



Technology and Teaching: A Conversation among Faculty Regarding the Pros and Cons of Technology

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Technology is often touted as the savior of education (Collins & Haverson, 2009). However, is technology the panacea that it is made out to be? This paper is an extended conversation among a group of faculty members at three different universities and their attitudes and beliefs about technology and education. Three professors shared their pro-technology stance and three took a less favorable view. The contents of the conversation were then analyzed by a neutral party to extract the various themes that emerged. What was discovered was that there were three major threads to the conversation: technology and educational access, online education, and technology and instructional strategies. While there was little agreement, throughout the evolution of the conversation, both sides began to understand each other a little more. Keywords: Technology, Equity, Online Learning, Pedagogy

Introduction

Technology has become a major component of our educational system. For instance the Internet has grown to be a part of our everyday lives but, “In fall 2001, 99 percent of public schools in the United States had access to the Internet. When NCES first started estimating Internet access in schools in 1994, 35 percent of public schools had access” (NCES, 2002, p. 3). However, it is not simply just having the Internet that is important but rather what the Internet allows teachers and students to do in the classroom. Several years ago there was widespread agreement that mobile devices and social media should not be in the classroom however that has changed to what type of mobile devices and which social media sites work the best (Ed. Week, 2011). There are some individuals that wholeheartedly support the infusion of technology throughout schools and universities. Others, however, find that technology has many disadvantages. As evidence of the disagreement about the role of technology in education, *The New York Times* sponsored a session titled “The Great Debate: The Role of Technology in Education” in their web series Schools for Tomorrow in September 2013. Duebel (2007) provides an overview of the reasons people are for and against technology in higher education in her article “The great debate: Effectiveness of technology in education. In it she highlights some of the problems in the debate such as differing terms, levels of implementation, and beliefs about education. For this paper, both sides of the debate will be addressed. One side will suggest that technology is taking the

humanity out of education while the other will surmise that technology is opening many new gateways and expanding the possibilities of education. While there is no guarantee or agreement, the issues involved are key to making decisions about the role of education.

Methodology

Most papers do not open with the methodology, however, the structure of this paper is somewhat unique. This paper is a part of a pilot of a potential new qualitative method that is being called expert discussion. The key part of this research method is to allow for a more interactive experience for the reader. Unlike many research methods, where the bulk of the content has been summarized, synthesized and analyzed, the method of this paper is written as a dialogue. In fact, it is not just written as a dialogue, it is the actual dialogue created by a group of faculty members regarding technology and education. It is followed by a more traditional analysis using inductive reasoning and a simplified grounded theory. For the conversational portion, three of the faculty members had backgrounds in educational technology (through education, research and/or experience) and were proponents of the use of technology. The other three faculty members, while not necessarily experts, had experience with educational technology but were more critics of the use of technology as it stands. The analysis and discussion were written by a non-conversation participant.

The document was created in Google Docs with six authors who were all given permission to edit. An introduction was written to the paper that gave a brief background on each side of the debate. This introductory material was not meant in any way to be exhaustive, but was meant to create a spark for the growth of the conversation. In fact, it is a summary of a discussion that led to the writing of the paper.

Each contributor was given free reign to flesh out ideas, thoughts and rebuttals to any or all of the posts. The only stipulation was that responses could be no longer than 300 words and that all ideas should be supported when necessary. No additional information could be added with the exception of citations to support ideas.

The conversation lasted approximately four months. Admittedly, it was written in bursts. There would be a lot of writing over a one-week period and then a lull due to schedules, research, and reflection. Because of this, the lead author had to periodically stimulate the conversation through reminders. Most of these reminders were in the form of a short email that consisted of a rehash of recent contributions and a reminder to participate. Other times, the communication was through text messaging or phone calls. In addition, intermediate deadlines were incorporated into the process in order to facilitate participation. For instance, a date might be set six weeks in the future stating that all participants should try to submit a section to the conversation.

Upon reflection, the authors felt that the method of writing allowed for immediate, yet thoughtful responses because there were no hard and fast deadlines (except those that were instituted to promote moving forward with the piece), specific lines of questioning, and the responses were spontaneous. The structure of the communication allowed for meaningful dialogue tempered by the ability to research and respond.

In order to retain the natural flow of the conversation, all responses were unedited in order to provide a true dialogue. It was decided that the deletion of any material would diminish the natural flow of the language and would leave gaps in the stream of consciousness style of the writing. The idea of this paper was to replicate (as closely as possible through asynchronous discussion) the feel of the type of conversation that colleagues have that inevitably end up ending with, "That would make a great paper idea." The reason for not recording and transcribing a true audio conversation was that this method allowed for reflection, research, and the time to more thoroughly defend ideas.

As noted previously, the bulk of this paper is the unedited conversation of the participants. The only caveat to this rule was that citations could be added to support any and all ideas. However, this use of unedited dialogue did lead to some methodological concerns. One issue that might be questioned is the use of the raw data as the bulk of the paper. Because this is an attempt at a new type of inquiry, a decision was made to include the full conversation. Because this paper was conceived as a dialogue, the use of the full conversation allows the reader to become a part of the conversation. Instead of relying on a researcher to interpret, categorize, prioritize, and select information for the audience, this technique allows for the reader to read the nuances of the discussion. In turn, the reader can draw his/her own conclusions about the veracity of the conclusions which could stimulate further research. The ability to consider unanswered questions, to track down faulty lines of reasoning, and to trace the development of viable arguments both for and against the proposition that defines the paper could lead to future research, collaborative projects with some of the authors, or the consideration of lines of inquiry involved in the discourse. The uncut conversation allows the reader to be a bystander to the conversation, both agreeing and disagreeing with the arguments for the purpose of thoughtful and critical reading.

At the end of the discussion, a party not associated with the conversation, analyzed the content of the exchange, and discussed the findings. This person was listed as the final author. This was decided because each of the writers had a particular belief about the nature of the discussion. An observer that was not intimately involved with the dialogue was recruited to analyze the content without bias. A qualitative analytical method utilizing a thematic/deductive analysis was used to extract common and/or divergent themes that arose. So, this paper does two things. First, it allows the reader to experience the conversation as it occurred. Second, that dialogue was deconstructed and analyzed by a non-biased participant that allowed for summative analysis. Therefore, there is an intimate engagement with the discussants and the closure associated with analysis. Essentially, this dialogue would establish the respondents as the data for a qualitative study. As opposed to having chosen individuals as data, this study will have experts in various aspects of the field as the sources of commentary that provide a discussion of the key points in the debate.

