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## Abstract

COVID-19 has changed the day-to-day landscape of education for students, faculty, and staff worldwide, and this is especially true for students in health sciences and medical education programs. This paper explores the effects of the rapid shift to e-learning modalities for students at the University of Arkansas for Medical Sciences Northwest, a regional medical campus located in Northwest Arkansas. A survey and open-ended written interview questions was conducted with a total of 144 student respondents and in-depth follow up interviews were conducted with 29 of those students. Utilizing descriptive statistics and qualitative descriptive analysis, the survey and interviews explored the effects of COVID-19 on the lived experiences of students as part of the transition to e-learning. We found that 64.5% students reported satisfaction with the transition to e-learning as good or very good and the primary themes that influenced e-learning success for students were: *Communication, technology, pedagogy, and community*.

## Introduction

E-learning has become an increasingly important area for content delivery, especially for technical and post-graduate education.<sup>1</sup> E-learning for some educational programs has become routine, but for many students in medicine, pharmacy, and other health professions, e-learning is still relatively novel.<sup>2</sup> As of April 20, 2020, more than 1.5 billion students have been affected by COVID-19-related closures across 191 countries.<sup>2,3</sup> The effects of the COVID-19 pandemic penetrate to nearly every aspect of the contemporary world and most colleges and universities moved to online instruction during the Spring of 2020 as a way of protecting students, staff, instructors, administrators, and faculty from exposure to COVID-19.<sup>2,4,5</sup>

Prior studies demonstrate that a transition to e-learning in health sciences and medical curricula should be conducted with careful planning, and the skills that faculty need for e-learning contexts can be widely

divergent from successful face-to-face pedagogies.<sup>6</sup> The onset of a pandemic allowed for neither careful planning nor the careful training of faculty in e-learning pedagogies. It is important that researchers, administrators, and educators understand and evaluate the successes and failures of education systems and pedagogical practices during this rapid transition to e-learning.

There are more than 1 400 regional medical and health sciences campuses (RMC) across the United States.<sup>7</sup> The Liaison Committee on Medical Education, which provides accreditation for medical education programs in the United States and Canada, defines an RMC as "an instructional site that is distinct from the central/administrative campus of the medical school and at which some students spend one or more complete curricular years".<sup>8</sup> Regional medical campuses do not often compare to the infrastructure and resources of an institution's main campus; however, some regional

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campuses may more commonly implement online learning platforms.<sup>9,10</sup> Little is known about how regional medical campuses transition to e-learning. This article analyzes student experiences related to the transition to e-learning on a regional medical campus, presenting lived experiences of these students. This article indicates areas of concern for institutional responses to future pandemics or emergencies that may require such transitions in the future.

The University of Arkansas for Medical Sciences (UAMS) is the state's only academic health center. UAMS Northwest is a regional campus with 268 students in 4 colleges: Health Professions (Genetic Counseling, Physical Therapy, Occupational Therapy, and Radiologic Imaging Sciences), Medicine, Nursing, and Pharmacy. UAMS Northwest also has primary and specialty clinical care clinics, residency programs, research, and community health education programs. Educational programs varied in use of e-learning prior to COVID-19. Most health professions courses were taught with in-person faculty with a limited amount of interactive video courses. Pharmacy and medicine students were already familiar with some in-person course and some interactive video classes that had been deployed to ensure consistent education across campuses. Interactive video classes included several students sitting together in a classroom with a live faculty member in their classroom and second faculty member remotely teaching on the interactive video. Some programs, such as graduate nursing programs, instruction almost exclusively relied on e-learning prior to COVID-19. All programs had extensive clinical rotations at UAMS and partner health care institutions. The decision to cancel classes was communicated by email to all faculty, staff, students, and clinical partners on Thursday, March 12<sup>th</sup>, 2020. For most programs, classes were canceled for one week, and leaders within each of the colleges managed the logistics of shifting course materials to online, to an e-learning system for course delivery and management, with attention to accreditation standards for each program. The College of Health Professions (Genetic Counseling, Physical Therapy, Occupational Therapy, and Radiologic Imaging Sciences) made the transition over the weekend and began e-learning instruction on Monday, March 16<sup>th</sup>, 2020. To protect student health, all students were removed from in-person clinical rotations at UAMS and partner health care institutions. Some clinical education continued utilizing telemedicine technology. The amount of latitude in pedagogy and delivery technology for individual instructors or courses varied, but leaders from

each college worked to harmonize approaches for delivery, testing, clinical/practical instruction, and lab and manual instruction to keep students on track. University library technology and academic affairs staff worked to make available new educational technology to further support the transition of all programs to e-learning platforms.

