

Building Trust in Virtual Teams

—NANCY W. COPPOLA, SENIOR MEMBER, IEEE, STARR ROXANNE HILTZ, AND NAOMI G. ROTTER

Abstract—This paper presents a study of trust development in online courses. It reviews the concept of swift trust and examines changes in faculty roles as professors go online. An exploratory content analysis looks at indicators of the development of swift trust in the highest rated of a large number of online courses studied over a three-year period, and contrasts these results with one of the poorest-rated online courses. Establishing swift trust at the beginning of an online course appears to be related to subsequent course success. Strategies for trust formation are also suggested.

Index Terms—Asynchronous learning networks (ALNs), e-learning, swift trust.

An asynchronous learning network (ALN) uses the world wide web and the internet to deliver courses anytime rather than “same time,” with an emphasis on student-student as well as student-teacher interaction. The most successful courses use extensive class discussions and group assignments (in teams varying in size from dyads to the whole class) to build a learning community [1]. This paper presents an exploratory qualitative study of whether the formation of SWIFT TRUST in the first few weeks of an online course can help explain the success of online courses. Though it is limited primarily to an intensive study of trust formation indicators in one especially successful course, the study has implications for other types of online work in which work groups or teams plan to interact over a period of several months.

Swift trust is a concept developed by Meyerson et al. for temporary teams who form around a clear purpose and common task with a finite life span [2]. Swift trust was originally developed to describe high-risk and high-stake temporary groups such as film crews or cockpit crews. The researchers discovered that temporary teams are tied together by a form of trust with unusual properties. Swift trust is a unique form of collective perception, rather than scaled-down trust, for temporary, but not trivial, situations. Meyerson et al. frame swift trust in temporary systems in terms of the following social characteristics:

- vulnerability—the belief (hope) that others will care for what is being entrusted with good will.
- uncertainty—a willingness to suspend doubt in order to execute the task performance.
- risk—a willingness to take risks.
- expectations—A positive expectation of benefits of temporary group activity.

Especially for students and faculty who are new to learning online, the above set of characteristics is important to members of new “temporary teams.” Compared with a traditional classroom, the virtual classroom presents more uncertainty, risk, and expectations. This is certainly the case for the first time ALN user who is uncertain about how to proceed and what to expect. Moreover, this new ALN user may be concerned with how to interact successfully in an unfamiliar and ambiguous setting, where many of the usual social cues are missing. Even if a faculty member or a student has had a prior course using the ALN approach, they are never sure whether or how this new set of characters is going to be able to work together.

While trust in general is an important ingredient in the functioning of social relationships, swift trust takes on heightened significance in the ALN environment because the situation can leave students vulnerable to feelings of isolation. This sense of isolation has been discussed extensively in the literature on telecommuters (e.g., Kugelmass [3]). The telelearner working alone is analogous to the telecommuter. The dynamic of swift trust can alleviate this potential aspect of the ALN environment.

Because people in temporary groups have a limited amount of time to become familiar with one another, they import trust and assign perceptions based on past personal and professional stereotypes. Since these groups come together to get a job done, swift trust is sustained and reinforced by a high level of activity. According to Meyerson et al., “The more forceful the action, the greater the willingness to trust and the more rapidly does trust develop” [2, p. 180].

High levels of action are associated with high-performing teams in the Iacona and Weisband study of temporary electronic teams [4]. These researchers wanted to understand what temporary, distributed teams do to produce and maintain trust. They studied 14 teams of graduate and undergraduate business students in three geographically diverse

Manuscript received September 25, 2002; revised November 18, 2003. The authors are with the New Jersey Institute of Technology, Newark NJ 07102-1982 USA (email: coppola@admin.njit.edu).

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universities for instances of active interaction. They coded email between team members for instances of initiations and responses to initiations. They found that high levels of trust were maintained in teams that engaged in continuous and frequent interaction, what they describe as “doing trust work,” [4, p. 413]. In summary, while trust, swiftly or slowly built, combines both feelings and beliefs regarding the extent of confidence to be placed in another’s words and actions, it derives from reliable acts and communications.

Jarvenpaa and Leidner extend the original concept of swift trust to an examination of global virtual teams [5]. They define a global virtual team as a temporary, culturally diverse, geographically dispersed, electronically communicating work group (following Kristof et al. [6]).

Jarvenpaa and Leidner’s research analyzes behaviors and actions both in early and later stages of group work.