This approach to dialog-based paper development has been tried before with success (Kemp, Blake, Shaw, & Preston, 2009). In this case, the conversation allowed the participants to engage in a conversation that was more reflective than a face-to-face conversation. One major difference in the two papers was that in the previous example, there was no external reader. The participants collaborated on the conclusions that were drawn. Another major difference was that in that situation the paper was written by email that allowed an immediacy that this forum did not. The respondents in this paper have noted that the asynchronous nature was difficult at times because it was quite easy to fall behind on the conversation. On the other hand, the intimacy of the forum did allow for meaningful discussion.

Background

Technology is a Problem

For centuries, teaching has been a purely human endeavor. While an argument could be made that with the introduction of Gutenberg's printing press education potentially shifted into a solitary enterprise, a more persuasive argument could be made that teaching has been an interactive process throughout the course of history. In explaining how teaching has always been a human endeavor Spence (2001) gives the example:

For just a moment, assume that time travel is possible. Plop a medieval peasant down in a modern dairy farm and he would recognize nothing but the cows. A physician of the 13th century would run screaming from a modern operating room Galileo could only gape and mutter touring NASA's Johnson Space Center. Columbus would quake with terror in a nuclear sub. But a 15th century teacher from the University of Paris would feel right at home in a Berkeley classroom. (p. 11)

The exchange of ideas, be it from teacher to student in the most traditional sense or whole class in the purest Deweyan manifestation, has been the keystone of the teaching and learning process. However, in the last decade or more, teaching has been ripped from the realm of human endeavors and morphed into a technological leviathan that is slowly usurping the soul of the profession.

At virtually every level of education, the addition of technology is seen as a way to increase the amount of information that accessible and available. The National Council for Accreditation of Teacher Education (NCATE) states that in a teacher education program, "The unit's commitment to the integration of technology to enhance candidate and student learning" is required. (National Council for the Accreditation of Teacher Education, 2010, ¶ 9). The NCATE guidelines continue by explicitly giving the following evidentiary requirements for certification of a program:

COMMITMENT TO TECHNOLOGY: The unit's conceptual framework(s) reflects the unit's commitment to preparing candidates who are able to use educational technology to help all students learn; it also provides a conceptual understanding of how knowledge, skills, and dispositions related to educational and information technology are integrated throughout the curriculum, instruction, field experiences, clinical practice, assessments, and evaluations. (¶ 15)

Thus, the integration of technology is a critical and required part of any teacher education program. Critics, however, suggest the over-reliance on technology has caused people to become deskilled in almost every other area (Apple, 2003). Apple also offers that technology has led to pre-packaged curricula with materials created outside of the realm of the teacher, loss of professional dispositions associated with good teaching, a further stratifying of society due to the inability of lower socio-economic areas in acquiring the needed technological advances. While technology has increased the availability of knowledge and made information more accessible, it has also reduced our collective humanity.

Technology is the Solution

Viewing technology as an extension of the human body and following McLuhan's tetrad-based approach to analyzing technology and media's influence [McLuhan 1992], It is proposed that the following questions be asked:

1. What does the medium enhance?
2. What does the medium make obsolete?
3. What does the medium retrieve that had been obsolesced earlier?
4. What does the medium flip into when pushed to extremes?

Let's focus narrowly on Internet and computer technology specifically since TV, audio recordings, and film are "antiquated" and not in current debate; when taken to the extreme, pencils, chalkboards, and books are technologies, but I think we'd all agree that the negatives are inconsequential! :)

Turning to computers and the internet:

1. Access and distribution are enhanced.
2. Constraints of synchronous and in-person interaction are made obsolete; additionally, a one-size-fits-all (or more correctly, a few-sizes-fit-most) approach to learning is made obsolete.
3. Customized, tailored-to-the-learner education and acquisition of knowledge as a means of social status (i.e., collection of books) is retrieved.
4. When pushed to extremes, chaos of data over information and becoming lost in a sea of knowledge (much of which is not verified or verifiable) driven by the ease of self-publishing can break down (and devalue) social structures (i.e., the academe) that have historically existed to act as generators, bearers and keepers of knowledge.

As a result, computers and the Internet are, like any technology, resources that should be managed to accentuate their potential and reduce their negative consequences for education and learning.

The Conversation

Andrew

As an educator, I appreciate technology. I do it all. I have blogs, Facebook pages, Twitter accounts. I create PowerPoints, Prezis, and tutorials. I live and breathe technology. However, I see technology as a personal tool, not a means to educate. Technology is an extension of the person, not a replacement. While I love texting students to tell them classes are changed, or updating a blog to enhance a discussion, the technology is a textbook. It is a tool. And with all the bells and whistles, it is just a tool.

To teach, you need human interaction. While PowerPoints might replace overheads, and YouTube might replace a video, the interaction between student and teacher is essential. There is nothing in the electronic world that replaces the facial recognition, the tone of voice, the furled brow that a classroom can create. Sure, there are synchronous chats, even virtual worlds filled with Avatars that allow for a simulation. There are streaming videos that can replicate a classroom. However, each of these scenarios distances the educator from the educated. Nuance is lost. Teaching is not just the dissemination of information. It is the discussion, the argument, the consternation that can only be achieved face to face.

Rebecca

While I get what the critics of technology are saying-technology and online learning are not equal to face-to-face interaction, technology should be used as a tool only, etc., I have to re-visit the world my students are a part of. This is the generation that saw Egypt liberated, with banners hanging in the midst of the chaos that said, "Thank you FaceBook." This is the

world they are living in. Our students are part of a technology-rich world; they are texting, tweeting, blogging, posting on each other's walls and videoing themselves for YouTube. In my mind, education has to move with the times, adapting to the world that our students are living in.

Joseph

What is most complicating about the institutionalization of technology and the pedagogical shifts that have resulted from this move is the fine line created between teaching and learning online and the use of technology to augment teaching and learning. As Rebecca pointed out, technology is a fundamentally essential tool in today's global society, and as such, our youth must be offered pathways to master its many uses. However, the difficult question of how does the privileging of technology alter the nature of community and interaction is begged.