Communication with students was conducted at multiple institutional levels simultaneously. Students received daily updates from the UAMS Chancellor's office related to COVID-19, including local infection numbers, and numbers of patients in UAMS medical facilities. Programs and colleges directly communicated with students regarding changing expectations and standards within each program's curriculum. Programs also conducted outreach and sought feedback from students regarding administrative issues, student health and wellbeing, and issues related to coursework. Faculty met with students, one-on-one, and in small groups, using phone and video communication methods to provide support and instruction.

## Methods

UAMS Northwest has conducted a yearly program evaluation survey to capture student experiences on the UAMS Northwest Campus. The 2020 version of this survey included questions on COVID-19 and e-learning. All 268 students enrolled in programs on the UAMS Northwest campus were sent an email with the evaluation survey. The qualitative interview respondents were recruited using a stratified (by academic unit) randomized list of survey respondents. The survey instrument captured students' demographic information and included questions regarding their experience on the UAMS Northwest Campus. In May and June of 2020, COVID-19-specific questions were included on the survey instrument. These questions included "Please rate the transition from in-class learning to online learning" and "Please indicate your level of satisfaction with UAMS about the support you are getting from UAMS to help you transition to taking your classes online" with Likert scale answers along a 5-point scale. Other questions focused on COVID-specific experiences, such as "Given the changes at UAMS caused by the spread of COVID-19, how often do you worry about the following?" with a 4-point Likert scale response across 4 dimensions including "Doing well in classes now that many or all of your classes are online" and "Accessing and successfully using the software

needed for your online classes (e.g. Blackboard, Skype, Zoom, etc.)”.

Open-ended survey questions and the semi-structured qualitative interview guide focused on the effects of COVID-19 on students’ experiences and perceptions of the transition to e-learning, and their experiences related to the COVID-19 pandemic. The open-ended questions and semi-structured qualitative interview guides students to speak in their own words about their lived experiences.

Surveys were captured using the SurveyMonkey platform. Qualitative interviews were conducted by trained research staff, one male and one female, and were recorded using Zoom teleconferencing software. Interviews were recorded and viewed multiple times by the research team. Quotes were transcribed verbatim from interview recordings.

Quantitative data are summarized to describe respondent characteristics and their self-reported rating of experiences. Qualitative descriptive analysis was used to explore respondents’ experiences and perceptions what worked well and what did not work well during the transition to e-learning.<sup>11-13</sup> This methodology focuses on the summary of respondent experiences and perceptions, while also emphasizing the meanings that are ascribed to their experiences.<sup>11-13</sup> Following data collection, the research team developed a codebook based on a combination of *a priori* and emergent themes using a template analysis methodology.<sup>14-16</sup> The research team which consisted of one primary coder and 2 confirmation coders collaboratively discussed themes to ensure scientific rigor.

## Results

Demographic characteristics of survey respondents are presented in Table I. The survey and written interview responses had 144 respondents (53% response rate), with all academic programs at UAMS Northwest represented. The majority of students reported that they were 18-30. Most (81.3%) survey respondents reported Non-Hispanic White as their race or ethnicity, and 72.9% of respondents reported their gender as female. 29 of those students took part in the additional in-depth interview.

Table I. Descriptive survey results (n = 144).

