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Teaching During a Pandemic Event: Are Universities Prepared?

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Abstract

As the threat of pandemic events streaks across the planet, the question then becomes can universities, particularly health science centers charged with producing the next generation of health care providers, continue their teaching and educational mission by offering classes in a distance environment, completely uncentralized, away from the traditional centralized campus? A sampling of campus websites were reviewed to gather a sense of how well prepared we are, followed up with a survey administered to faculty and staff in the School of Nursing at Vanderbilt University. The concern being that if a technology rich environment such as Vanderbilt is not fully prepared to continue teaching in a pandemic event, what concerns should we have for other institutions providing health care provider education that may not have access to the resources a Vanderbilt has? Finally, a set of recommendations to schools is presented, based on the findings.

Keywords:

Educational technology, Audiovisual aids, Multimedia, Education distance, Videoconferencing, Education nursing.

Introduction

This is an interesting time to be teaching. The threats of a pandemic event on the mission critical functions of a teaching university can be overwhelming. With the threats of pathogens and natural and man-made disasters impacting schools and businesses around the world, it is important that universities, (particularly with health care programs producing the disaster responders) be prepared to carry on their academic mission through the event. Lim et al [1] clearly describe the problems associated with closing professional schools with a healthcare orientation. While it may very well be accepted practice to close schools and give credit to students for work covered (as what happened in many institutions in the United States during the Kent State University event in 1970 [2]) it is inappropriate to extend that practice in today's world, particularly to those training to enter the field of healthcare. This means it is important that schools of nursing, medicine, dentistry, and pharmacy be prepared to continue the instructional process even while a school closure and suspension of teaching activities is happening all around them.

The question then becomes how well prepared are institutions and the faculty and staff in those institutions to continue educating during a pandemic or disaster event? If a pandemic event, perhaps caused by H1N1 swept across an institution, would that institution be able to quickly implement new teaching environments to replace the traditional face to face lecture presentations currently in place now?

Materials and Methods

A quick perusal of institutional websites around the world show that colleges and universities are giving this issue real thought. A number of institutions have posted websites outlining various features faculty should consider using in the event of an official or unofficial closing. [3-8]. For purposes here we will define an "official closing" as one in which the school administration has told students and faculty to stay home. They may dismiss students from the dormitories. Of course the problem about what to do with students who are too sick to travel home, or have no place to get to quickly is a confounding factor. But precedent for official closings does exist. Probably the most well known were the closing across the United States that took place after the Kent State University incident where national guardsman open fired upon student protest demonstrators resulting in four deaths. [2] However, that was a different situation as students, and faculty were angry, but not sick. While over 4 million university students "struck" by refusing to go to classes nationwide after the event, they could, if they so desired, continue to read, organize and meet face to face. Also at that time there were few options for continuing collective education when the students were suddenly dispersed across the country. While the current situation with regard to H1N1 may result in some official school closings, it is far more probable that we will begin to see large numbers of "unofficial school closings". For the purposes here an "unofficial school closing" is one in which the faculty member and/or large numbers of students are too sick to come to class. The university does not officially close the institution, rather people are just too sick to show up for work, either as a faculty member, staff person supporting the academic environment, or the students themselves.

As one examines this problem of continuing the educational process in the face of a pandemic event, it is clear that there are three stakeholders in this problem. Obviously there are the students themselves. While many students would briefly relish the time off, most students in professional schools recognize that this creates a direct hit on the quality of their education. There are knowledge, skills, and content they know they need to know, and simply giving students "time off" will not ac-

complish their goals. Many spend a lot of money on their tuition and they have a reasonable expectation to be taught.

The second stakeholder is the faculty member. They have defined content they know they need to get through so that the student may advance in the program. They have spent considerable time and effort refining their course syllabus and providing the right types of lectures and presentations, typically in a face to face traditional classroom environment. They have assignments that make and papers that need to be submitted for grading and evaluation. Finally, of course there is the typical sit down examination at various points in the course. Even if students are able to meet for a test, these exams would have to be completely rewritten to account for the fact that significant content may have been missing because of lost lectures. Included in this group are deans and associate deans who not only teach courses in their academic programs, they make sure the correct policy decisions are implemented and enforced. If closing decisions are made at the college level, these administrators need to have a significant presence during the entire decision making process, even if they too are home sick.

Lastly there is the academic support staff that many faculty members rely on to accomplish the more mundane tasks of collecting papers, duplicating handouts, typing exams, and providing library materials on reserve. Without these people the academic mission can grind to a halt. In addition, support staff members provide the administrative support needed to continue the infrastructure of the school such as making sure that people are paid correctly and on time, tracking work time, and paying the bills the school incurs. Finally there is the technology support staff to be concerned about. If the people maintaining the servers, software, and network become ill what happens when their efforts are needed to provide support to the faculty, staff, and students of the institution?