For-profit educational institutions like the University of Phoenix, Cappella University, and others are reshaping the role of the teacher. In conversations I have had with people who teach online courses, they complain that they, as the instructor, have little to no control over the scope and sequence of the syllabus, texts chosen, assessments created, and pacing of the material. Moreover, since the teacher does not actually have "face time" with students, it becomes infinitely more difficult to develop relationships with students. Gone are the impromptu after class discussions. Gone are the spur of the moment interactions when running into students-- or teachers-- while walking across campus. Gone are the real life lessons of how to engage in challenging conversations with divergent opinions. Gone are the moments when students must look at each other and hold one another accountable for completing group projects. That is not to say that these things do not happen with online instruction, but it is altered. Online courses, even when using visual technologies like Skype do not allow the possibility of seeing *all* students in a class and the fact that a student who may be in at home in rural Kansas do not have to fully consider the repercussions of *how* a divergent or controversial opinion may be interpreted by others. The overemphasis of technology has the unintended consequence of reshaping our social mores and norms that guide discursive practices. The question is whether or not this is a good or bad trend? Although technology can bring people together and make the sharing of information more rapid and efficient, it is not until people have come together in a physical community that ideas and positions coalesce and change happens. As Rebecca pointed out, Facebook had a significant hand in motivating the youth of Egypt (and other technologies are and have proven to be effective in other socio-political situations: the Iranian elections of 2010, the election of Barak Obama, reporting from Pakistan and Afghanistan, and the revolution in Libya). But it was not until people were in solidarity, in the streets and voting booths, that the technology made a difference. Technology can be thought of as potential energy that can build, until that floodgate opens individuals come together.

Such is the case with technology and education. Although a person can learn a great deal through technology and online education, until that person is in physical interactions with others and engaged in the practices of community does the value of that education make sense.

Jon

Rebecca states that "technology and online learning are not equal to face-to-face interaction" - and I'll argue that this is precisely the point! If technology-infused education were the same as face-to-face, then the only gain in using the tech is to offer an alternative

delivery mechanism, allowing distance education. I'll assert that technology-infused education moves WAY beyond traditional face-to-face education in that it offers a richer set of experiences, and these must be understood and embraced not in competition with face-to-face education but along side it. I won't argue that there is no place for face-to-face education (in fact, I prefer it in many contexts such as first-semester courses when students are apprehensive and need more hand holding and aren't well connected with the campus culture). But for courses I teach

- Online material increases access in allowing a student who was sick (or missed class for any of a myriad of reasons) to not "miss out" and allows students to review the material as many times as they'd like
- Email and other asynchronous and synchronous communication mechanisms outside of class increase the depth of attention I can give to individual students as well as "mass mailing" reminders and content to students outside of class; this increases time on task beyond a "three hours of contact per week" traditional lecture course

Joseph states that spur of the moment interactions (impromptu meetings) with students and faculty are lost in online education; I'd argue that the opposite should be occurring if online education is done properly. Are you more or less connected to your friends and family as a result of FaceBook, Twitter, instant messaging, and email? Are you more or less connected when you have a smartphone whose siren's call beckons you to such an extent that people can't resist texting while driving!?! We should be more connected to our students and colleagues as a result of technology, and the experiences our students have in our courses should be richer as a result.

Steven

Jon argues that online education should enhance student and faculty interactions if it is done properly. I somewhat agree with this stance but problems arise when students and faculty do not know how to properly interact and get the most out of online education. As Andrew addressed in his opening much of the nuance of personal interaction is lost online. I like to use sarcasm and humor when I teach. Of course many may disagree with the idea of using sarcasm I find that it has a place in the classroom. When responding to students online I find myself having to tone back the sarcasm and humor because I realize they cannot see my facial expressions or hear the inflection in my voice so this leads me to feel as though I cannot be myself. We have all received an e-mail or read a posting from a student that struck us the wrong way and I am sure that in most cases that if the conversation was held face to face it would have went more smoothly for everyone involved.

As Jon pointed out the use of smartphones helps us be more available and connected with our students and I often feel as though I have to respond immediately to a student's e-mail when I get it on my BlackBerry. I choose not to text with students because I think that I would become completely consumed by the Berry. However I wonder if our constant use of smartphones' and technology may cause our students to be more dependent on the professor? I was thinking back to when I was an undergraduate, e-mail was new and most of the professors did not know how to use it. If I had a question and was not able to make it to the professor's office hours then I would have to figure out the problem myself, which I think made me learn the information and it helped refine my problem solving skills.

Jon

I like Steven's point of technology potentially consuming us. Here it is at 1am on a Saturday night, and I'm compelled to log in and continue in this dialog because I had an email in the queue. I was notified by the icon atop my phone and thought, "Just one second, and let me get this done and I can keep my inbox down to single-digits." :) I find that I do this regularly with my students; I'm "gaming" education, which, since I'm a professor in the field of computing and gaming, this seems to make some sense. But what opportunities might be lost if I allowed students to "simmer" and not get a quick, short (perhaps incomplete) response from me. Am I feeding them the equivalent of fast food and supporting a world where instant gratification (oftentimes without substance) is expected?

Lest I seem to be turning to the "dark side" of the "anti-tech" group of this exercise, I'll shift gears and contribute that we can use meta-tags, such as: "<sarcasm>Have you checked the interwebs before emailing to ask me this?</sarcasm>" in our online interactions. Emoticons - the sideways smileys :) - can also be useful. If technology is just an extension of us, then perhaps educators just need to get more adept at utilizing the tools available to them and then the learning will be improved by it.

Finally, I'll posit an interesting question: has there been a study done to correlate the increase in student retention with the adoption of online tools to help faculty be more accessible to students? I've heard it said that students leave schools, they don't leave communities; so if technology can improve accessibility to teachers and better form communities among students (many of whom don't form "traditional" communities on campus because they're "non-traditional" students with jobs, families, etc.), perhaps there should be a trend of increasing enrollments.

I'm off to bed; unless when I lie down there's another email waiting for me. :)

Rebecca

As I read what the others have written, I find myself nodding, frowning my brow, and contemplating what everyone has posed. As Joseph pointed out, online classes do require more effort to create relationships with students. However, might I point out that the same is true in those face-to-face class seminars you had at the university. You know, the ones where you were in an auditorium with two hundred other students. If this were Vegas, I would make a bet that even though that professor taught me face to face, he no more knew who I was or had any kind of relationship with me other than that of lecturer. My point is that Joseph's argument could also be levied against face-to-face classes. Unfortunately, what I see happening with technology and online learning is that people blanket it with statements that insinuate the lack of quality associated with online course delivery. However, in doing so, we are privileging courses which are taught face to face, saying, without saying it directly, that they are better, when in fact, this is not the case.