Early behavior and actions that facilitate trust in-group

Communication

- Social communication; social exchanges
- Communication conveying enthusiasm

Member actions

- Coping with technical and task uncertainty
- Individual initiative; members suggest topics, volunteer

Later behaviors and actions that facilitate trust in-group

Communication

- Predictable communication; regular pattern of communication; warning of absences
- Substantive and timely responses; explicit and prompt responses that the messages were read and evaluated

Member actions

- Leadership rotated among members
- Transition from procedural to task focus; movement from rules to emphasis on the task
- Phlegmatic reaction to crisis; ability to ride out turbulence

Jarvenpaa and Leidner’s study suggests that swift trust forms in global virtual teams with unique communication and behaviors. First, communication via the earliest keystrokes begins to establish trust. Task communication maintains trust while social communications (and explicit statements of commitment, excitement, and optimism) strengthen trust. Finally, the members’ initial actions as well as their responses to one another are critical to trust development.

CONTEXT OF THIS STUDY

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, called the Virtual Classroom, and studying its use in a wide variety of courses [7]. NJIT can be considered a “strategic research site” for studying determinants of the effectiveness of online courses, since it has one of the largest sets of online undergraduate and graduate programs in the US (according to U.S. News and World Report), mostly in information technology degrees such as the B.A., B.S., and M.S. in information systems and computer science. As of the 2001–2002 academic year, when this study was conducted, 136 instructors offered ALN courses, with approximately 2,800 students enrolled.

We found that students are generally enthusiastic about the opportunity to learn online. Our findings correspond to those for over 30 empirical studies of the effectiveness of ALNs as compared to traditional face-to-face courses [8]–[10]. The research literature, which uses grades and student evaluations about equally to measure course effectiveness, tends to show either no significant difference in learning outcomes or significant advantages of ALNs over traditional face-to-face classrooms in student satisfaction. For example, Wade and Power found that students in ALN environments received more in-depth exposure to the course content area [11]. Bourne et al. showed that ALN is more effective than the traditional lecture or laboratory and that peer-to-peer learning is enhanced through ALN [12]. Other studies evaluated grades and test performances in ALNs. Alavi found that final grades of students using computer-mediated collaborative learning were significantly higher than those of students who did not use computer-mediated learning [13].

Relatively little research has been published that documents exactly how the technology changes the teaching process and the role of the university faculty member. Among the few studies that do examine these questions are our prior study of role changes for virtual professors, described below, and recent content analysis of discussion transcripts by Heckman and Annabi [14]. They coded the length and type of “utterances” in a course transcript using four major categories: social processes, cognitive processes, teaching, and discourse. They found a shift in student and faculty roles: the presence of the teacher was much more pervasive in face-to-face, but while in ALN, the student utterances were longer and teacher utterances were shorter.

Our research path to the investigation of swift trust began with questions concerning student outcomes. If studies describe students gaining significantly higher grades using computer-mediated learning, what factors might explain this? Through

examination of faculty experiences, we uncovered shifts in self-described faculty role behavior as they moved from the traditional setting to the electronic classroom. These shifts, described below, led us to look for associated effects in virtual classroom interactions.

Role Changes for Virtual Professors To understand how ALN technology changes the teaching process and the role of faculty, the authors designed, conducted, transcribed, and coded 20 semistructured interviews with faculty who have prepared and delivered at least one online course [15]. 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. The interviews and their analysis suggested that the roles enacted by instructors in traditional settings are also enacted in ALN environments, though each of these roles is transformed. 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. They noted the need for precision and a certain formality in outlining 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 clearly detailed, they may be misunderstood and lead to disorganization. However, 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 toward more “give and take,” a kind of “Digital Socrates” who shifts from conveying information to raising questions and engaging in dialogue.

Answers Lead to Questions We knew that faculty, in their own words, found changes in their online teaching roles and persona. However, we wondered if there were any independent data to support faculty perceptions. Faculty talked about building community, relationships, and trust. Could we find examples of these interactions?

These questions lead to the literature of teamwork in corporations, whereby team members gradually develop interpersonal relationships and trust over time. Research into building trust among members of

temporary teams has produced the theory called swift trust. In temporary teams, a variant of trust, swift trust, is necessary to predict successful teamwork. We set out to explore whether the development of swift trust in the beginning of an online course could help to explain why some ALN courses are especially successful, as judged by the students.

RESEARCH METHODS

Our current research thread attempts to operationalize the concept of swift trust in virtual learning communities. Our research premises are as follows.

- (1) If faculty are to become successful “Digital Socrates,” they must overcome the coldness in the electronic medium with social communication clues in the conferences.
- (2) The most effective online teachers get a good start in the very first week of online classes, which is the essence of swift trust, with online conferencing.
- (3) Once established, swift trust will carry over in the remainder of the semester.