	Frequency	Mean or %	SD
<b>Age</b>	<b>135</b>	<b>26.9</b>	<b>5.4</b>
18-24	65	48.1%	
25-30	54	40.0%	
31-40	8	5.9%	
41-50	8	5.9%	
Missing	9	6.3%	
<b>Race/Ethnicity</b>	<b>139</b>		
Non-Hispanic White	117	81.3%	
Non-Hispanic Other	11	7.6%	
Hispanic (any race)	11	7.6%	
Missing	5	3.5%	
<b>Gender</b>	<b>142</b>		
Female	105	72.9%	
Male	37	25.7%	
Prefer not to say	2	1.4%	
Missing	0		
<b>Program of Study</b>	<b>144</b>		
Genetic Counseling	3	2.1%	
Medicine	18	12.5%	
Nursing	11	7.6%	
Occupational Therapy	17	11.8%	
Pharmacy	28	19.4%	
Physical Therapy	47	32.6%	
Radiologic Imaging	20	13.9%	
Missing	0		
<b>Marital Status</b>	<b>142</b>		
Divorced	4	2.8%	
Married	54	37.5%	
Member of an unmarried couple	16	11.1%	
Never married	68	47.2%	
Prefer not to answer	2	1.4%	
Missing	0		

Table II provides survey responses. Most (84.5%) respondents stated that they were 'satisfied' or 'very satisfied' with their experience on the UAMS Northwest. A majority of respondents rated the transition to online/e-learning as 'good' (43.4%) or 'very good' (41.1%). Further, 77% of respondents rated their satisfaction with the support for transition to e-learning/online learning as 'very satisfied' (30.1%) or 'generally satisfied' (46.9). When asked about agreement with the statement: "I received appropriate communication from UAMS about its ongoing responses to COVID-19", 97.3% of respondents stated that they 'strongly agree' or 'agree' with that statement. Regarding students' concerns about finding a job after graduation, 22.5% of respondents reported that they were concerned 'to a great extent', 31.5% concerned 'somewhat'. Almost half (41.4%) of respondents noted that they were 'not at all' concerned with working in health care professions because of COVID-19, and only 8.1% of respondents noted being concerned 'to a great extent'.

Table II. Survey responses (frequency and percentage of all valid responses) for academic consequences of COVID-19 (n = 144).

	Frequency	Percentage
<b>How satisfied are you with your overall Northwest campus experience?</b>		
Very satisfied	53	41.1%
Satisfied	56	43.4%
Neutral	17	13.2%
Dissatisfied	3	2.3%
Very dissatisfied	0	0.0%
Prefer not to answer	0	0.0%
Missing	15	
<b>Please rate the transition from in-class learning to online learning.</b>		
Very good	29	25.7%
Good	45	39.8%
Fair	32	28.3%
Poor	5	4.4%
Very poor	2	1.8%
Prefer not to answer	0	0.0%
Missing	31	
<b>Please indicate your level of satisfaction with UAMS about the support you are getting from UAMS to help you transition to taking your classes online.</b>		
Very satisfied	34	30.1%
Generally satisfied	53	46.9%
Neither satisfied nor dissatisfied	18	15.9%
Generally dissatisfied	4	3.5%

Very dissatisfied	4	3.5%
Prefer not to answer	0	0.0%
Missing	31	

**Please indicate your level of agreement with the following statement: I received appropriate communication from UAMS about its ongoing responses to COVID-19.**

Strongly agree	52	46.8%
Agree	45	40.5%
Neither agree or disagree	8	7.2%
Disagree	3	2.7%
Strongly disagree	3	2.7%
Prefer not to answer	0	0.0%
Missing	33	

**Because of COVID-19, I am concerned about getting a job after graduation.**

To a great extent	25	22.5%
Somewhat	35	31.5%
Very little	24	21.6%
Not at all	27	24.3%
Don't know	0	0.0%
Prefer not to answer	0	0.0%
Missing	33	

**Because of COVID-19, I am concerned about working in the health care profession.**

To a great extent	9	8.1%
Somewhat	25	22.5%
Very little	31	27.9%
Not at all	46	41.4%
Don't know	0	0.0%
Prefer not to answer	0	0.0%
Missing	33	

Table III describes responses related to student worries related to the COVID-19 pandemic. Only 19.5% of respondents reported that they worried 'very often'. Approximately one-third (31.9%) of students reporting that they 'sometimes' worried about their friendships or social connections, with an equal number of students (31.9%) reporting that they 'never' worried about it. Students reported worrying about technology, with 18.6% reporting 'very often', 17.7% reporting 'often', or 35.4% reporting that they 'sometimes' worried about technology. Related to technology, students were also asked about worries related to access and successfully using software for e-learning with only 10.6% reporting 'very often', and 15% reporting 'often'. Of those surveyed, 41.6% reported worrying about this issue.



