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Give Them Grace: An Autoethnographic Study on Instructors' Adaptation to Online Technology in Education as a Result of COVID-19

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Abstract

This research paper describes the study of instructors' experiences in K-12 and higher education as they adapted to new technology while education shifted to an online format as a result of COVID-19. This autoethnographic study sought to understand commonalities in five instructors' attitudes toward online education tools, external variables that affected their adaptation, and their overall perceptions of the technology and its usefulness. The research design was guided by the Technology Acceptance Model (TAM). Deductive analysis of reflections, interviews, and focus group transcripts demonstrated the presence of TAM constructs in participants' experiences. Participants recognized the usefulness of various technologies and tools but did not inherently view them or the experience of teaching online in a positive way compared to teaching in-person. Participants noted the need to practice empathy with their students and themselves, the effect that external factors (such as administrative support) had on their acceptance of technologies, and the lessons learned on how their instruction has changed as a result of online instruction.

Introduction

The experience of adapting to new technologies is universal. However, we often are willing to make these changes in order to adapt to our professional careers, or more specifically, the teaching landscape. The experiences faced when confronted with a global pandemic and continuing education are shared phenomena teachers, students, and even parental figures are continuing to navigate. The shift to exclusively online learning was abrupt for many educators and administrators across all levels of education. Many schools in the K-12 and higher education landscape had a limited time frame to begin transitioning online and to ensure meeting program learning outcomes [1]. Although there have been several avenues for digital learning for decades, this shift exposed the reality of modern U.S. educational systems: disparities in the resources students have at home [2] and the lack of instructor preparation for online instruction [3]. In order to better the experience of online instruction for both teachers and students, there is a need to understand the characteristics of the transition to online learning and how this adaptation continues. Ubiquitous stress due to a new 'normal' and an unknown future exacerbated this need. Previous work on online learning has shown that students often feel negative emotions in the learning environment, such as loneliness, isolation, and anxiety [4]. Teachers' adverse feelings in preparing for and delivering online teaching include sentiments of being restricted, stressed, and devalued [4]. By examining attitudes and perceptions as described in the constructs of the technology acceptance model (TAM), this study addresses an area that is lacking in research: the affective factors that underlie the emotional process of technology acceptance [5]. Recognizing that participants are able to elucidate their experiences through the narratives produced in an autoethnography, this study has afforded the authors the opportunity to reflect on the techniques used in their adaptation and mindsets, and make plans for future instruction [6], [7].

To prepare for future semesters, teachers should reflect on what worked for instruction, how students need to be supported, and what requests need to come from the administrative level [8]. As the discussion of a more equitable education continues to reach out to disadvantaged populations [9] , not only should there be preparations made for indefinitely supporting online education, but valuable lessons have been learned which can be applied to in-person courses [10]. The autoethnographic study has been guided by three research questions involving both the

K-12 and higher education areas: 1) How is the process of adapting to online instruction experienced by instructors? 2) How do the external variables of their teaching contexts impact their abilities to adapt to new technology? 3) How have instructors felt as they have adapted to online learning?

Theoretical Framework

Technology as an educational asset allowed schools to continue enrollment provided students had access to the internet and an electronic device. From an instructional perspective, teachers had to learn new applications and implement different teaching modalities in order to instruct online. To better understand the implications of a shortened time frame for implementation of various technologies and modalities due to the presence of a worldwide pandemic,the Technology Acceptance Model (TAM) was used as a framework for exploring five instructors' perspectives on technology adoption. Davis, Bagozzi, and Warshaw (1989) developed the TAM seen in Figure 1 [11]. Originally derived from two existing theories -- the theory of planned behavior and the theory of reasonable action -- this model helps the researchers understand the interplay of external factors leading into internal decision making. External variables consider factors that may influence a user's beliefs about a technology. This could be characteristics of the technology, training the user may or may not have received, administrative support, and the autonomy the user has in the system. As these external variables are internally considered, the model described how users accepted a new technology and how users perceived its usefulness and ease of use [5], [11]. The TAM intends to predict and explain a user's motivation(s) to accept new technology. This motivation is explained by three main factors: perceived ease of use, perceived usefulness, and attitude toward using [5]**.**

