Becoming a Virtual Professor: Pedagogical Roles and ALN

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Abstract

This paper presents a qualitative study of role changes that occur when faculty become virtual professors. In 20 semi-structured interviews of faculty, coded with pattern analysis software, the authors captured role changes enacted by instructors in ALN settings -- cognitive roles, affective roles, and managerial roles. The cognitive role, which relates to mental processes of learning, information storage, and thinking, shifts to one of deeper cognitive complexity. The affective role, which relates to influencing the relationships between students, the instructor, and the classroom atmosphere, required faculty to find new tools to express emotion, yet they found the relationship with students more intimate. The managerial role, which deals with class and course management, requires greater attention to detail, more structure, and additional student monitoring. Overall, faculty reported a change in their teaching persona, towards more precision in their presentation of materials and instructions, combined with a shift to a more Socratic pedagogy, emphasizing multilogues with students.

1. Introduction

An Asynchronous Learning Network (ALN) uses the World Wide Web and the Internet to deliver courses, with an emphasis on student-student as well as student-teacher interaction. Asynchronous ("anytime," rather than same time) online interaction leads to new paradigms for teaching and learning, with both unique problems of coordination and unique opportunities to support active, collaborative (group or team-based) learning [9]. In particular, the instructor/facilitator must re-conceptualize his or her role as a teacher and create a set of situations and reward structures that encourage students to look upon their interactions with their peers as valuable resources for learning rather than to focus on memorizing lecture-type material presented by an instructor. An ALN learning environment differs in terms of its communication dynamics not only from the traditional classroom but also from technology-enhanced classrooms where synchronous (same time) CMC is used in conjunction with face-to-face interaction [21].

For over a decade, a research team at New Jersey Institute of Technology (NJIT) has been involved in constructing a specific version of an ALN, which we call the Virtual Classroom®, and studying its use in a wide variety of courses [12]. NJIT has one of the largest sets of online undergraduate and graduate programs in the U.S., mostly in Information Technology degrees such as the B.A. and M.A. in Information Systems, the B.S. in Computer Science, Telecommunications Networking graduate programs, and even the courses (but not the on-campus thesis work) needed for a Ph.D. in Information Systems. Software design and implementation, equipment, course design and delivery, and faculty training, and evaluation research have been funded for over $2 million by such sponsors as the Corporation for Public Broadcasting, The Alfred P. Sloan Foundation, the State of New Jersey, UPS, and IBM. Currently, about 50 instructors offer ALN courses each semester, with total enrollments over 1000 a semester in 1999-2000.

What we have found is that students are generally enthusiastic about the opportunity to learn online. In fact, our experiences correspond to those for the over 30 empirical studies of the effectiveness of ALN's based on student evaluations that show either no significant difference in learning outcomes or significant advantages of ALN's over traditional face-to-face classrooms in student satisfaction [18]. For example, Wade and Power [20] find that students in ALN environments receive more in-depth exposure to the course content area. Bourne, McMaster, Rieger, and Campbell [2] show that ALN is more effective than the traditional lecture or laboratory and that peer-to-peer learning is enhanced through ALN. Other studies evaluate grades and test performances in ALN's. Alavi [1] finds that final grades of students using computer-mediated collaborative learning are

significantly higher than those of students who do not use computer-mediated learning.

While we know something about students' response to ALN's, little research has been published that documents exactly how the technology changes the teaching process and the role of the university faculty member. The only existing in depth study of ALN that includes observations based on faculty experiences is the Hiltz [10] study of the late 1980s implementation of the Virtual Classroom® in a variety of courses. This included a chapter on faculty experiences and perspectives, based on participant observation and on standard post-course reports completed by six faculty members. All except one of the six were enthusiastic volunteers who were early adopters of what was then a new technological innovation.