Measuring Teaching Effectiveness For this exploratory study, our objective was to identify the “most effective” teacher in the ALN environment we had examined, and to develop and apply a coding scheme to measure the extent of swift trust formation in the first few weeks of one of the courses taught by this instructor. We also decided to contrast this to a coding of the same period of interaction in a course in which the teaching effectiveness rating was very low. To determine the most effective teacher, we used data collected from over 1300 postcourse questionnaires that rated instructor’s effectiveness for ALN and “matching” face-to-face sections of both undergraduate and graduate NJIT courses over a period of three years. Sections of the questionnaire contained sets of items designed to measure various aspects of the process and outcomes of courses: perceived quality of the instructor’s performance, course outcomes, and overall evaluation of the “Virtual Classroom” ALN experience (the latter only for sections using ALN). The unidimensionality of these sets of items was validated by an item analysis using Chronbach’s Alpha and exploratory factor analysis, before being combined into an index.

Two key indexes for measuring the effectiveness of the instructor in an ALN section are the “instructor overall” index and the “Virtual Classroom overall” index. The items in the instructor index are similar to those used for decades to obtain student course ratings at many institutions and represent modifications of the standard teaching evaluation instruments used by various departments at NJIT; the modifications were designed to take into account the delivery medium [16]. From a methodological

point of view, there are more items than would be needed to get an overall measure of teaching, and the positive nature of all of the items can introduce bias. However, organizational context must also be taken into account in devising a measure of teaching effectiveness. That is, for promotion and tenure purposes, it is important to make the measurements similar to those already used in traditional classes.

The Virtual Classroom overall index (Tables IV and V) was designed at NJIT; of the six items, half are stated positively and half are stated negatively, in order to minimize response bias. Looking at the Virtual Classroom overall questions, the results for this study are very similar to those for the previous project that involved undergraduate CIS students only. These results show the ratings to be generally favorable for the ALN courses, in terms of the students feeling that they are as good or better than traditional courses. For example, on the question, "Did the use of the system increase the quality of your education," a 1–7 Likert-type scale, 56% indicated positive agreement, and 25% saw no difference; 19% disagreed. With 1.0 the score for the most positive response and 4.0 the value for a no difference or "unsure" response, the mean of 3.3 is on the positive side and compares to a slightly less positive mean of 3.4 for the previous study of undergraduates only.

For those instructors with at least eight valid student questionnaires, an analysis of variance (ANOVA) was performed to determine if there were significant differences among instructors. A Duncan's Multiple Range test showed that the mean ratings for instructors are significantly different from one another for both indexes. Since the rank order for

instructors was somewhat different on the two major measures of instructor effectiveness, we selected the instructor with the highest average ranking as the most effective online instructor. We will refer to this instructor as "Professor T."

For comparison, we selected Professor X. On the key indices, Professor X was in a group of the three lowest ranking instructors, which were significantly lower than most other instructors, according to the Waller-Duncan ratio T-test. For example, on the instructor overall index, Professor X had a mean of 60, compared to the mean of 70 for Professor T.

Determining the Codes To analyze the communication within the group, we adapted a classic, well-established system by Bales called interaction process analysis, which makes a distinction between task achievement and social maintenance [17]. This is one of the most widely used interaction content analysis schemes, even fifty years after its first introduction, with approximately 100 citations in the 2000–2002 social science literature. Our coding scheme, shown in Table I, distinguishes seven categories of behavior and communication in group interaction. To establish a common understanding in applying the codes, the three researchers individually coded part of the same conference transcript and discussed discrepancies. These discussions set the guidelines for the rest of the coding of the conference. We then continued coding independently.

Analysis: The conference transcripts (online discussions) were transcribed and coded using QSR NVivo software (1999), which has been used

TABLE I
Swift trust coding in virtual classrooms

Code Number	Code Description
1	Positive expectations about the course or system use, connoting enthusiasm, confidence, hopefulness .
2	Negative expectations about the course or system use, connoting apprehensiveness, vulnerability, uncertainty.
3	<p>Social Emotional Positive reactions to each other</p> <ul style="list-style-type: none"> <input type="checkbox"/> Shows solidarity, raises others status, gives help or reward <ul style="list-style-type: none"> o Includes "initial and responsive acts of solidarity" including greetings, welcoming the other, any indication of mannerly consideration for the other, any gesture that indicates that the actor is friendly, congenial, sociable, affiliative, cordial or informal: sharing personal information o Praising, giving encouragement or approval o Any act of assistance to the other <input type="checkbox"/> Shows tension relief, jokes, laughs (smiley), shows satisfaction <ul style="list-style-type: none"> o Any manifestation of cheerfulness, enjoyment, enthusiasm <input type="checkbox"/> Agrees, understands, concurs, complies <ul style="list-style-type: none"> o Includes agreement with an observation or analysis.
4	Social Emotional Negative reactions to each other
5	Task Area -- asks for help, information, opinions, orientation
6	Task Area -- gives help, information, directions, suggestions, opinions
7	Technical/Logistical/Procedural issues