Table III. Survey responses (frequency and percentage of all valid responses) for items addressing worries caused by COVID-19 ("Given the changes at UAMS caused by the spread of COVID-19, how often do you worry about the following...?")

	Frequency	Percentage
<b>Doing well in classes now that many or all of your classes are online</b>		
Very Often	22	19.5%
Often	22	19.5%
Sometimes	35	31.0%
Never	34	30.1%
Prefer not to answer	0	0.0%
Missing	31	
<b>Losing friendships and social connections now that classes are online</b>		
Very Often	15	13.3%
Often	26	23.0%
Sometimes	36	31.9%
Never	36	31.9%
Prefer not to answer	0	0.0%
Missing	31	
<b>Having the right equipment for online learning (e.g., reliable internet, computer, etc.)</b>		
Very Often	21	18.6%
Often	20	17.7%
Sometimes	40	35.4%
Never	32	28.3%
Prefer not to answer	0	0.0%
Missing	31	
<b>Accessing and successfully using the software needed for your online classes (e.g., Blackboard, Skype, Zoom, etc.)</b>		
Very Often	12	10.6%
Often	17	15.0%
Sometimes	47	41.6%
Never	37	32.7%
Prefer not to answer	0	0.0%
Missing	31	

Four primary themes emerged during analysis: *Communication, technology, pedagogy, and community*. Seven secondary themes emerged across the 4 primary thematic categories. These secondary themes include: *Frequent and clear communication, software and hardware, instructor proficiency with technology, dialogic and adaptive teaching techniques, clinical skills and field experiences courses, studying and learning environments,*

*sense of community, and transition to job market*. Primary and secondary themes are listed in Table IV.

Table IV: Primary and secondary themes

Primary themes	Secondary themes
1 Communication	1.1 Frequent and clear communication
2 Technology	2.1 Software and hardware 2.2 Instructor proficiency with technology
3 Pedagogy	3.1 Dialogic and adaptive teaching techniques 3.2 Clinical skills and field experiences courses 3.3 Studying and learning environments
4 Community	4.1 Sense of community 4.2 Transition to job market

#### *Frequent and Clear Communications*

Respondents discussed that the clarity and frequency of official and unofficial communications were critical in easing the transition from in-person courses to a full e-learning environment. Respondents often integrated their assessment of communication regarding COVID-19 generally with the communication about their courses. When asked about their experience, respondents stated that they appreciated the way that the administration "kept [students] informed of the discussions that administration was having regarding our return to

school". Further, this respondent appreciated the way that instructors "checked in with our mental health and stresses regularly in class". Respondents stated that frequent and clear communications "kept class normal and routine while giving clear expectations was helpful". Respondents reported that clarity of expectations became increasingly important as the ability to communicate in person with instructors decreased.

#### *Software and Hardware*

Some e-learning technologies were identified as useful in facilitating learning and others were identified by students as impediment to learning. Respondents often noted that video calling utility functionalities for "breakout rooms" for "smaller class discussion" enhanced their learning experiences. Quiz and polling software, such as Kahoot, was often noted as a technological solution to unidirectional communication where such tools facilitated active learning. Another student noted that "the hurdles [faced by students] are technology and software" for her program, although some problems were avoided through program requirements for "specific hardware" so "everyone in the program had the same setup".

#### *Instructor proficiency with technology*

Students' experiences were influenced by the faculty members' proficiency or lack of proficiency with new technological tools. Students reported that some faculty were "already comfortable with the technology and structure" of e-learning. However, Respondent discussed concerns with "first time instructors [who were] unfamiliar with technology". Respondents said they recognized that the transition was difficult for instructors who had to adjust delivery methods mid-course, stating "transition was hard for everyone, even for professors who were used to submitting on one platform". Students described that when their faculty were not as experienced in the technology that resulted in ineffective teaching and often resulted in courses beginning significantly later than scheduled. Respondents also noted that faculty's lack of experience with technology resulted in classes that did not always "start on time". Respondents also stated that "classes went over". One respondent stated that "a couple [of my classes] went hours over, one [class] went an hour over" which resulted in "mental fatigue".