Since this early study, the situation has changed markedly, including at NJIT. As universities commit to the production and maintenance of whole degree programs online, many of the faculty who participate could be described as “persuaded volunteers” at best and as "coerced conscripts" at worst. The whole issue of online courses and the virtual university has become politicized and the subject of faculty - union negotiations. For example, the faculty of the University of Hawaii went on strike to protect intellectual property rights for materials for distance courses. Many of the faculty at the University of Washington signed an open letter opposing the enthusiasm of the Governor for the use of a virtual university to obviate the need to build more physical campuses. And the AAUP New Jersey conference has (so far) successfully lobbied its state legislature to bar the for-profit University of Phoenix, which had applied to offer degrees in New Jersey. Many are alarmed by the rush to automate higher education and to produce digital diploma mills [15]. Thus, there is a critical need for study of faculty experiences as faculty are swept up in changes in the nature of university education and of the university itself brought on by the growth of the virtual university.

At the crucible of change for faculty who become virtual professors is the role the instructor plays in ALN environment. We often hear the change in instruction characterized as moving from the "Sage on the Stage” to the “Guide on the Side” [5]. This suggests that faculty who are accustomed to being performers in the classroom will need to adjust their role expectations and behaviors to suit a different instructional environment. Moreover, role theory [14] purports that role expectations are developed through a combination of organizational and individual factors. When the organizational context of instruction shifts dramatically, as is does in the change from the traditional classroom to that of distance learning, then we should expect shifts in role enactment from the focal person (instructor). However, no empirical research was uncovered to examine any role changes that may occur when professors change their mode of teaching from traditional to distance learning.

A different body of research [15] has demonstrated that distance learning is not a distinct learning process. Those factors (knowledge, attitudes, course design, communication, and interaction) that influence learning in the traditional classroom are present in the distance-learning situation. However the media for transmission of these factors changes from direct contact to contact via telecommunication. Given this fundamental change, it becomes important to understand if professors do modify their various teaching roles to accommodate the new medium and how these modifications are expressed.

A review of research [13; 4; 19] suggests roles that are enacted by instructors in traditional settings. Among the many roles mentioned are cognitive roles, affective roles, disciplinary roles, managing roles, evaluative roles, performing roles, facilitator roles, gate-keeper roles and boundary-spanner roles. Underlying the enactment of all roles is the critical factor of communication. In the traditional classroom, the instructor has both verbal and non-verbal communication available to enact the various roles. The shift to distance learning changes the nature of verbal communication from spoken to written and diminishes available paralinguistic cues. To the extent that some of the roles require affective expression, the diminution of non-verbal communication could prove problematic to enacting the affective role.

Given so fundamental a change in communication medium, how do these roles get enacted, do all get enacted, and does the priority attached to any of the roles change?

To understand how ALN technology changes the teaching process and the role of faculty, the authors [6; 7] designed, conducted, transcribed, and coded 20 semi-structured interviews with faculty who have prepared and delivered at least one online course. We wanted to hear from ALN faculty about how they perceive the teaching and learning process to have been altered by using online communication as the primary mode of communication with their students. This paper, then, describes those roles, which our research captured in the interviews, as they deal with shifts in communication and behavior. We look first at the specific roles -- cognitive, affective, and managerial -- and then at how these roles contribute to an overall persona shift.

2. Research questions on ALN pedagogy

The interviews of faculty covered course preparation and delivery, instructor motivation, training and support, faculty attitudes toward policy issues, perceived outcomes for both students and faculty, and ALN pedagogy. In focusing the heart of the interview on pedagogy, we queried our sample of professors on issues such as

changes in interaction patterns with students and other faculty, changes in teaching style, perceived changes in learning dynamics, changes in course design, perceived changes in control, and changes in the role of faculty. Figure 1 shows questions from the interview guide that probe aspects of faculty perceptions to pedagogy.

Question 10. Now let's talk about the ways that ALN may have affected your work as a teacher.