Reviewing the academic plans institutions are providing their people is an interesting exercise. While none reviewed made reference to any type of data collection process to see what is needed, they did, instead, focus on what their institution can provide currently for their stakeholders. Some websites were very specific, dealing with the applications and services they can provide. Others were more general and dealt with why one should use various approaches rather than the specifics of how to use a specific application.

Four assumptions seem to dominate the discussion online. First, there is the assumption that institutions "know" what is best for their stakeholders and have no need for data collection. Secondly, there is the assumption that the institutions already have in place the correct technology in terms of mission and quantity to address the problem. Third, there is the assumption that the stakeholders have the right type of technology at home to deal with any type of work from home situation (whether they are faculty, staff, administrators, or students). Finally there is the assumption that the stakeholders will be able to train themselves quickly and just in time on any technologies needed to work from home. These assumptions are very short sighted. Let us deal with each of these assumptions in sequence.

Assumption 1: Institutions know what is best for their stakeholders. The problem with this approach is that the decision makers typically are not "in the trenches" and have very little knowledge about what is really needed. These decision makers often have no teaching responsibilities and typically do not interact with faculty, support staff, and students regarding the act of teaching. While they may know in general terms, the devil really is in the details and they never have a real opportunity to learn the details from an instructional point of view.

Assumption 2: Institutions already have in place everything they need. Academic budgets are eclectic. When money is available a product or two may be acquired, but typically this happens with little planning and lots of penny pinching. Hardware and software licenses are frequently underestimated (or overestimated) with little effort to build the environment to capacity correctly. For example, at Vanderbilt University, which would be regarded as a rather typical institution using a course management system, such as Blackboard, less than half of the classes have a significant Blackboard presence. If suddenly the other 50% decided to use the course management system extensively, could it handle the sudden increase in load? Often it is one or two vocal stakeholders who decide what should be purchased and implemented, often times at cross purposes with the rest of the institution. If the products are acquired with grant monies, they may not meet the direct needs of the institution because of grant limitations. Furthermore the grant investigator gets to decide what he will spend his resources on. Finally, grants are typically not cross disciplinary. This means they acquire software specific for their situation and often mount it on servers they are directly involved with and not shared with the rest of the institution. Universities are often "silos" fostering this behavior.

Assumption 3: Stakeholders have the right technology at home. Do they and what are the consequences if they do not? Later we will report survey data at our own institution that clearly belies the opinion that even in 2009 our faculty and staff are appropriately configured at home. Failure to have the right setup at home means they cannot function as they do at work. Furthermore, as the data that follows shows, there is a strong reliance in the Vanderbilt University School of Nursing, for example, on the use of administrative assistants (secretaries) who, for a variety of reasons are less configured at home than the faculty. Finally, none of the technology does any good if the students are inadequately prepared at home.

Assumption 4: Stakeholders will train themselves in what they need to do just in time to do it. Will they? Some of this technology is complex with a significant learning curve. Most institutional websites we reviewed offered little in the way of real training, opting instead to let the users train themselves as best they can once they have identified what technology they wanted to use for their classes.

The question then becomes how well prepared is the health sciences academic area, to provide real education to our students in the event of a pandemic closure? The answer appears to be "not very." The Vanderbilt School of Nursing (VUSN) has one of the premiere informatics support areas of any school of nursing in the world. With 18 faculty and staff members in informatics, out of a total of 242 employees, with

expertise in educational informatics, software development and design, use of interactive communication tools such as web and video conferencing, and with extensive course management system experience (two of the faculty actually developed an early prototype of a CMS in the mid 1990s), VUSN is well positioned to help faculty and staff use technology extensively in their teaching. In addition, 7 of the 9 masters specialties have a significant distance education component as part of a blended program that has the students show up on campus only one or two long weekends per semester. In short, the faculty are very well versed in the tools of distance education (the exact set of tools they will use if their students cannot come in at all) and do just about everything on Blackboard including administering exams, even if the program is not a distance specialty. Therefore, it was natural to assume that the faculty and staff would be exceptionally well prepared to continue the educational mission of the school, even in the event of a pandemic closing.

A careful review of institutional websites about teaching in a pandemic situation is rather enlightening, more in what it does not say than what it does say. First of all very few institutions have program specific websites related to this issue, opting instead to have a general university approach to the problem. This "one size fits all" approach may play well in the press, but in practice, with a myriad of programs and needs it is doomed to fail many times. Most likely individual schools within a university do not have the support personal, hardware, and software to go it alone and must rely on an institutional response to succeed. Clearly some things must be institutionally based. (It makes little sense for individual colleges in a university to have their own course management systems for example) but the tools that are promoted in a specific program (even down to the specific tools and features in a course management system) must be college and program identified and supported. For example, the instructional technology needs teaching statistics in a Doctor of Nursing Practice (DNP) program are far different than the technology needs of an English Professor in an undergraduate Arts and Sciences program. A statistics professor needs presentation programs that demonstrate statistical techniques to his students, whereas the English professor needs tools to allow students to engage in more real time discussions. What universities typically do is provide a collection of tools hoping the individual faculty members will find an appropriate tool in this smorgasbord and learn how to use it, and then learn how to use it effectively, all within a very short period of time.