#### *Dialogic and adaptive teaching techniques*

Faculty who utilized dialogic and adaptive teaching techniques were identified as dramatically improving

student experience with e-learning. Respondents stated that being asked about preferences, needs, and issues related to learning, and then having their responses incorporated into the course, was essential for a smooth transition with minimal disruption for learning. Respondents stated that the courses that worked best "adapted to the changing circumstances" and with adjustments that fit "online learning needs". Respondents noted that pedagogical methods that "fostered active student involvement in discussion" alongside "activities that students could work through with guidance" were the most effective for their courses.

#### *Clinical skills and field experience courses.*

Respondents reported that e-learning delivered health sciences and medical education works for some courses but noted that the experience of shifting to e-learning did not work as well for hands on clinical skills and field experience courses. Respondents frequently noted that clinical skills courses became impossible or lost most educational value. Respondents noted that "practicing these hands-on skills was something I was looking forward to, which we didn't really have a great way to do this online". Another respondent echoed this sentiment stating that "it's hard to watch your professor on a computer screen...practicing on a dummy or their child" and that "you're making the best of it, but there may not be time when you resume normal classwork to...practice those skills".

Respondents reported being anxious about the quality of their education compared to past courses where hands-on clinical skills instruction methods could be observed, critiqued, and corrected. Respondents described changes in public health field experience as well, stating "because of COVID we had to go online and we couldn't go out and meet people" and this "class had to dramatically change...but, it felt like our learning experience was hindered because of that". Respondents noted the inevitability of changes to classes due to the pandemic and discussed anxiety about educational quality especially for clinical and field experience courses.

#### *Studying and learning environments*

Several respondents noted that prior to COVID-19 they had relied on quiet study spaces on campus, including the UAMS Northwest library, empty classrooms, or lounge areas. Losing access to quiet, uncluttered learning environments for class time, group activities, or for studying was identified as a major concern with the rapid transition to fully online courses. Some

respondents noted that their home environments were often shared with family or with roommates or were otherwise not conducive to class time or to study time. Respondents identified that “studying at home was not beneficial to me and made it harder to get schoolwork done”, and others described that it was “easy to get distracted” while studying at home. One respondent summarized their experiences with studying and learning at home, stating that “for me, what made [studying and learning at home] harder was not having...places to study [and] trying to make myself study at home, where there are the most distractions”. Respondents also linked pedagogical practice with their problems with a home studying environment and described that “being at home, there are many more distractions and it’s hard to focus when someone is just reading/lecturing to me”. Some students also experienced issues with their home technology and internet connectivity noting that “internet connection was a big problem for me. My internet would go out during a test or a quiz. I tried multiple places and the internet was never reliable”.

#### *Sense of Community.*

Students often described missing face-to-face interaction with fellow students and missing these contacts as part of the shift to online learning. Respondents linked their sense of community to the nature of the smaller campus noting that they chose to come to UAMS Northwest because “I like how personal it feels on campus, and especially within each college. Not a whole lot of people, and it’s easier to connect. You get a lot of one-on-one time; you aren’t fighting for attention”. Respondents stated that the UAMS Northwest campus was “much closer knit”. This was echoed by a respondent who noted that the UAMS Northwest campus “is more like a community than what my classmates are feeling at the main campus”. The switch to online learning was identified as challenging the close-knit community that students had experienced, noting that “not being on campus for studying, events, etc. made me feel separated and distant”. Other respondents noted that “classrooms [help] maintain connections with the professors and other students”. However, students also noted that even with online learning that the group worked to maintain their close-knit community, recounting that “other students sent out reminders and group me notifications” to keep each other accountable and completing necessary coursework.

#### *Transition to job market*

Several respondents discussed anxieties about how COVID-19 and changes in instruction would translate to their capabilities as professionals entering the job market. Respondents identified that they were “worried about how COVID will affect the future” and especially how it would affect her licensure process and especially the job market for her profession. Respondents noted that their biggest concern was “not finding a job/being able to take the boards” and “ability to take the NAPLEX and get a job...is stressing me out”. Respondent discussed that “our professors seem to be very optimistic about us finding jobs, which is fine, it’s great to hear that they are optimistic, I’m not sure, I know people...in my profession who have lost their jobs...and nobody knows when there is going to be an upswing”. Some respondents stated that they were anxious about “having a job on finishing school, since hospitals have been cutting positions” and others discussed their worry that “there’s no way to plan, the timeline has been changed, and the job market itself has dramatically changed”.

