and C.L.A.R.; formal analysis, X.Z.G., D.D., A.B., and K.L.; investigation, X.Z.G., D.D., A.B., and K.L.; resources, X.Z.G.; data curation, X.Z.G., D.D., A.B., and K.L.; writing—original draft preparation, D.D., A.B., K.L., B.R., K.C., and X.Z.G.; writing—review and editing, D.D., A.B., K.L., B.R., K.C., C.L.A.R., and X.Z.G.; supervision, X.Z.G.; project administration, X.Z.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study was approved by the Institutional Review Board (or Ethics Committee) of the University of Mississippi Medical Center (protocol code 2021-1068 and 29 October 2021).

Informed Consent Statement: Informed consent was waived due to the fact that requesting consent could compromise the anonymity and confidentiality of respondents.

Data Availability Statement: The data used and analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Faculty Interview Guide

1. Please state your school and how many years of teaching experience you have.
2. Did your school go completely online, hybrid, have students pick up packets at the beginning of the pandemic, etc.?
3. How was access to technology (Wi-Fi, computers, city/town bandwidth, homeless/displaced, low-income, rural) assessed for your students?
4. Were faculty involved in any decision-making regarding online learning during the COVID-19 pandemic? How so?
5. What kind of technology (hardware, software, online resources, apps) did you use during the COVID-19 pandemic? What was supported/provided by your school and what are things you are using on your own?
6. Compared to your COVID-19 pre-pandemic technology skills, what would you say about your technology competencies right now?
7. In general, how did your students perform academically during the COVID-19 pandemic?
8. What do you think will be the long-term impact on their learning?
9. Did you have students who were at risk academically? If so, how did you ensure that they could continue to progress in the online learning setting?
10. What challenges did you experience related to teaching during the pandemic?
11. Have you seen any positive effects for you and/or your students from the adaptations made during the COVID-19 pandemic?
12. How will this teaching experience impact you as a professional? What technologies and/or practices, if any, will you continue to use in the future?
13. What other lessons have you learned?
14. Any other thoughts or comments on teaching during the COVID-19 pandemic?

Appendix B

Survey link: https://uofmississippi.qualtrics.com/jfe/form/SV_7QG616aesfhuyH4 (accessed on 10 August 2023).

Appendix C. Cronbach's Alpha

Reliability Statistics			
Cronbach's Alpha			N of Items
0.931			14
Item Statistics			
	Mean	Std. Deviation	N
1. My ability to troubleshoot technical problems associated with hardware (e.g., network connections).—Pre-pandemic	3.25	1.071	97
2. My ability to address various computer issues related to software (e.g., downloading appropriate plug-ins, installing programs).—Pre-pandemic	3.37	1.102	97
3. My ability to assist students with troubleshooting technical problems with their personal computers.—Pre-pandemic	3.23	1.254	97
4. My ability to use technological representations (i.e., multimedia, visual demonstrations, etc.) to demonstrate specific concepts in my content area.—Pre-pandemic	3.49	0.980	97
5. My ability to implement program curriculum in an online environment.—Pre-pandemic	3.45	1.331	97
6. My ability to use various courseware programs to deliver instruction (e.g., PowerPoint, Canvas, Arc, Nearpod).—Pre-pandemic	3.40	.996	97
7. My ability to create an online environment which allows students to build new knowledge and skills.—Pre-pandemic	3.42	1.360	97
8. My ability to implement different methods of teaching online.—Pre-pandemic	3.21	1.428	97
9. My ability to moderate online interactivity among students.—Pre-pandemic	3.38	1.636	97
10. My ability to encourage online interactivity among students.—Pre-pandemic	3.26	1.603	97
11. My ability to use online student assessment to modify instruction.—Pre-pandemic	3.45	1.555	97
12. My ability to use technology to predict students' skill/understanding of a particular topic.—Pre-pandemic	3.21	1.399	97
13. My ability to use technology to create effective representations of content that depart from textbook knowledge.—Pre-pandemic	3.42	1.171	97
14. My ability to meet the overall demands of online teaching.—Pre-pandemic	3.28	1.397	97

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