Yes, Steven is right. Sarcasm and humor do not often come through the same way. However, technology has developed its own lingo, if you will, which can convey that sarcasm as well. Think about the text abbreviations, the use of emoticons, etc. All of these rose out of the need to convey humor and individual personalities over electronic mediums, so even Steven can convey his sarcasm and wit with a few carefully placed acronyms. (LMAO as I type.)

I don't agree with what Joseph said about impromptu discussions and what we would consider "teachable" moments as disappearing. Instead, I agree with Jon because technology connects us to our students in ways unlike any before. The past few semesters I gave students my cell phone number when they went to their lab schools and I can't tell you how

many texts I answered for pertinent coursework questions as well as some birthday wishes I sent via text. I continued to work on building relationships with my students both face-to-face and online. Without technology, those five weeks they spent in lab schools would have resulted in no contact between teacher and student. Instead, technology has allowed me to be connected to both my students and my colleagues in a way like never before. This summer I am teaching a writing class online and though I am not personally on FaceBook, my students are, and they are posting info and pictures about our class on FaceBook at rapid speed. As a result, information about our class is getting out there and we are hoping to use this publicity as marketing for the class next summer. While technology is not a perfect solution for all things education, it does provide educators with the opportunities to expand what they are already doing in their classes.

Andrew

Whew! As I read through my colleagues thoughts I am consumed by two things. Online education must be planned and there are serious issues here. In a nutshell, I submit that online and technologically based education distracts from the purpose of teaching. Online classes require readings and responses as opposed to readings and discussions. I will admit, there is a small distinction here... I think that I have a problem with the loss of immediacy (like in this paper). By this I mean that that instantaneous reaction to another human being is lessened by time and space. However, I want to change the focus of this discussion.

Aside from the technological issues of teaching, I think that technology is also inherently biased against class. Let me frame this discussion from the point of view of public education below higher education. The argument that I postulate is mirrored by Apple (2003) in which he notes that while technology has many benefits, it also alienates those that cannot participate. Let me elaborate.

In Georgia (Galloway, 2011), there has been a movement by a representative to give all students iPads (or the like) for middle school. In essence, this is a great idea. However, it is a great idea for those that have wireless Internet, a 3G connection, time at home to use the technology, and a situation that won't devolve into caring for the technology. In reality, this is a great idea for the middle class and upper middle class. For those that cannot utilize the resources, it creates a greater barrier. There are those that have and those that don't. It becomes another tool of the middle and upper class to distance themselves.

Do I think that this is purposeful? Hmm... That is a difficult question to answer. Do I think that there is a person making this decision? Probably not. However, as a society, I think there is a real and distinct division between classes. When policies can be enacted to promote one at the expense of the other, I think it is purposeful. Let's be honest. The rich like being rich and promoting educational ideals that reinforce the class divisions, while not, perhaps, direct, are purposeful. If you can use technology to the fullest, you promote yourself for further education. If you can't, you are relegated to the underclass that is growing and becoming more permanent.

Discussion?

Rebecca

Andrew, you do bring up a great point. Does the influx of technology continue to widen the gap between the haves and the have nots? In some ways, yes. Rural residents may not have access to the equipment and services needed, but the flip side to that coin is that

technology can often provide the under-privileged and under-served WITH access, something that otherwise would not be available without it.

Benita

I taught English at the secondary level for ten years. I spent five of those years teaching ninth-grade English in a K-12 virtual charter school that was a full-time publicly funded alternative to “brick-and-mortar” schools (Cavalluzzo, 2005, p.58). Teaching high school students in a virtual school environment was challenging, especially when some students believed the public school system failed them. At this particular virtual charter school, the student population ranged from those who had been homeschooled all their lives; ones who fled the traditional public schools because of peer pressure, to those who had flunked out, been expelled, or been placed in a juvenile facility. When I started teaching at the virtual charter school, I had to figure out how to teach students online. I had to explain how to complete the assignments constantly, and in most cases, many students still did not submit the assignments. There were times when I thought the problem was with online education. At this point, I believed online education was not the best route for these students and shared Andrew’s beliefs about the need for human interaction when teaching. In fact, I began to believe Zucker and Kozma’s (2003) argument that it was easier for students to develop a closer bond with their computer than with their teacher in an online environment. After speaking with a colleague and reading Dupin-Bryant and DuCharme-Hansen’s (2005) article, “Assessing student needs in web-based distance education,” I learned how to select appropriate technology and instructional strategies that enabled me to develop an online learning environment that was appropriate, responsive, and beneficial for my students. One instructional strategy that I incorporated was to email students, at the beginning of the school year, a questionnaire that asked them about their learning preference. Some shared that they needed audio and visual to help them comprehend material and others revealed that they needed repetition. After reading the students’ feedback and knowing about their prior educational experiences, I began to understand why some felt the traditional public school failed them: they had not experienced a “teachable” moment. I wanted this to happen for them.

How did it work? First, I realized that I had to make myself visible online to my students. Although I disliked recording myself, I embedded videos that allowed my students to hear and sometimes watch me introduce or model a lesson. I also arranged weekly real-time chats with my students. Beyond the videos and chat room discussions, I realized my course had to follow an inquiry-based curriculum, which meant “text” had to be defined in new ways (Behrman 2003; New London Group 1996). Text(s), in this case, meant locating and accessing multiple resources online. This material included film, music, blogs, chats, art, magazines, newspapers, e-books, etc... In this educational environment, it was imperative to develop a ninth-grade curriculum that acknowledged my students’ multiple literacy practices. For instance, I taught a social injustice in Black History unit. This unit included Jacob Lawrence’s *Migration Series* artwork. My students had access to a website that allowed them to listen and watch as the narrator told the stories that Lawrence illustrated through art. I also found a video where Jacob Lawrence, himself, explained the history captured in his work. After watching and listening, I had the students capture—in a poem, essay, PowerPoint presentation, or blog—an experience related to injustice that they wanted to pass on to their descendants. In this assignment, the students had to explain what they learned and how they were willing to work to eliminate the problem. I provided multiple avenues for expression, which gave free rein to my students’ creativity. I found this approach to be rewarding for both the students and me. In particular, one student, who had always received failing grades

in English, revealed in an email that he enjoyed this unit because it allowed him to write poetry. The student claimed that it took him sixteen years to find out that writing was the best way to relieve stress. In Prescott's own words, he wrote, "So I put those feelings in the black history poem and I guess it came out good because maybe you have felt that feeling before."