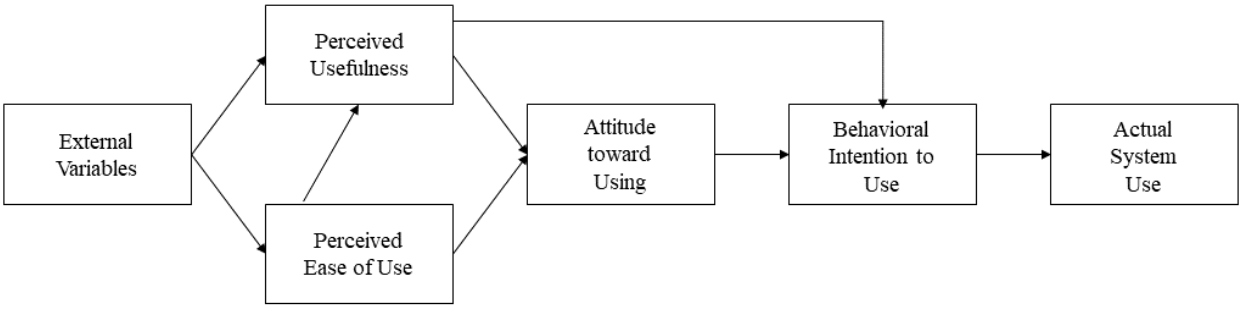

Figure 1. Technology acceptance model [11]

Although there are extensions and modifications that have been made to the Technology Acceptance Model, there is reason to believe that the structure and underlying assumptions remain the same despite the changes and do not affect the interpretations of this study [5].

This framework was used to inform the autoethnographic methods used for data collection and to guide analysis. While this framework was not originally intended to extend to education, the expansion of the internet and other computer technologies over the years has made the model applicable to a multitude of disciplines [5].

Methods

Autoethnography is a means to reflect on an experience that is situated in one's self and the context of culture [6], [7]. Reflection begins with the examination of the self, during or after an experience, that leads to confrontation, understanding, and resolution in one's actions, particularly in the context of teaching and learning [6] As the object of study is the researchers' experiences, there is not an attempt for objectivity. This lends itself to the discussion including affect and how that impacted participants' teaching and acceptance of online instruction. While authors exist in varying educational contexts the shared experience led to collaboration that spanned these differences.

The analysis of experiences through the lens of autoethnography blends several components of research design; the researcher-participant relationship shifts as the authors are guided by the collaboration present and take note of the socio-cultural implications of their experiences. Through the combination of narration/description and analysis/interpretation, the continued dialogue perpetuated through autoethnography serves the purposes of its authors [7], and in this study tells the accounts of instructors adapting and accepting the technology required to teach their students in an online environment.

Context

Starting as informal conversations during the spring of 2020, this study became an effort to connect teachers with shared experiences and conduct research as to how they were adapting to the technology they needed to teach in an online capacity.This study was partially motivated by the feelings of the lead author as she switched to online learning as a graduate student and her knowledge of frustrations that were apparent in the participants' conversations. As all of the participants are fairly new to teaching (<5 years) and some were in University settings, it was found to be fitting and beneficial to all to conduct an autoethnography that would give participants the opportunity to ask questions of themselves and the others as they processed their experiences and reflected on the changes that have occurred over a year of teaching online. This collaborative effort introduced some of the participants to qualitative research and proved to be a learning experience in both online teaching and research design.

Participants

Of the seven authors in this study, five were active participants in both the discussed teaching and the conducted research. This included an adjunct science instructor, an environmental engineering instructor, a high school agriculture educator, a middle school math teacher, and an elementary school teacher. As the collaboration of this autoethnography was an organic result of peer discussions, there was no recruitment of participants.

Table 1. Summary of Participants' educational and teaching backgrounds

Participant name	Area of study	Years of experience	Teaching location	Educational level and subject
Amber	B.S. natural resources, emphasis in wildlife management, M.A.E. (agricultural education)	2	Arizona	High school, Agriculture
Byron	PhD environmental engineering,	1.5 (4 including	Arizona	University, Chem car, environmental lab, graduate seminar, online course

	specialization in Engineering Education	grad school)		
Chris	B.S. psychology, ongoing M.A. teaching	2	Oregon	Middle school, math, electives (PE, gardening)
Malori	B.S. atmospheric and oceanic sciences, M.S. atmospheric science	2	Bay Area, California	University, intro to meteorology; intro to oceanography; corresponding labs
Tara	Bachelors of Science in Middle Level Education with endorsements in Language Arts and History	3	Nebraska	4th grade, Middle school art

Technology Assessed

The technology users sought to accept in this study includes any software and/or hardware that contributed to participants' abilities to perform online instruction. This may incorporate various applications and interfaces but will be a singular entity in analysis. Examples of applications include but are not limited to: learning management systems, Zoom, Google Classroom, and interactive learning tools. Interfaces or hardware incorporates participants' access to resources such as spare monitors, consistent internet access, or overhead projectors.