1. What changes do you observe in the way you interact with students in the classroom vs. ALN?
2. Consider the various assignments or weekly activities that you include in your course. Do these activities result primarily in individual student work, small group work, or work in which the whole class was involved?
3. Many faculty have found that to be most effective instructing online, they need to devise new kinds of assignments or activities. Are there any kinds of innovative assignments or class activities that you have devised that worked particularly well?
4. What techniques have you used for encourage discussion? Probe: how well did these techniques work?
5. What techniques have you tried for keeping class discussion on topic? Probe: How well did these techniques work?
6. Are there any things you tried online that did not work well? Probe: If yes, why. If no, what went wrong?
7. Have you experienced any particularly challenging situations or incidents online? Prompt: For example "flaming." If yes, please describe the incident? How did the group respond to the incident? How did you respond to the incident? How did the individual(s) who initiated the situation respond? What was the outcome?
8. Some faculty have said that their persona, or teaching style, had to change for online teaching. Have you found this to be the case? If yes, in what ways?
9. In what ways has ALN impacted your interactions with other faculty and their courses? (Prompt: Have you compared your course to others on the Web, or have you exchanged ideas with other faculty?
10. Do you think that students in your distance ALN sections learn about the same as those in traditional sections? More? Less? Probe: Why?
11. Overall, how do you see the dynamics of learning changing with ALN regarding roles of faculty? Roles of students?
12. Overall, in what ways has teaching distance courses with ALN been a frustrating experience?
13. Overall, in what ways has teaching distance courses with ALN been a fulfilling experience?. Would you prefer NOT to teach another asynchronous course? Why or why not?
14. Would you prefer NOT to teach another asynchronous course? Why or why not?

(From the Interview Guide©)

Figure 1. Interview questions about ALN pedagogy

3. Background: The Virtual Classroom® and Virtual University projects at NJIT

While the first portions of courses and not-for-credit courses were delivered online at NJIT during the early 1980's, The Hiltz-Turoff research group's first funded research project on the Virtual Classroom® began in 1986 and involved the design and implementation of the first version of the software, course design, and comparison of a large number of courses over a period of two years in many different disciplines. For some courses, there were matched sections offered by the same instructor in a traditional classroom and using the Virtual Classroom (as the sole means of delivery, or in combination with a reduced number of face-to-face meetings). For other courses, there was no match, and the comparison was subjectively made by the students and instructors to previous, traditional courses. The purpose of this first project was to establish the feasibility of this approach both technically and in terms of course outcomes. It is most fully chronicled in the book, *The Virtual Classroom* [10].

We have continued to develop and use our own (text-based) software in subsequent projects, and are currently using the third, web-based version of Virtual Classroom®. A second project, from 1994- 1996, was designed to develop, offer, and assess the effectiveness of entire undergraduate degree programs in Information Systems and Computer Science delivered via Virtual Classroom plus videotapes of lectures, to attain these goals: faster progress towards the undergraduate degree, by facilitating self-paced learning and solving major educational logistics problems; improved quality of learning through increased collaborative learning and faculty-student interaction facilitated by computer conferencing; increased access to educational opportunities for working adults or those trying to re-enter the work force, particularly women; and increased knowledge about relatively effective and ineffective ways of using this technology to support post-secondary education. The third project, "From Virtual Classroom® to Virtual University," (1997-1999) added the objective of spreading the innovation begun in the Computer Science department, to disciplines throughout NJIT, and to graduate and certificate programs as well as undergraduate programs

Course development was always by an individual faculty member, with some assistance available from the project director, student laboratory assistants, and the instructional media department. They have been relatively low-budget courses. Faculty developers were given the equivalent of a month's summer pay (second project) or only the equivalent of teaching a summer course ($2500 stipend, current project), and the budget for videotaping a live class in the "candid classroom," to provide the lecture-type material, was about $7500 a course. Faculty training initially consisted of a one-day workshop on how to design and teach courses online; currently, there is a second, one-day workshop on how to create Web pages for courses. Projects two and three were partially supported by the Sloan Foundation; and it is the completed, second project that is the basis for most of the data that will be reported here.

Though the courses in these projects are available through the Internet to students anywhere, the majority who enrolled have been "close to campus" New Jersey students who mix on-campus and online courses in completing their degrees. For those within driving distance, ALN students are encouraged to attend an orientation session at the beginning of the semester and required to take any midterms or finals in a proctored, on-campus setting.