So, even in the online world, "teachable" moments can occur. It's just a challenge sometimes finding a way to make it happen.

Jon

I appreciate Benita's and Andrew's recent contributions to the discussion, and I find it interesting we're debating the use of technology while using technology. It seems ironic. :)

Andrew's point of class and socio-economic differentiation and the place of technology in education seems like a broader issue than what we'd originally began to discuss. I see that technology is another tool, and some have and some don't have tools. Our role as a society should be to enable learning by any means necessary and help those who need help; this includes the use and distribution of technology to students. But I think the access to a tool shouldn't influence the discussion of the utility of the tool. We can debate and research whether computing and online technology is beneficial to learning as a separate issue of how to best provide access to the technology. I'd argue that providing access is a larger, harder problem to solve - yet one that is important to solve!

In one regard, we could consider that if higher income districts with more resources are adopting technologies, one of two things could be at play:

1. The technology doesn't improve learning, or perhaps gets in the way of learning. In this case, access to the technology is either proving no benefit or is a waste of funds/resources.
2. The technology is improving learning and is benefiting those with access.

If the first scenario is true, then the districts with more resources are throwing away resources and are positioning themselves in a lesser position for the future. If the second scenario is true, then the gap between the "haves" and "have nots" is widening; additionally, one could argue that since technology is being adopted in more affluent districts, it's a self-fulfilling prophesy in that those with resources are devoting these resources wisely. This could very well be an error in distinguishing causation with correlation. Are students in some districts learning more because they have technology, or are such districts populated with students who have other influences to encourage learning (including access to other resources and support structures).

Technology is certainly not a silver bullet to solve problems within an educational setting; I argue that access to technology, like access to books and other resources, can be used to enhance learning and open opportunities. How the tools are utilized - whether iPads and books sit on a shelf or are in the hands of learners - makes all the difference in the world.

Steven

I would like to expand on the line of thought (or flight as Deleuze would say) about technology in K-12 school districts. At ASU we have the privilege of observing our students in school districts that run the gamut of socio-economic status. Most of these schools have at least the basic technology: computer rooms, rolling laptop labs, wireless, etc... However in the rural and urban districts, which also happen to be areas of higher poverty, the technology

is older and if there is a problem they do not have the resources to fix it. I taught in one of these districts and the “IT Department” went crazy with blocking access to websites. As I have said, I am technologically inept but I am sure there is software that can be used to block certain types of websites without blocking sites of educational value. I have also heard of “broken” laptops staying on the rolling laptop labs for two years because the district did not have anyone who could even begin to see what was wrong with them.

In the school districts that are on the upper-end of the socio-economic ladder we see the opposite. My daughters’ gym classes have Wii’s which really bothers me because I thought the idea of gym class was to get more exercise than flipping your wrists. Those of us who love games have found out that while the Wii is fun you can actually play baseball, bowl, shoot a round of golf, play tennis, and box while sitting down with one arm tied behind your back. At my daughters’ school the teachers also have microphones they wear that sends signals to the intercom system so they do not have to raise their voice for the students to hear them. The first time I experienced this I saw the teacher standing on one side of the room and I heard a soft angelic voice coming from above, I thought I was having a religious experience. My point to all of this is that these types of technology take the human aspect out of learning out of education. I believe one of the most important parts of gym is actually playing the sports and then learning conflict resolution when you think a ball was in or out of bounds or if you think you were fouled. Children are so used to a computer making the calls that they do not learn to interact with one another. Also, the wifi microphones can cause students to listen to the voice above and not directly at the teacher therefore not seeing facial expressions. Of course they can look at the teacher but when one hears a voice instinct causes them to look in the direction of the voice, which is the round speaker in the ceiling. All of this leads me to ask, what role will technology play in education in ten years? We have come so far so fast with technology that the Matrix does not seem that far away.

Andrew

There are three distinct threads occurring here. One has to do with the dehumanizing of education due to technology. One has to do with the ability of teachers/faculty to adapt to a changing educational environment through technology. Within this, an argument could be made that resistance is more about an inability to adapt than to an aversion to the the technology. The last thread obviously present is that of the societal impact and the potential inequities exaggerated by technology. Overall, it is a lot to think about.

Ultimately, it comes down to the question, “Does technology enhance or hinder education?”

I argue that it is more specific than this. I argue, “Does technology enhance or hinder teaching?” Here the point becomes sticky. What is teaching? Is teaching the process of transferring information from teacher to student? Or is teaching more constructive? Is teaching a transfer of knowledge of the facilitation of learning? I feel that teaching is a facilitative process. Teachers need not know everything, but they need to know how to teach...how to facilitate...how to motivate students to learn. Here is where the face-to-face becomes important. Online education is great for content transmission. But, a face-to-face class allows for intimate discussion. It allows for the immediacy described earlier. All of the advantages of online learning, the ability to extract information, to do immediate research, to have the ‘world’ at your fingertips, can be done face-to-face, when the technology is an enhancement not a crutch. Like I started, I am not opposed to technology. In fact, I embrace it. But, I embrace it as just a tool--a small tool.

Rebecca

At the end of the day, I think educators have to consider the “why” behind what they do. Why am I using technology to teach this? Does it really enhance the learning experience, or does it make it easier on the teachers? With any instructional strategy, curriculum, or technological tool, teachers must understand why they are using it and must still retain ownership of their teaching. Think about the use of your in car navigation systems. Prior to this technology, we actually had to get directions from someone, look for landmarks, know road numbers, instead of blindly following the voice that says, “Turn right.” If we let it, technology can guide us down the wrong path, much like your navigation system can do when you forget to install the updates. While I agree with some of the points the opponents have raised, I think the real problem is not that technology is dehumanizing education. Instead, it is the lack of reflection and consideration by teachers as to why they are using it that is hindering the true purpose of education.