Data Collection and Analysis

In order to understand each participant's individual experience in transitioning to online instruction, initial semi-structured interviews were conducted by one member of the research team via Zoom during Spring 2020. These interviews lasted thirty minutes to an hour. The interviews were transcribed real time using Otter.ai and were reviewed after each interview for clarity and correctness. The interview protocol was broken into three sections: online teaching, students, and wrap-up. The online teaching questions focused on the before, during, and after of the transition to online learning. The questions within the student section first asked participants how they interact with students in and out of class. Second, these questions sought to understand the participants' perceptions of their students' motivation, engagement, and mental state. Finally, the wrap-up section was motivated by the desire for participants to have their own takeaways from the interview. This included both their overall experience with the changes to their lives and work as well as what they have learned about their educational system.

Participants produced reflections at the beginning of 2021 that encompassed changes that had occurred since the first interview. Guiding reflection questions focused on constructs from TAM were co-constructed. Collaborative analysis of the reflections led to development and consensus of a focus group protocol that was used when the participants met to discuss their experiences.

Data analysis was a two pronged effort- participants individually explored their data and the lead author coded across all transcripts and reflection. As analysis continued, repeated one-on-one check-ins were conducted to corroborate codes and guarantee consensus. Throughout the data

collection and analytical process, participants iteratively reviewed protocols, reflections, and narratives to ensure correctness and authenticity of the interpretation.

Measures of Quality

Due to the nature of an autoethnographic study, data was collected and handled in a manner that ensured all collaborators were able to review, analyze, and interpret the data consistently. Guided by the Quality Management Process Model [12], a shared Google Drive folder was established to document all work done by the lead researcher, communications between the collaborators, and transcripts and reflections collected in the study. Genuine dialogue with subjects paved the way for the creation of this study and contributed to the openness and vulnerability of the focus group. Data analysis was iterative in nature and was contingent on collaboration to ensure coherent interpretation of narratives. This shared repository assisted in maintaining homogeneity in protocols created for interviews, reflections, and the focus group.

Limitations

We recognize due to the nature of this autoethnographic study that many of the experiences of the participants are not generalizable, but they may be relatable and useful to current instructors [13]. The participants of the study had varying levels of autonomy in their teaching practices as their contexts varied in location and governmental oversight. The experiences that participants had could be indicative of those who are new to teaching, as all participants have less than 5 years of teaching experience. The technology acceptance model and work done in the area has acknowledged that age may be a factor in how people adapt and accept technology [5].

Results

To answer the research questions, the technology acceptance model is used to describe each of its constructs in the words of the authors. A special focus is placed on the external variables that each participant handled in their acceptance of technologies for online instruction. The contextual component [5],[6] of an autoethnography contributes itself to examining the similarities and differences between the external constructs aiding/hindering the authors.

External variables

Amber- Amber teaches agricultural education at a rural high school in southern Arizona. The location of her school, home, and students' homes present a challenge for consistent internet access. She recognized that 'expectations are constantly changing and administration's like, "do this, oh wait no do this, we're doing it this way." Because the laws and the policies about it are changing frequently'. She is supported by her school's administration as they understand the importance of emotional learning in conjunction with conceptual understanding. However, Amber has had interactions with members of the school board, which affected her attitude towards teaching, being told that "soldiers are essential workers and they did their job. You're an essential worker, you just need to go do your [job]." These comments and the decision from the school board to reopen physical school buildings presented another needed adaptation, hybrid learning. Amber's classroom was not equipped with proper hardware to appropriately teach students both in-person and online. All students did have access to computers, allowing for dissemination of materials in a more productive manner than the previous paper packets that had been created during Spring 2020. Her school switched platforms, prompting Amber to have to shift gears in order to adapt to the new technology.

Byron- Byron is a chemical and environmental engineering instructor at [blinded]. He has extensive experience with online instruction having created and worked with online courses before the start of the pandemic. Through licensure available through his university, he had been able to attempt and decide on the implementation and use of technology in his classrooms. He had no optimal home work space, but had imperative access to his office on campus, providing him with reliable use of dual monitors and working space. While he had worked to adapt several courses during the Spring 2020 semester, he was assigned new courses in Fall 2020. Byron had to simultaneously learn course material as he created, modified, and adapted three courses to online instruction. He credits his pre-existing knowledge of online instruction to previous collaboration to the Office of Instruction and Assessment, other instructors, and time to learn without the pressure of a deadline.