4. Research methods

A semi-structured interview was used to gather data about faculty experiences creating and delivering courses using ALN. Themes of the interview included faculty members' initial motivation in using ALN, their reaction to training courses, and their experiences in developing course components. Other areas of inquiry regarded policy issues of enrollment, compensation, and intellectual property, institutional support (administrative, technical and leadership), pedagogical issues (e.g. dynamics of learning, learning outcomes, student interaction), overall teaching experiences, and future perspectives about the impact of distance learning. The interviews were conducted in 1998 and 1999.

Sample description and procedure

Fourteen male and six female professors representing departments of Computer and Information Science, Electrical and Computer Engineering, Humanities and Social Sciences, and School of Management were interviewed. The courses that were the subject of the interviews were both graduate and undergraduate, with 11 undergraduate and 9 graduate courses. Faculty were interviewed by one of four interviewers; three interviewers were faculty and part of the research team, and the fourth was a graduate student. Typically the location was a faculty office. Interviewees were assured that their individual responses would not be for attribution, and all interviewees were asked for and granted permission for taping of the interview. The interviewer also took notes during the interview that would last about 60 to 90 minutes.

Analysis. The interviews were transcribed and coded using QSR NVivo software (1999). A review of the

literature pertaining to the use of QSR NVivo reveals it is used most frequently in analysis of clinical data [8]. Another area where it has been used is education [17]. This program assists in qualitative data analysis when the data to be entered are transcribed interviews. The researcher decides what becomes a meaningful section of text for coding by entering hard returns into the document. Then each text unit can be coded using either a researcher created code or using the program to uncover themes within the interviews. This research used coding categories determined by the structure of the interview guide in combination with the pattern of responses given to interview questions. In addition, we applied quantitative analyses and counted responses to determine the most frequently coded passages.

Determining the codes. The research team set up codes by examining an interview transcript and generating code categories and sub-categories for each of the major interview parts. To establish a common understanding in applying the codes, the three researchers individually coded the same interview and discussed discrepancies. These discussions set the guidelines for the rest of the coding of interviews. The researchers then continued coding independently. As the need for additional categories was identified in subsequent interviews, the researchers coordinated these changes via email, face-to-face meetings, and exchanges of software files. Using these codes, the interviews were then subjected to content analysis. The software also provides counts of responses in various categories thus enabling frequency analysis.

4. Cognitive, affective and managerial roles in ALN pedagogy

Cognitive Role

The cognitive aspect of instruction deals with mental processes pertaining to perception, learning, information storage, memory, thinking, and problem solving. We looked for changes that occurred in instructors' cognitive processing because the communication medium changes in ALN from oral to written and because the need for increased course planning in ALN suggests that there is less spontaneity and more formality in instruction. Those processes that were discussed in the interview relate to learning, information storage, and thinking.

Learning became more obviously a two-way process using DL. That is, professors reported learning from students' experiences. Responses to questions also became more reflective and deliberate. That is, professors were engaging in a deeper level of mental processing as they edited both questions and responses to questions.

"Let's focus on the accounting course because that's the one I am going to teach 3 times a year with about 70 people in a course and the only way I can do it is with a conference. I can say point blank that there's no way that I would ever teach a Distance Learning course without the computer conference. For the simple reason that every time I teach a course, I learn -- the instructor learns -- something. But if you don't have a mechanism for this type of feedback you aren't going to learn anything." (School of Management faculty member)

"With ALN, with text, you have a lot more time to think about what they are really asking." (School of Management Assistant. Prof.)

"First way is, I give myself more time to think about what they're saying before I respond to them. In the classroom, I'm more prone to avoid the silence. That should probably be easier, the silence, but I hear the question or I read the question and this allows me to really sit back and really think about giving a reasonable response rather than something that's right there. In class, they want the immediacy, they want my response. And this [ALN]gives me a chance to think." (Humanities and Social Sciences Assistant Prof.)

Thinking, reasoning, analyzing. These processes deal with the mental manipulation of information. Instructors mentioned that using ALN helped extend students' ability to analyze information because instructors could easily guide students to other sources of information on the WEB to assist in their analyses.