In order to determine where the Vanderbilt School of Nursing is, in terms of faculty and staff technology capabilities at work and at home, a brief survey asking them about their capabilities was prepared and electronically distributed through Survey Monkey. A small number reported themselves as administrator, but administrators were asked to report themselves as faculty if they do a reasonable amount of teaching during the year. The thinking here is that the focus of the effort for the relatively brief closure time needs to be the direct support of the instructional mission. Most likely software required for teaching would be a superset of software access required for administration. The survey was divided into two components. The first component was filled out by everyone and dealt with infrastructure capabilities at home. The second component dealt entirely with teaching needs. This second section was filtered by role so that only those reporting as doing a significant amount of instruction, either didactic or clinical, were asked these questions. The faculty and staff were given 10 days to complete the survey. The students were not surveyed because the students need to have the correct hardware and software, as a prerequisite for admission into the program, to function in a distance environment (even if their academic program is not a distance program). All of Vanderbilt's nursing students have contemporary PCs (including some Macintoshes) and broadband connectivity. The only area where students appear to be deficient is in the number of systems with webcams for video conferencing, but in the event of a closure, because of class size, video conferencing would probably not be used outside of the PhD program anyway, and those students already have webcams. Furthermore, the costs of webcams and their ease of use means they could quickly acquire one should the need arise. Interestingly, students rarely complain about the technology requirement. While that could be the type of student Vanderbilt attracts, more likely it is that today's students in the health professions just know that personal ownership of contemporary technology is an important component of their educational responsibilities.

Results

Based on the survey results and follow up interviews with faculty and staff the following competencies were identified but everybody does not need to know everything:
Competencies (infrastructure):

1. Installing/using Virtual Private Network
2. Creating drive mappings/transferring files
3. Using Remote desktop
4. Checking bandwidth
5. Configuring headset and/or webcam

Competencies (applications):

1. Posting documents and hyperlinks
2. Creating/administering a test
3. Using discussion board/wikis/blogs/social networking
4. Using web/video/text conferencing tools
5. Creating/posting narrations (Powerpoint/screen recordings)
6. Using assignment submission

The following tables show the response rate to the survey as well as the areas that are deficient.

Table 1 – Overall Response Level

	Faculty	**Support Staff**
Total. Number	109	78
Reporting (%)	87 (80%)	63 (81%)

Table 2 – Strengths and Deficiencies at Home

Capability at home:	Faculty	Support Staff
Computer	85 (98%)	60 (95%)
Broadband	85 (98%)	53 (84%)
VPN	25 (29%)	20 (32%)
Narrated Powerpoint	33 (38%)	N/A
Headset	33 (38%)	N/A
Other software needs	30 (34%)	N/A
Assignments in Blackboard (Bb)	66 (76%)	N/A
Post Material in Bb	59 (68%)	N/A
Test in Bb	18 (21%)	N/A

Faculty members teach extensively with Powerpoint, yet have learned to use Powerpoint to provide "talking points". Simply providing the students their slides without any audio narration to accompany the slides renders the presentation essentially useless. Currently only 38% of our faculty know how to narrate a Powerpoint presentation for posting in the course management system. Audio quality is a significant issue. Built in microphones in laptops provide a hollow sound making the narration difficult to understand. The solution is to narrate Powerpoint slides using a microphone headset, yet less than 40% of the faculty have such a device. 34% of the faculty want to show things other than Powerpoint slides, yet only two have the ability to create screen recordings and convert them into a format that can be posted in Blackboard. While 76% of the faculty know how to receive assignments from students in Blackboard, only 21% have the personal ability to create and administer an exam in Blackboard. However, since almost all the faculty use the Blackboard examination feature, how can this be explained? It turns out, upon further questioning that faculty rely heavily on administrative assistants to do this type of work for them. They provide the assistant with test, in Word format, and the assistant then puts that effort in the Blackboard utility. The implications for this are significant if the school becomes involved in a pandemic event. The question then becomes if a faculty member creates an exam or wants to post content to Blackboard, and they typically have their administrative assistant complete the effort, is the administrative assistant going to be able to work with this from home? The answer, even in a technology rich environment such as Vanderbilt University, is equivocal. While 84% of the administrative staff can reach the internet from home, that includes all 15 information technology (IT). support people as well. It appears that only 46 of the 63 true administrative assistants reporting have that capability. That means 1/3 of the support staff either do not have that ability or haven't indicated that they have that ability. Preparing for a worst case scenario requires the assumption that no response likely means they cannot do it. In short, faculty are relying on personnel who will not have the ability to do this ,from home. The problem is compounded by the fact that only 32% of the administrative assistants have true Virtual Private network (VPN) knowledge and connectivity to be able to carry out the complete academic mission from home. VPN software allows the user to access IP restricted resources on the campus. The situation regarding administrative assistants is very serious when it comes to broadband connectivilty. Only 84% of the administrative assistants have some form of broadband connectivity from home. This means some do not have the infrastructure to their homes to provide real service to the faculty, even if they have the correct software and are trained in its use.