Chris- Chris is a middle school mathematics teacher at a Catholic school in Oregon. Decisions regarding actions within the school are largely governed by members of the associated church. Yet, liability is discussed in terms of "blaming the government". The principal of the school is a former practitioner that has provided support throughout the pandemic. Students are provided with iPads which makes technology-based lessons more accessible. As of January 2021, Chris is teaching in-person with social distancing protocols in place. However, his school has strict guidelines in place about families traveling or taking advantage of the online instruction happening simultaneously. Chris's class room has an older projector that makes it difficult to display content to both in-person and virtual students. He noted that the challenges he faces currently are unlike those he faced at the beginning of the pandemic when he was primarily adapting materials and lectures to an online format. He noted "teachers are expected to utilize technology with limited ways to implement it".

Malori- Malori is an adjunct instructor who teaches multiple general education science courses across multiple higher education institutions. Her perceptions of job security have influenced her decision to teach several courses stating, "I'm taking and accepting almost any and all teaching assignments that are being offered to me." She recognizes that while she has the support of her peers who together are able to try different technologies and provide guidance and feedback to one another, that a lack of care from colleges for the instructors is still a present issue. Having the resources for licensure, Malori was able to implement new technologies otherwise unavailable to her.

Tara- Tara teaches 4th (now 5th) grade and art at a Lutheran elementary school. Her school was able to prepare for online instruction faster than neighboring schools due to the awareness of administration and a known case of COVID in the area. She noted that "they actually shut down our school in [the] beginning of March. And so, when other schools were still going on we were already off [and preparing] because of Corona." Tara's school was able to partner with a local internet provider in order to ensure that all students had access to the internet in their homes. Teachers gave up their spring break to be trained and prepared to instruct their students online. The presence of a technology advisor in the school provided teachers with helpful, basic knowledge for their platforms. In Fall 2020, she switched to teaching fifth graders, which allowed her to remain with the students she adjusted to online learning with, however, she had new content to prepare and a new platform to learn. Tata noted that familiar technologies were easy to manage online, where newer ones brought challenges to students. In the transition to hybrid learning, there was a need to manage the gap between teachers' expectations and those held by students' families.

Perceived Ease of Use

In the process of adjusting to online learning, amid these external variables, participants began to experience challenges (or lack thereof) with technology. The perception of ease was more predominant throughout the data, due largely to how many technologies could be used within the realm of online teaching. As new technologies have been rolled out over the past year, the authors marked which applications had a steeper learning curve. Amber, who was required to switch to a new platform midway after learning another, noted, "It was hard doing Teams, because it looked so difficult to use, especially class notebook. But honestly, once I tried, it wasn't too bad…" Linked to one of her external variables, Amber had no choice in adapting to Teams, but her perception changed once she used the technology more frequently.

Perceived Usefulness

Perceptions of usefulness often revealed shortcomings of online teaching in that it removed helpful measures, such as being reminded of due dates during in-person classes. Several of the authors noted that while cameras were an inherently useful tool for online learning, they felt uncomfortable trying to enforce their use. Malori wrote in her reflections:

> The feedback loop of seeing if students understand/when they're done writing is still pretty much gone - but some students do have their cameras on, so I use them as the gauge. Otherwise I have to rely on students asking questions or for them to tell me to go back a slide.

Much of the time, the authors perceived a technology to be useful if students engaged more with it. The chat and reaction functions within several applications were able to provide students with multiple avenues of interacting with the instructors, even if cameras were off, either as a function of slow internet connection or preference. The learning management systems each participant utilized was dependent on their institution. All were able to make due, several noting the ability to have all materials in one place made communicating with students, posting materials, and getting feedback easier.

Attitude towards Using

As seen in the framework, both perceptions led to the participants' attitudes toward using online learning. Amber acknowledged the usefulness of online learning but expresses a negative reaction to it, "so I definitely think that having online education is important for equity and accessibility. But I'm very excited to get back in my physical classroom. This isn't the way I want to teach." For several participants, while online learning had its uses in order to continue their students' education, they often had negative emotions connected to the act itself, but this could perhaps relate to the fact that online learning was being adjusted to while they had to work at home. Byron, who was still able to work in his office, had an overall positive reaction to online learning, partly because they had experience in the past,

> First of all, because I already taught a fully online course, the education system is 100% easily able to transition to online classes, but it requires already knowing how things work… And quite frankly, I am considering moving some of my course load online, just because I enjoy having that flexibility.