"I tell them what they should be doing, just to keep them on track. And then I give them things to think about. So for leadership, I'll ask them to think about what a transformational leader is, is there a moral dimension to leadership, if there is what is it or is it just about making money and looking good in Forbes. I give them 4 or 5 questions and I just throw them out. Sometimes they answer them and sometimes they don't. Sometimes they bring up other issues. But I do require that the bulk, not all of it, but the majority of the discussion deal with the topic for the week. I get an awful lot of stuff from their personal experiences, their worklives." (School of Management Asst. Prof))

"What was interesting is the comments you get.. In many ways they are more thoughtful. They have more time to reflect." (School of Management Asst. Prof))

" And what I did, was come up with assignments,… that required that the students read my notes, and/ or read some sections of the book.. So depending upon what we were doing that week, they had to do one of those things. And each week they had to send a response, about what they read." (Humanities and Social Sciences Special Lecturer)

"I think it is not so much discussion but mostly questions like I don't understand how to apply this

theorem. So I would create a page in PDF and post it to the website, then in the conference I would say, go to the website." (Computer and Information Science Asst. Prof.)

Information storage. In a traditional class, when a question is asked only a few respond. While the ideal situation has everyone in the class engaging mental rehearsal, the instructor has no clue at the time as to whether students attempted an answer. In DL, all students are frequently required to respond. This added effort helps students engage in rehearsing information and retrieving information. The more actively information is processed, the more connections it makes to other information and the better it is stored. Faculty frequently spoke of being more reflective or carefully crafting their own responses and also mentioned the increased flow of questions from students. Several devised exercises to assist students in reflecting on material they were assigned.

"The virtual classroom was interesting as it was a challenge- thinking of creative assignments to put up there for the students to do. I think that in terms of face to face, it's a better learning experience. Then they have to think about the materials, digest it and internalize it. So I developed what I call reflective questions, integrating experience and make them do the exercise." (School of Management Prof)

" It was actually a lot of fun putting the assignments on the web page. My first lecture or so is primarily definitions and simple things. So I created a cross-word puzzle and it was on-line. Students can interact and answer the crossword puzzle. It was a lot of fun. I tried to make the assignments sort of hidden. You know what animated GIFs are? They're animations which made it attractive. Students commented they liked my assignments because they never knew what was coming. I have one terrific one, it's a wrestling database. It's a problem, you have to do some theoretical things, I had a GIF on top of one wrestler throwing another wrestler out of the ring. It added a new dimension to the assignment which I didn't do before. (Computer Information Science Assoc. Prof)

"But in crafting the responses, I typically do not craft them on the fly. I craft it on the fly and then I edit it. It keeps getting longer and longer. I'm also cognizant there is a written record of this. Accuracy is very important. " (School of Management Prof)

Affective Roles

In carrying out tasks related to ALN pedagogy, one instructor role deals with the affective domain. The affective role includes instructor behavior related to influencing student's relationships with the instructor and with other students and the virtual classroom atmosphere. We were particularly interested in learning how faculty were coping with this computer-mediated communication channel which remains impoverished with respect to emotional expression. Faculty reported in their interviews that their affective role changed in terms of lack of non-verbal communication, intimacy and formality.

Lack of non-verbal communication. Faculty noted the absence of facial expressions, eye contact, voice qualities, and body movement which are used in the traditional classroom to support and encourage students on both conscious and unconscious levels.

"When you and I are talking face-to-face, the manner, the way we go about discussing things, how we say things, how we look each other in the eye, how we gauge things that we say based on how you react to that I said…If I get the impression that you are uncomfortable I may adjust and so on. This isn't there with the keyboard." (Computer Information Science Ass't Prof.)

"During one ALN experience, I had a relatively good relationship with the majority of the students. But there were a few students with whom the relationship did not work that well. I believe that in the face to face relationship, it is easier to straighten it out. When I talked to these students on the phone, we found out that basically there were some misunderstandings; they did not understand what I wanted from them, and I did not understand what their problem was." (Computer Information Science, Ass't. Prof)

Intimacy. In spite of the lack of nonverbal expression, faculty found that their relationship with the students online was more intimate, more connected.

"Even though the richness of exchange is reduced, there is a possibility for more intimacy online than in the regular classroom. That's definitely a plus. It's hard to get to that, to have that happen. I like that very much."(Humanities and Social Sciences, Assoc. Prof.)