Jon

Andrew’s summary of the three threads (tech dehumanizing education, teacher adaptation, and societal impact of tech) is a good way of looking at this conversation. I’d argue that adaptation and societal impact of technology are broader questions than we’re able to answer here (though the questioning is a good exercise), and I’d like to focus on the single topic of dehumanizing education through technology. Schools can adopt technology for a variety of reasons, but I believe all of these distill down to two categories:

1. Utilizing technology to enhance/extend what we can do
2. Utilizing technology to improve efficiency

Forgive the gross oversimplification, but consider some examples. The use of the Wii Sports in PE points to enhancement (though a failure in my opinion). The use of the PA necklace to speak to students across the gym points to efficiency (in being able to handle larger volumes of students in a larger gym space). Online course materials and communication mechanisms can serve both purposes depending upon the perspective; administrators see online as a means to increase enrollment (efficiency) while educators see online as a means to enhance the learning process. Again, I oversimplify and exceptions abound. Online universities like Phoenix and adjunct-based online education with massive numbers of students and standardized testing (a technology adopted to compensate for 1-1 conversations with students to assess learning) are examples of efficiency in economies of scale. Podcasts, National Geographic movies and iPad apps for learning, etc. are examples of enhancement through interactive content.

Perhaps a good way to frame the discussion as it’s evolved here is to notice that whenever efficiencies are introduced, we risk dehumanization and whenever enhancements are introduced (which are often costly) then improvements and the full potential of technology to improve education/learning are realized. Just as pumping our own gas and doing our own banking has dehumanized these heretofore personal interactions, we should observe there is a cost to efficiency that is sometimes worth paying. Technology should not be used to “process” students through an education system merely to improve throughput without considering the cost. Rather, opportunities to utilize technology to enhance should be embraced... with a mind on what we’re missing out on if we spend our resources on the technology.

Benita

As I read through this document, I began to see myself taking on the position as “straddling the fence.” In most cases, straddling the fence is considered being indecisive, but in this instance, I define it as understanding the realities of virtual education. In other words, I understand the possibilities and the challenges of this 21st educational landscape (Archambault & Crippen, 2009). When I taught at a blended/hybrid charter high school in Las Vegas, Nevada, I witnessed many students succeed in ways that they may not have in a traditional “brick and mortar” school environment (Archambault & Crippen, 2009, p. 363). I always wondered if they succeeded in this school environment because it combined online learning with face-to-face interaction. However, I began to ask certain questions but found it difficult to locate answers. One question was “How many students succeeding in any of the distance education high school models are actually graduating and getting admitted into four year accredited colleges/universities?” Another question was “How often do online high schools offer teachers, in particular, those that only have experience teaching in the “brick and mortar” an opportunity to attend professional development seminars prior to teaching online that shows them the differences between teaching in a traditional school setting versus online? When I started teaching online, I faced many challenges because I did not receive the training to demonstrate ways to transition from a traditional classroom to an online one. As an aside, I wonder if students that struggled in the traditional classroom setting face challenges when they enroll in virtual schools that continue to follow the traditional “brick and mortar” curriculum model? I have many questions about this 21st century virtual education. Interestingly, virtual education has shaken this nation’s educational system like the earthquake that occurred on the East Coast August 23, 2011. I wonder though, how long will it take before those who are on the inside, like I was, ask questions about the validity of this model of education.

Andrew

I would have to disagree with Jon about the fact that the scope of this paper, “...that adaptation and societal impact of technology are broader questions than we’re able to answer here.” If we are discussing the dehumanization of education, than the broad societal impact should be the center of the discussion. As I argued previously, inequity due to technology is perhaps the greatest dehumanization possible. However, I do agree that given the confines of this discussion, it might be difficult to complete such a discussion.

Jon’s analysis of the situation pitting efficiency versus enhancement is spot on. If technology is used purely for efficiency of delivery, it is here that the deleterious effects manifest themselves. Education becomes impersonal and, in my opinion, impotent. However, as an enhancement tool, technology has great potential. It is just essential to not replace humanity.

However, the idea of technology as being an enhancement is tantalizing. That makes sense as an evolution of technology. Moving from hand copy scripts, to the printing press, to the typewriter, the Ditto machine, to the photocopier, to the Internet, to the PDF file. And that is only for reading. If used as a tool, as a supplement, as an enhancement, technology is valuable. I just think that for many people, technology has become a crutch to mask inability to teach.

Jon

I'll pose a small theory that minimalist technology is always appropriate and has no negative impact. This is intentionally hyperbolic, and I post it here to see if it can be refuted. What I mean by minimalist technology is technology that merely improves upon an existing process. I'll further explain by way of example:

Previously, I had student submit assignments via paper, and I would assess them. Now, I have them email (or post online) their submissions to me. This use of email is minimal in that it only modifies the submission process; it does not take anything away (since students are merely moving information from themselves to me), but it's an improvement in that I can allow students to submit assignments at times that heretofore were not practical. For example, I recently had students submitting papers all through the night up until the 6am deadline; this allowed them an additional 14 hours to work on the assignment (and listen to an additional lecture) that they would not have otherwise had.

As another example, within one hour after the deadline, I now email all students that haven't submitted anything. This has enforced the fact that I do care that they remain current on assignments and don't fall behind, and it also allows students who had a misunderstanding or other issue to submit the assignment ASAP, without penalty in most cases. Without the minimalist technology of email, students and I would have to wait until the next class period to realize there was a problem, losing as much as a week (since this is Labor Day weekend in this most recent instance) and perhaps putting the student in a no-win situation.

Andrew has made the case that the digital divide can be the worst dehumanizing effect of technology. Perhaps relying upon this minimalist approach to assessing technologies' impacts can establish a baseline for the utilization of technology in the learning process. Certainly placing the latest iPads in classrooms makes for good press, but from my experience partnering with K-12 schools, simple, minimalist technology helps and is accessible to nearly all students.

I look forward to your rebuttals. :)

Steven

Jon's example of email with students brings up a subject that I have been struggling with a lot this semester. Andrew and I decided to combine our two sections of the same course and co-teach in the hopes that we would be able to offer students a greater understanding of our areas of expertise and to make sure that all the students in this particular program of study receive the same information. Although we explained in great detail on the first night of class they needed to become more independent in working on their research projects we are still getting inundated with emails that are full of questions. Keep in mind we have answered these questions numerous times by email and in class. I struggle with either saying "figure it out on your own" or answering their questions. To give you an idea of the severity of the problem, Andrew has received 72 emails from a student so far! This leads me back to the point I made earlier that I believe text, emails, and chat can lead to students not taking the next steps to becoming intellectually independent.