The faculty situation is appreciably better. 98% have a functional home computer (either desktop or laptop) to work from and 98% have broadband capabilities to their home. One concern is that only 29% of the faculty have the VPN client installed on their home computers. Lack of VPN capabilities mean they will not be able to get to their office desktop machines, through remote desktop nor will they be able to get to files stored on departmental servers.

Implications

The implications for what this means in terms of carrying out the educational mission of the school of nursing are profound. On the staff side, the administrative assistants need to acquire broadband services at home. Part of the problem is that some of these individuals live in locations where broadband connectivity is either unavailable or prohibitively expensive. Their personal resources may be low and they may have to be financially incentivized to do this. At the very least those without capability at home need to be identified with what responsibilities they are in charge of, and develop methods for shifting those responsibilities either back to the faculty member or to other administrative assistants who have capability from home. As the data show, currently faculty are very reliant on administrative support personnel to do a lot of the work related to technology, for them. Relying on individuals who, in much larger measure, do not have the capabilities at home to carry out the task makes little sense.

Specifically what do institutions need to do to be able to continue the educational mission of these professional schools during the pandemic event? First, the faculty need to become aware of what technology teaching solutions are available, both inside their institution and what can be acquired from outside the university. They need to conceptualize how they would teach their courses from a distance and what software they need to do this. Trangenstein [10] has created a toolkit set that explains the various options available to the faculty in schools of Nursing. There are perhaps some course content that cannot be taught through distance education techniques. This content will have to be put on hold until face to face classes reconvene after the pandemic event is over.

Secondly, software needs to be acquired in sufficient license quantities so that faculty can continue the teaching mission of the institution. At Vanderbilt School of Nursing we have Blackboard as the course management system, Camtasia to record narrated Powerpoint presentations, Centra for synchro-

nous web conferencing, and Scopia for small group video conferencing with webcams. Vanderbilt also provides servers to store video files to be viewed in classes asynchronously.

Third, support materials need to be created to teach faculty and staff the tools they need quickly and in a timely manner. Production of PDF brief training manuals, quick reference guides, and brief (3-7 minutes in length) narrated screen recordings can all be posted online. Break longer videos into shorter segments each centering around a specific technique or concept. Faculty and staff will not listen to long winded presentations when they are attempting to get a class up and running quickly. Examples from Kent State University [6] and Vanderbilt School of Nursing[10] are demonstrations of ways of doing this effectively. Avoid generalized approaches that do not get specific quickly. In an emergency, faculty do not have the time or patience to wade through pages of general explanations. They want to learn how to do what they want to do quickly and immediately. Avoid wasting time by discussing features they have little chance of acquiring or using.

Fourth, give the faculty the opportunity to try these techniques before they need them and strongly encourage them to do so. At Vanderbilt a new server was installed to use with narrated Powerpoint presentations. The use of this server is now required even though it really would not be technically necessary until a closing. Attempting to learn how to use new software applications or hardware in a crisis is often just not successful.

Fifth, make certain that the IT support people are philosophically on board and realize it is their responsibility to keep the technology running during the pandemic event. Give them the tools they need to manage servers, networks, and software licenses from home. They may not be allowed on campus either.

Sixth, determine what prerequisite hardware and software are required to manage each application. Faculty may need headsets, webcams, robust network connections, and expensive software, all in their home environments.

On the school side, training materials (consisting of online printable manuals and screen recordings of the actual application) will have to be created, aggregated onto a website, and made available to staff and faculty well in advance of the need. Convincing faculty and staff to learn this material well in advance of the need is an interesting training challenge but one we are overcoming. In the past 72 hours since this article was outlined, traffic to our website has dramatically increased, two faculty have requested additional one on one help, and three administrative assistants have asked for additional work in this area. Faculty are transitioning to taking charge of their own technology and the administrative assistants are recasting their role from what has traditionally been highly secretarial to one of technology support. This shows people are ready to make the move if given the correct tools, training, and resources.

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