"I have more of a sense of some of the issues and problems that students face in their work lives. They tell me about it in VC [Virtual Classroom]. They are having all these problems in work and all these stresses in their lives. They don't tell me about it in the classroom for obvious reasons. ..I've become more sensitive to some of the issues they face." (School of Management, Assoc. Prof.)

"What is interesting is the comments you get in the ALN network in many ways are more thoughtful. And odd as it seems, they are also more intimate because you are not in a group of people. People are not going to talk about this lousy boss in front of thirty people." "School of Management, director)

Formality. Faculty noted that their interactions were characterized by more formality and less humor. But they also noted that they were trying to find new tools to show energy and humor.

"I'm more reserved online. I don't know why. In the classroom I tend to be energetic and I use humor a lot. I use energy a lot. Online, I tend to be more reflective and introspective. It has driven me to be more intellectual, to write well-crafted answers, to ask better questions, to think more abstractly and to think about the total implication." (School of Management, Assoc. Prof)

"You can't be extemporaneous with this [ALN] the way you can be in the classroom. In the classroom, you can walk in knowing the subject matter and let things happen. [In ALN] it won't work. (Humanities and Social Sciences, Special Lecturer)

"In the classroom, I'll tend to talk to my students more directly, joke around with them al little more. For instance, I've found a couple of my students are big South Park fans, so I'll kid about that so he'll wear his South Park hat or his South Park shirt. That's the sort of thing you don't get in ALN." " Electrical and Computer Engineering, Assoc. Prof)

Managerial Roles

One of the roles filled in carrying out tasks related to pedagogy deals with class and course management. This role includes instructor behavior related to course planning, organizing, leading, and controlling. Course planning deals with the effort involved in getting the course online. Organizing deals with establishing relationships between the instructor and other in administration, between students and the instructor, and among students so that course goals can be achieved. Leading deals with instructor behaviors that reflect motivation and coordination of students and controlling deals with monitoring and evaluating student learning outcomes.

Course Planning. Faculty found that they had to plan and structure a course for online delivery much more tightly than for classroom based courses. They spent a great deal of time gathering and organizing materials and getting them into digital or other media formats.

"It has gotten me to rethink pedagogical objectives, pedagogical techniques. It has exposed me to new ideas and new means of delivery that I hadn't paid any attention to at all. It has gotten me to think about the fact that class does not revolve around me which is what every new teacher thinks. They are more concerned about themselves and what they are doing. We speak about a community of scholars; it's about time that we had a community of learners." (School of Management Assoc. Prof.)

"I had to prepare that course very tightly, and I think that was much to their benefit. Even stuff that didn't work, it had much greater structure, so that was good for them. I think they learned more." (Humanities and Social Sciences, Special Lecturer)

Organizing. Faculty reported added effort needed in organizing the class. These efforts include getting students into the conference as well as interactions with other administrative units such as the Distance Learning office.

"But just tracking them down, and by the time, and they have a lot to do, more to do, get the EIES account, and all this, and whether their computer is being worked on, or a student just came online now and it's the third week." (Humanities and Social Sciences, Adjunct))

"Getting students enrolled was a major headache. I remember that originally I had about 35 students, and practically all of them had some problem that I was involved with. One of the difficult problems was that they did not have an account. Another major headache for me was simply getting students signed into the conferences to do their work." (Computer Information Science Ass't. Prof.)

Leading. Paradoxically, some faculty reported the need to be more pro-active while others spoke of the need to be a facilitator or coach. This contradiction resolves itself in examining the controlling aspect of the instructor role in DL. As seen below, monitoring takes on increased importance in the DL format.

"I found that my persona did not work well online. Here the instructor has to be more proactive, more aggressive, and directive in terms of a leadership role; however, that's not my style. I found myself in a position where I needed to change my teaching style, and I didn't know how to do that."(Humanities and Social Sciences, Ass't. Prof.)

"In ALN,…I see myself more as a facilitator, I'm more there to answer questions, steer them in the right direction that will aid understanding something…" --- (ECE associate professor)

"It's more mentoring, discussion leading, than anything else and that's the beauty of it. That's where the students really start to think on their own." ---SOM associate professor

Controlling. Faculty reported enhanced activity regarding monitoring of student progress. This took for the form of

being online frequently to answer student questions and to guide them in the right direction regarding assignments.