I think the fact that Jon emails his students who have not turned in their assignments to remind them shows that he does care about their education. However, I have to wonder why we have to ask remind college-level students? Have our students become more dependent on their college professors in recent years? I don't know that it is necessarily a bad thing if they are dependent on us because we are here for them and without them we have no job. There have been many times when I required an assignment to be turned in at the beginning of class in hard copy form and I have students who have given me thumb drives or

e-mailed it right after class. Yes I got the assignments within an hour of the due date and time but it still irritates me.

All of this being said, can technology cause our students to not fully develop intellectually. I think by not allowing them to become more intellectually independent is dehumanizing and it causes them to become more dependent on others.

Jon

To deny a student access to email and connection/community is the same as denying power/lighting. Schools should allow for open and free access to content, and the idea we can silo and isolate learning into brick-and-mortar traditional schools will only stifle learning. I understand the liability and "bad content" protection mentality, but there should be a reasonable approach to access. And I agree - I believe we're talking of secondary education, not K-12 overall in this paper... I merely mentioned the K12 partnership to counter the mentality of technology for technology's sake - which makes good press and seems the latest fad.

Discussion of the Discussion

Over the course of this discussion, there were many different paths traveled, ranging from the minimalist approach suggested through the dehumanization of education from the focus of the paper to a more global outlook. Looking back, these make the perfect bookends to the overall scheme of this paper. Throughout this conversation there has been ample evidence of both the utility and the danger of technology. From the outset, it was clear that there was a wide difference in opinion regarding the infusion of technology in education. In the end, there was some agreement that technology, when used for efficiency is an anathema; when used to expand or enhance it is appropriate.

Analysis of the Conversation

In order to reiterate the structure of this paper, it is important to consider the components. First, a member of each side of the discussion (pro-technology and the technology cautious) wrote an introduction that was meant to create a strong opinion about the stance of their side. This introduction was supported through a brief literature review that was meant more for a background and to stimulate a reaction. This was followed by the full text of the conversation that followed. The purpose of this was to allow the reader to understand the nuance, the subtlety and the thought process unimpeded by a researcher. Finally, the conversation was then analyzed for content so as to draw conclusions and allow a reader to have a summative experience.

Using inductive analysis and grounded theory, the dialogue presented in the previous section was categorized through a coding process. Four general themes emerged:

1. Technology and educational access;
2. Online education;
3. Technology and instructional strategies; and
4. Technology as a communication tool.

Both the merits and drawbacks of technology were discussed within each theme. The four themes are discussed below. The purpose of this analysis is to extract and delineate the

various emerging themes that occurred in the conversation for the purpose stimulating future conversation regarding the potentialities and pitfalls of technology.

Technology and Educational Access

It was noted several times throughout the discussion that technologies such as the Internet and personal computer do not increase access or improve learning for all potential students. The most fundamental drawback is the unequal availability of technologies for people of low socioeconomic status. The concern is that technology is benefiting only those with access while alienating those who cannot participate. Some authors think that the use of technology to access education could widen the gap between the haves and the have-nots, and perhaps make this divide more permanent.

Technologies such as the Internet and the personal computer could increase the benefits of education and reduce its negative aspects, depending upon how teachers make use of them in the classroom and how online classes are managed. Problems in the educational setting, such as the unavailability of technology for low-income students, are far from being solved. Thus, technology should not be an essential tool for receiving a quality education. Instead, it should be viewed as an option to enhance learning and increase opportunities.

Online Education

One of the main themes that was addressed was that one side believed that despite its efficiencies, technology leads to the dehumanization of education. They strongly believe any interactions and relationships built through online courses, even if they are very sophisticated, cannot replace face-to-face interaction and real-life, human experiences. They emphasize that the purpose of education is not merely transmission of knowledge but also the development of students' experiential knowledge and life skills. In order to achieve these objectives, it is critical that students experience various face-to-face interactions.

On the other hand, the advocates of online education maintain that it has ways of nurturing good student-instructor rapport. They describe the different ways, including Skype, chatrooms, and video messaging, that can effectively and periodically infuse personal communications into their on-line courses. Additionally, they argue that face-to-face courses do not automatically guarantee or promote student-instructor rapport. For instance, some of the university courses have very large class sizes that would make it extremely difficult for the instructor and students to get to know each other. Advocates argue that if online education is done properly, taking full advantage of modern communication technologies, such as e-mail, blogging, and social networking, instructors should be able to effectively connect with the students and develop a thriving academic community online.

While some authors admit that communication and relationship building via technology are different from face-to-face interactions, they argue that this is not necessarily a bad thing. Other authors are convinced that face-to-face interaction is key to developing a meaningful community of learners and meaningful educational experiences. They believe that students experiencing real life lessons requiring engagement in challenging conversations, development of trust with peers, and accountability in collaborative work are only possible in a face-to-face program.

Conversely, the supporters of online education claim that online teaching can create and take advantage of teachable moments, just as can face-to-face teaching. They perceive that what leads to teachable moments is not the learning environment but the instructor's competence.

Still, some authors do not view online teaching and face-to-face teaching as equally effective. They find it is important for an instructor to be able to see all the students and observe their learning experience as a whole to maximize teachable moments. Moreover, they find the face-to-face interactions particularly important at the beginning of each course or in the students' first semester so that an instructor can be aware of or detect the needs of students and provide support. They argue that online communication can potentially cause more misunderstandings and also take away the nuances of personal interactions.

The authors who are supportive of online educational programs insist that, considering the unique strengths of online universities and online courses discussed above, online education needs to be better understood and embraced as being not in competition with but in conjunction with face-to-face education. Another group of authors does not dismiss the role of online education; however, these authors emphasize that it does not provide the same kind or quality teaching and learning experiences.

Technology and Instructional Strategies

In this findings section, the institutionalization of technology (teaching and learning online) and the use of technology to enhance the quality of teaching and learning must be distinguished. Both involve discussions of pedagogical shifts and have some overlaps. This finding addresses the role of technology to improve and enhance efficiency in the traditional classroom as well as its ability to expand instruction, as seen in online classrooms.