Both quotes demonstrate that participants have their attitudes placed firmly in their preferences while recognizing online learning's capabilities and usefulness. As Spring turned to Fall, several of the authors began to face a new mode of instruction, hybrid learning. Attitudes began to shift for Amber, Chris, and Tara who teach in the K-12 space. Apprehension grew out of the aspects that they could not control, like students' ability to adapt to being back in the classroom. Chris took note of his attitude towards returning to his classroom, "I wasn't teaching them curriculum or those things… it was always 'let's make sure that we're all okay being here'" and how that played into teaching in a hybrid format, "I forget that I have kids that are all the way in the back of the room". This adjustment misplaced some of the comfort some of the participants were beginning to feel after having been teaching online for several months.

Behavioral Intention to Use

Because so much of adapting to online instruction was framed in explicit actions, behavioral intentions to use digital learning were not as apparent within conversations and reflections. Some participants voiced their intentions about the changes they were making, such as Amber, who explained, "My goal is really for them to just gain some knowledge, have something to put in their notes." Intentions for online learning were often centered on making the experience of online learning positive for students, as partici[ants voiced their concerns about students' abilities to learn and not be overwhelmed. Chris observed, "...we want to make sure that even though we are in the pandemic [students] are still feeling comfortable and not overwhelmed by what we're asking them to do…". Participants have had to make significant changes to their courses. The underlying intention behind many changes were to keep students from getting overwhelmed or burnt out while still attempting to keep the rigor in their courses. In looking to the future of teaching, whether it is online or in person, authors note their intention to continue using applications, noting that their usefulness and ease of use would benefit their classrooms.

Actual System Use

These intentions were put into action by these participants as they describe how they teach their classes online, change their existing material, and adapt to the current situations. Participants are adapting throughout the process of online learning, and this is evident throughout conversations and reflections.. Malori discussed the changes made to both classes in labs, during the Spring of 2020:

> …what I tried to do first was create a little anonymous survey to see the accessibility that my students have to Wi Fi to a device... It's been interesting, especially lecture versus lab... where normally I would give them whatever activity and they would have to complete the activity, and then they could leave -- kind of like an exit ticket sort of thing. But now I have to be a bit more asynchronous, right, so I still explain the activity that they have to do, and show them what their [tasks are], what websites to use or what the modules do and then they answer questions and they have a couple of days to submit said questions and that's how they'll get the credit for that week

All the participants were acutely aware of the need to assess what technology their students had access to in order to understand what their students are capable of doing from home. This led to changing the content of their classes, what format material is presented in, opportunities for students to earn credit, and timelines for due dates. For the authors, the use of the technology became a routine until a new problem arose. This was often addressed with a new application or

substituting existing applications with one that were more efficient and easier to use. In their actual use, there was a concern present about too many applications, sites, etc. in their teaching. There was agreement to use as few as possible so long as they were able to meet the needs of their students and their teaching.

Emotions

Participants recognize the need to take care of themselves in the midst of adapting to a new manner of teaching and doing so from home. Several participants recognized that not having to commute to and from school afforded them time to work out, an outlet for many to destress from the physical toll working from home takes. The intersection of working from home and teaching online had the participants needing to create a new boundary that was marked previously by that physical act of commuting to work. The care that participants are taking is also evident from school support. Amber mentions,

> …my district is nice and they're like, please work out and get some sort of physical exercise during your scheduled work hours which I'm like, thank you. So part of my day is going and taking care of my animals which to a point is also part of my job because I have seven ducks designed for classroom use that now live in my backyard…

So, while the new 'normal' of working and teaching from home isn't ideal, the schools, universities and colleges that the participants work for are encouraging their teachers to take care of themselves as well.

Emotions for participants would run high in the face of the beginning of any big change. Tara expresses that for her, "there is an instinctive fear in using something brand new and knowing that there are people expecting us to be proficient." She goes on to question whether that fear is perceived by others or is it an isolating feeling that teachers must push back against in order to move forward. In conversations among authors, stress is repeatedly brought up. Whether it's a result of the people they interact with, the expectations laid upon them by administrators or other stakeholders in the community, or the fear of getting sick, they all agree that this feeling has become normal in their work. With the uncertainty that comes with changes that could and have happened over the past year, Tara compared online instruction in a pandemic to being in limbo saying, "...I'm not a Catholic by any means but I feel like that's the closest thing I could kind of connect with purgatory. Sure, you're not in heaven but you're not in hell you're kind of just like aimlessly wandering."