"With 30-40 students, to give them each individual feedback on everything they write, every week, becomes sort of daunting… Even to write little interlinear comments on each student's journal every week, it really adds up."(Humanities and Social Sciences, Assoc. Prof.)

"It is still much more time then I ever spent in a classroom, obviously… Managing the discussion will take time, somewhere from 3 to 6 hours a week, where with a normal classroom it will take a hour. With a normal classroom you have a discussion and it's over. But if you're monitoring people and keeping track of how many comments they do and deciding which ones you want to answer and deciding which ones you want other people to answer, to keep track of that would take three or four hours a week… In a traditional classroom it is an hour. Plus the fact that you were "expected" to be on-line for an hour a day. Although I didn't do it on weekends. I was there four or five days a week…" (CIS, Assoc. Prof).

5. Evolving ALN persona: The "Digital Socrates"

When asked about changes in teaching style and persona in ALN, only three of the twenty faculty interviewed found that they had not changed their public teaching personality. Interestingly, two of the three faculty who report no change are new to teaching, and we may attribute no change to the fact that the instructors have not yet developed a distinguishable teaching persona.

In a metacognitive way, faculty described their teaching persona and were able to articulate the stance they take, the sense of acting, or mask they wear in teaching, as being differentiated in online and face-to-face modes.

Implicit in the responses is the sense that the online persona is one in transition. We just have not yet had enough experience with the digital role. Faculty understand that this mode of teaching requires different skills, and persona, and they are committed to making a successful transition. As one Humanities and Social science faculty noted, "I found myself having a completely different personality in [ALN], writing initially much more stilted things, more formal things."

Other faculty have noted that, with experience, the online persona develops.

"I'm getting better about building a sense of community. That is what you really have to do. I don't know how I've done it. At first I wasn't so good. After three shots at it now, I am getting a sense of community. (School of management, Assoc. Prof.)

Faculty characterized the differences in teaching persona primarily in four ways: formality, Socratic method, accessibility, and authority. In the remainder of this paper, we will look at some quotes that deal with formality in the form of increased precision, and the increased use of a Socratic method.

The most frequent response characterizing change in teaching style was formality [11 times]. Formality was interpreted as relating to (a) precision, (b) intimacy, and (c)lack of humor. Formality has been discussed above in terms of changes in the affective role; here we will fill in the picture some more, on the precision dimension. In terms of precision, most faculty noted a need for precision in ALN that was not part of their traditional teaching style:

"I found myself having a completely different personality in [ALN], writing initially much more stilted things, more formal things." (HSS Assoc. Prof.)

"In the conferencing system, I'm pretty consistent, I think. I've become more precise in what I say. Not guarded, but precise." (SOM associate professor)

"I'm more reserved online. I don't know why. In the classroom I tend to be energetic and I use humor a lot; I use energy a lot. Online, I tend to be more reflective and introspective….It' driven me to be more intellectual, to write well-crafted answers, to ask better questions, to think more abstractly and to think about the total implication." (SOM, Assoc. Prof.)

"You can't be extemporaneous with this [ALN] the way you can be … in the classroom." (HSS special lecturer)

Some faculty described the formality as a transitional stage:

At first, I was more formal online. But later on I got more informal." (CIS, Ass'st. Prof.)

Socratic Method

A frequently reported characterization of changes in teaching style change was the increased use of the Socratic method, typified by a give and take between instructor and student with questions leading to learning.

"In ALN,…I see myself more as a facilitator, I'm more there to answer questions, steer them in the right direction that will aid understanding something…" (ECE, Assoc. Prof.)"It's more mentoring, discussion leading, than anything else and that's the beauty of it. That's where the students really start to think on their own." (SOM , Assoc. Prof.)

Finding their new online persona

Faculty described their teaching persona as being in transition. They understand that this mode of teaching

requires different skills, and perhaps persona, and they are committed to making a successful transition.