#### Discussion

This study used primarily qualitative methods to examine the rapid transition to e-learning for students on an RMC. This study found *frequent and clear communication, software and hardware, instructor proficiency with technology, dialogic and adaptive teaching techniques, clinical skills and field experiences courses, studying and learning environments, sense of community, and transition to job market* were key factors in the transition.

*Frequent and clear communication* was identified as a critical need for students. Students desired clear communication about institutional action, and also noted that clarity of expectations in courses and for clinical curricula was a major concern. This finding is consistent with prior research which highlights the role of clarity of communication in online learning environments, including clear guidelines, timely feedback, and virtual face-to-face elements.<sup>17</sup> Students were also concerned with technology related to course delivery, with 2 related themes arising out of general issues related to *software and hardware*, and with *instructor proficiency with technology*. Respondents noted that teleconferencing programs that allowed for more personal connection with instructors and peers were appreciated, while instructor proficiencies, or lack thereof, tended to exacerbate issues for students and created adverse conditions for learning. The rapid



transition to e-learning that is discussed here highlighted issues that had been identified in the literature on e-learning in healthcare fields, such as issues with technology, behavioral expectations, student mentoring, and communication.<sup>18</sup> Pedagogical issues, including *dialogic and adaptive teaching techniques, clinical skills and field experience courses, and the studying and learning environments*, were noted by respondents. Respondents noted that when instructors sought feedback from students, and then adjusted courses appropriately to that feedback, were the most effective for learning. Students drew parallels between at-home e-learning and difficulties in the social context of course delivery, where losing access to campus resources was considered the direct result of COVID-19 restrictions and the e-learning modalities. Students also identified community as a key primary theme in this study. Contrasting the sense of community felt by students pre-COVID-19 pandemic with difficulties in feeling connected to the community, students noted that e-learning modalities did not carry an inherent affective connection to other students. This is consistent with prior research that shows students look for interdependence with peers, which indicates a desire to have a connection in an academic setting with a peer group as part of their educational experience.<sup>19,20</sup> The findings of this study show that the rapid transition to e-learning modalities did not necessarily foster the same peer group environments which students found to be valuable prior to the COVID-19 pandemic. As a corollary to concerns related to community, students identified concerns related to networking and transition from their coursework to the job market. This is a novel finding and merits further research to explore the impacts of such a rapid transition to e-learning on these students when they enter the job market.

Overall, the findings are consistent with prior research which has demonstrated that the online delivery of course content and e-learning modalities present challenges for both instructors<sup>21</sup> and students.<sup>22</sup> This research provides new and important insights because most prior literature regarding the effects of COVID-19 on education have focused on *higher education* as a unit of analysis, which often assumes some amount of homogeneity across educational programs.<sup>23-37</sup> Some studies have focused specifically on health sciences and medical education transition to e-learning during COVID-19.<sup>2,38-41</sup> and this is the first study to focus on that transition at a regional medical campus. The study offers new insights into the unique challenges faced by students in health professions, medicine, nursing, and

pharmacy at a regional medical campus. This study and others will be of particular benefit for institutional planning to conduct fine-grained experiential and longitudinal studies that link institutional and pedagogical techniques to student outcomes within and across different health sciences and medical educational contexts.

There are some limitations to the study. While the sample of 144 was large for a qualitative study, all students were from one regional medical campus. The sample size and location along with the homogeneity of the sample in terms of race and ethnicity reduces the generalizability of the study. Additionally, these findings may not be representative of health sciences students at other campuses. Follow-up studies will be necessary to understand changes in teaching and the perceptions of students over time.

### Conclusion

The examination of students' experiences can help us better understand the importance of communication, technology, pedagogy, and community as we determine the future of health sciences and medical education during the transitions to e-learning. It is important that institutions be prepared for deploying technological resources and that faculty be trained on those resources in advance. The most important finding of this study relates to community and communication within the institution, it is clear that students found value in efforts to keep them informed and in systems where their feedback was not just collected, but where that feedback was used to better shape classes, curricula, and other aspects of their educational experience.

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