Mentioning their interactions with students sparked discussion of the positive feelings the participants were holding onto. In talking about why they are teaching, the authors felt justified in persevering through online instruction for their students. They talked about the satisfaction it brought them when students laughed at their jokes in chat, the joy when students sent them Christmas cards in the mail, and the validation when students readily engaged online. Participants felt it was vital to be open and vulnerable with their students, humanizing themselves in their classes so that students understood that mental health challenges and frustrations/struggles were normal.

In talking about the study and what they had learned from reflecting, participants noted that listening to their interviews has been a positive experience in seeing how far they have come in a year. Being able to speak about how they feel with peers who understand what they're going through in an authentic, vulnerable way made them feel that what they were experiencing, whether those feelings were negative or positive, were valid. In his reflection Chris wrote that

“as I continue in this time, I remind myself that there will not always be large victories. Small victories daily will cause a massive change within the future I am trying to shape.” These victories centered around students being engaged, with each other and with the instructor, making progress on work, and taking breaks from screens when possible. Participants recognized that these feelings were not permanent, that there was an ebb and flow to feeling burnt out, to experience the joy of teaching, and to feeling like they are good teachers.

Discussion & Takeaways

The purpose of this study was to examine the experiences of five teachers as they adapted to online instruction. The Technology Acceptance Model indicates that external variables predict the attitudes of the user towards the technology through the perceptions of usefulness and ease of use [5], [11]**.** The TAM was able to appropriately describe the adaptation process of the authors, especially at the onset of the pandemic and online learning. The participants who had more autonomy in their classes in the higher education context were able to test more technologies and make the decisions for themselves as to which technologies were accepted into their teaching and classrooms [1]. The participants in the K-12 space were subject to the whims of their overseeing bodies. The inclusion of parental figures in their external variables shifted the K-12 instructors’ perceptions and attitudes towards the technology used as the push for returning to in-person learning appeared in the Fall of 2020 and persisted. Parental involvement is necessary for students’ success [14], and their interactions with participants impacted how technologies were used for online instruction.

These external factors in the context of teaching and learning online, demonstrated that the acceptance of technology is not dependent on one sole user. Acceptance is contingent upon external factors, such as students, parental figures, and administrators, as well as the internal factors of those implementing the instruction if the technology is meant to have an impact on learning [15]. The technology acceptance model could be used to describe any one decision of acceptance for the participants [5], [11], [16]. However, with the multitude of applications and learning management systems, as well as means of communication and reliance on internet access, the TAM fails to explicitly encapsulate the iterations and longevity of the process of adapting to and accepting online instruction tools for the authors. The nuance of using Zoom while sharing a screen for a PowerPoint presentation, and monitoring the chat is lost within the actual system use construct.

The emotions described by the authors are similarly felt by teachers in the context of non-pandemic instruction [4]. The expectations put on instructors across educational contexts were exacerbated by the stress of a pandemic and the uncertainty of the future. The stress and burnout experienced by instructors was present regardless of the modality of learning. The participants wanted to feel like they were supporting their students to the best of their abilities and guiding students towards learning in a meaningful way [10]. The larger implication of these emotions is to ask whether they are due to the pandemic and online learning or if there is a need to address the way teaching makes instructors feel due to their contexts.

Conclusions & Future work

In conclusion, the Technology Acceptance Model was able to describe the experiences of the participants’ adaptation to online instruction. The contexts of their teaching environments, location, administration, and access to resources shaped their attitudes, perceptions, and

behaviors towards the use of online instructional tools. The reflective nature of autoethnography lent itself to helping the authors in coming to terms with the changes they have made over the course of the past year. The presence of online instruction will continue to impact how schools, K-12 and higher education, use technology in the classroom and for those not physically present, online. As hybrid teaching continues to be adopted and implemented, there is a new wave of adjustment and uncertainty for teachers, students, and others involved in education.

The emotions that the participants had informed their attitudes about online learning, how they view teaching, and how they perceive themselves as instructors. For the authors' mental health, it was crucial to examine these feelings, process them, and enact measures to take care of themselves. This appeared in the form of exercise, setting personal boundaries for working hours, and reassessing expectations for themselves in what they can do teaching from home.

Future work can examine the shift from online instruction returning to in-person instruction. In terms of the impact that external variables had on the authors' acceptance of online instruction, we consider the idea of capturing various perspectives of the same process in order to better understand the phenomena in its context.

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