The ways in which technology enhances teaching practices include the promotion of multiple literacies and the establishment of effective discussion communities. With technology, especially the Internet and personal computer, the 'world' is at the teachers' and students' fingertips. It enables both students and teachers to easily utilize multiple types of resources online, as well as software that increase the varieties of input and output methods; effective use of technology promotes multiple literacies. Using technology, a teacher can allow different types of learning to take place in a more effective manner. For instance, teachers can acknowledge different learning styles of students and incorporate different types of resources such as online films or articles into their teaching. In addition to promoting multiple literacies for the entire student body, teachers also can enhance their lessons by selecting materials that meet the students' unique learning styles. For example, students' creativity can be enhanced by providing multiple avenues for approaching assignments from editing video clips, to establishing and facilitating on-line discussion boards, or even writing traditional essays. Another way that technology can enhance both teaching and learning is in the use of online discussion boards or social networks. These can provide supplemental teaching and learning opportunities beyond the traditional face-to-face instruction. When these tools are used appropriately, both teaching and learning are greatly enhanced; discussions are meaningfully elevated and educational interactions and sharing of information are conducted at rapid speed.

The authors who brought up the drawbacks of technology particularly disagreed with the use of online discussion tools, including e-mail, discussion boards, and social networking, among others. While the previously mentioned authors found such technologies to be almost synchronic and capable of promoting in-depth discussion, others saw this instructional strategy as a loss of immediacy, where intimate engaging discussions would be replaced by more delayed, isolating responses. Another drawback raised was the confusion between the use of technology to enrich the educational experience and simply to increase entertainment value or provide a convenience, which is not always necessary or appropriate (e.g. use of Wii or microphone in physical education class).

Teachers' competence is a major factor that determines the merits and drawbacks of employing technology for instructional strategies. In order to appropriately and effectively use technology in an educational setting, teachers must understand why they are using it and must retain ownership of their teaching. While there is a concern about technology becoming a crutch to mask teachers' inability to teach, technology can also provide a mirror in which teachers can objectively perceive their own teaching styles and methods both in the classroom and in online courses.

Technology as a Communication Tool

Today, many students belong to the digital generation. Communication methods in education, including teacher-student communication, are going through significant shifts that reflect the culture of a new generation of students, as well as the rapid spread and advancement of communication technology. The authors' discussion of the theme of technology as a communication tool developed mainly around professor-student interactions within a higher education context.

There are three arguments that emphasize the merits of using modern communication technology, such as e-mail, texting, and social networking in the context of professor-student communication – familiarity, convenience, and immediacy. The crux of each argument is that students are part of a technology-rich world, and they must be offered a pathway to master its many uses. The proponents of communication technology in education claim that teachers can effectively gain students' attention by employing communication technologies that are a natural, familiar part of students' lives. Examples were given of the effectiveness of using social networking in higher education to develop a community of learners or motivate students in previous discussions. Moreover, using modern communication technology is very convenient. The examples of convenience include the fact that instructors are more available and connected to students; texting enhances the speed and convenience of communication, while mass-mailings increase the likelihood that students will receive reminders or additional course information and materials; and students have the ease of submitting assignments and receiving professors' feedback via e-mail. The importance of maintaining an open avenue of communication is significant so that either side does not have to wait till the next class. While extensive use of modern communication technology could decrease in-person interaction opportunities, the authors argued that the more frequent technology-mediated communication is more effective in building rapport as well as keeping up-to-date and significantly outweighs the drawbacks.

The participants who emphasized the drawbacks of using modern communication believe that having the technologies available does not mean that they should be used all the time. There were two main points of their argument. One drawback is that the increasing availability of professors would hinder students' ability to think independently instead of prompting them to solve problems on their own. The line between caring about student's learning and spoon-feeding has becoming increasingly vague in practice, largely due to technology. Another drawback is that professors are constantly under pressure to immediately respond to students' e-mail, texts, and phone calls. Moreover, the authors showed concern about the impact of quick, yet very simplified exchanges via modern communication technology on students' development of skills for holistic, in-person communication. Use of communication technologies provides instant gratification, oftentimes without substance if students do not have sound skills in interpersonal communication.

In summary, some participants insist that education has to change with the times and adapt to the new generation of students. On the other hand, some warn that new problems arise when students and/or faculty do not know how to properly interact using technology.

Summary of Findings

It is evident that different usages and roles of technology in education have both positive and negative aspects. In the discussion above, the two sides are clearly distinguished for organizational purposes. There were however many gray areas because merits and drawbacks are often two sides of the same coin. Participants generally contextualized their positions as they presented them. Thus, their arguments must be understood in context. To understand this context, it must be identified who will use technology, for what purpose, and in which context. In other words, the participants' viewpoints are generally conditional. Jon summarized this point well and provided this answer to the research question; "...minimalist technology is always appropriate and has no negative impact...What I mean by minimalist technology is technology that merely improves upon an existing process."

Suggestions for future research

The unique opinions presented in this particular dialogue highlighted both the strengths and challenges of the use of technology in an educational setting. The dialogue also revealed potentially meaningful questions for future research.

It must be noted that throughout the discussion, the definition of educational technology was purposefully left undefined. The authors also presented the research question in the broadest of terms, "Does technology enhance or hinder teaching?" These two choices effectively contributed to encouraging the participants to discuss these issues in very general, binary terms. The dialog successfully unfolded in every direction and touched on all aspects of the issue. A big picture of technology in education was drawn and different perceptions were displayed in an inclusive and comprehensive manner.

The freedom from specifics regarding the focus of discussion also raised multiple questions that are potentially fundamental to meaningfully developing further research in this area. In future research, there could be some agreement regarding the definition of concepts (e.g., educational technology) and educational philosophies. The open dialogue interestingly led to the participants asking fundamental questions:

1. What is education?
2. Why am I using technology to teach?
3. What defines educational success?
4. Is technology for efficiency or enhancement of educational practices?

Furthermore, regarding future research on this topic, future discussions could explore the possibility of reframing the research question. For instance, creating a less dichotomous context for the discussion with a question such as, "In what ways does technology enhance or hinder teaching?" may enhance future discourse. While the original research question, "Does technology enhance or hinder teaching?" is broadly set, the suggested reframed question reflects the complexity of the topic and encourages a deeper level of discussion.

Conclusion

This paper was an attempt at trying to recreate the spontaneity of a conversation through the foundation of inductive analysis. By having access to the full, unedited text of the conversation, the reader can appreciate the subtlety and nuance of the conversation, along with the humor, vitriol, frustration, and, at times, the personality of the participants. Sometimes, this sense of intimacy is lost in the dissection of transcripts through the analysis. It allows the reader a first person perspective with which to judge the legitimacy of the conclusions, the validity of the themes extracted, but most importantly, to become a participant observer in the conversation.

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