"I felt that a lot of my skills…that I would traditionally rely on --- like body language ---I don't have anymore. Smiley faces, they're not my thing. ..So it took a while thinking about all that good stuff and wondering, how do I get that back?" (HSS, Assoc. Prof.)

One answer may be found in the words of another professor:

"It takes time. An ALN professor is not born; they evolve from this and it takes a long time." (SOM, Assoc. Prof.)

7. Summary, conclusions and discussion

Our research on the impacts of ALN technology on the teaching process and the role of the university faculty members show that role changes occur when professors change their mode of teaching. Our interviews suggest that the roles enacted by instructors in traditional settings are also enacted in ALN environments, though each of these roles is transformed. Our analysis shows that the specific faculty roles related to cognitive, affective, and managerial activities do change. The cognitive role, which relates to mental processes of learning, information storage, and thinking, shifts to one of deeper cognitive complexity for virtual professors. The affective role, which relates to influencing the relationships between students and the instructor and the classroom atmosphere, required them to find new tools to express emotion yet they found the relationship with students more intimate. The managerial role, which deals with class and course management, requires greater attention to detail, more structure, and additional student monitoring.

The cumulative roles may be described as a persona. Overall, faculty reported a change in their teaching persona. One thing they noted was more need for precision and a certain formality in laying out expectations for students. This is probably because there is little opportunity for students to raise spontaneous questions about details of requested activities; unless they are spelled out in detail, they may be misunderstood and lead to disorganization. But, while in some ways the online teaching persona is more formal in terms of precision of instructions given to students, in other ways it is less formal, especially in terms of moving towards more "give and take," a kind of a "Digital Socrates" who shifts from conveying information to raising questions and engaging in dialogue.

Understanding the shift in teaching roles should assist instructors as they change classroom venues from traditional to virtual. While universities plan expansion of Distance Learning by increasing bandwidth and by training the instructional staff in web design, there has been little attention paid to changing professorial roles. Although there may be informal transmission of information regarding the "Digital Socrates," instructors tend to get their training "on-the-job." The information regarding professorial role enactment in ALN can be used to provide instructors with appropriate expectations for ways their role behavior needs to change. Such professional development will prepare faculty for successful transformation of their roles when they use ALN. In turn a prepared faculty should result in more successful learning experiences for their students.

Cascio [3], describing challenges for managers of the virtual workplace, notes that managers will need better supervisory skills for that situation. In a parallel fashion, our research suggests professors using the virtual classroom will need better instructional skills. Those skills that need focusing upon include communication, organization, and motivation (via the affective role).

However, our research has limitations. It was conducted at only one university, and is a relatively well funded effort in terms of both technological and faculty support resources . NJIT has been named the " most wired" public university for last three years by Yahoo!. We also had upper administration support, starting with the President and the Provosts. We had technical experts to support and pedagogical consulting to build into the setting. If all of these things were not provided, the experiences of faculty would probably be different.

For most of the faculty interviewed, experiences with ALN were quite new; many were first-time users. It can be expected that faculty perceptions of changes in their roles will change with more experience with ALN. In addition, faculty in the Computer and Information Science department predominate in our sample, since the majority of ALN courses at NJIT thus far were developed in these disciplines. Finally, all 20 of the faculty were "volunteers," though in some cases they needed to be persuaded to teach using ALN by arguments relating to departmental needs to establish a strong online program. In order to establish the extent to which our findings can be generalized, interviews would need to be conducted with ALN faculty at different types of institutions and from a wider range of teaching areas.

While faculty told us that their pedagogical roles changed in ALN, we would like to find independent evidence of the changes. Therefore, our future research will include looking at specific conference transcripts for evidence of the changes faculty described in the interviews.

Overall, we believe that the faculty have in fact become virtual professors. We see evidence of success in the fact that all twenty of the faculty interviewed told us that they would teach again using ALN -- although with varying degrees of enthusiasm.

Acknowledgements

This research was partially supported by the Alfred P. Sloan Foundation, and by the New Jersey Center for Multi-Media Research. Two of the interviews were conducted by and coded by Jo Anne Saita, as her master's project. We are grateful to our colleagues for their generosity and candor in granting us time to interview them about their experiences.

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