extensively in educational research. This program assists in qualitative data analysis when the data are transcribed interviews. The researcher decides what becomes a meaningful section of text for coding. In this case, we selected messages, both instructor and student new posts (that is the initiation of a response) and replies (responses to posts), as the text section. Then, each text unit can be coded using either a researcher-created code or the program to uncover themes within the interviews. This research used coding categories shown in Table I. In addition, we counted responses to determine the level of interaction. We realized that we needed to read the subject lines of the messages in the conferences and to read the messages carefully for nuance and tenor of comment. We make no claims that our research is discourse analysis; although we multiply coded sections of text rather than using mutually exclusive categories, our qualitative research is content analysis [18].

FINDINGS

Effective Online Instructor For analysis, we selected Professor T's course on management of information systems. Professor T uses a commercial computer-mediated software system called WebBoard to organize his online discussion forums or conferences. The following conferences were structured to contain a small number of related topics: Instructor's Instructions; General Discussion; Introductions; Questions on Assignments; Questions on book Chapters; Questions on Lectures; Questions on Readings (i.e., professional papers assigned); Management Jokes (related to IS); and Café and Practice.

The Introduction conference is critical in online teaching because it establishes the atmosphere, interaction, and dialogue for the entire course. Typically, the instructor introduces himself/herself, providing a model of expected response, and outlining questions for response. Students then introduce themselves, perhaps informing the class of their experience in the field, their objective for taking the course, and their topics of interest in the course. Professor T knows the importance of these introductions. "The first participatory conference is important in that it helps create a welcoming atmosphere, so I make every effort to respond to most introductions. The students also know there are assignments where they can work as teams so they realize their introduction is useful for team formation" (Explanation by Professor T, 2001).

Early Communication: Using the swift trust coding scheme, we looked for evidence of swift trust in the Introductions conference, which takes place in the first two weeks of the course. The conference was examined for the kinds of behaviors and

actions that facilitated early trust formation in Jarvenpaa and Leidner's research. Their early communication activities of social exchanges and social communication correlate with our coding categories of social emotional positive response to each other (Code 3) and social emotional negative response to one another (Code 4). Out of 297 coded passages in the Introductions conference, we found 35 instances of instructor social emotional positive (32) or negative (3) and 74 instances of student social emotional positive (73) or negative (1). As one might expect, the most frequent social communication, occurring in 18 out of 34 passages, is the social exchange "hello" or a variation such as "greetings." An example of the instructor making a social emotional positive response to a student, in which he shows praise, encouragement, or approval, can be found in the following passage:

You're doing fine, Jinny. For someone here only a few weeks, your English is good. I could not resist using your words to make a point for the benefit of the class even though I suspected you probably should not have been taken "literally."

Even the instructor's social emotional negative comments are couched in positive language:

Jia, the colorful screen is very pretty but trying to read pink on gray is very difficult for those my age who need about twice the contrast level that you can use when you read. When you get a chance to take CIS 732, you will learn those things!

Students showed social emotional positive responses both to the instructor and to one another. One student agreed with the instructor's observation or analysis: *As you surmised, I do like being a systems analyst better than being a manager. They frequently expressed solidarity with their peers: Nice to meet you! Like you, I have about 14 years in IS. I also have children (3) and I live in South Jersey, taking this course as a distance-learning student. I hope to keep in touch.*

Expectations: Jarvenpaa and Leidner also found the communication behaviors of communication conveying enthusiasm to facilitate early trust; these correlate with our codes of positive expectations about the course (Code 1) and social emotional positive reaction to each other (Code 3). Findings regarding Code 3 are presented in the previous section "Early Communication." We found evidence of positive expectations about the course (Code 1) in 34 instructor instances and 89 student instances. The instructor connotes enthusiasm for the course in the following passage: *This is one of the reasons I like merging the face to face and the distance students in that we do get this rich mix of backgrounds. Students express positive course expectations, as exemplified in this passage: I'm looking forward to getting to know*

you. I hope I will have interesting discussions about diverse issues in the class.

Task-Related Communication: In early trust formation, Jarvenpaa and Leidner found member actions of coping with technical and task uncertainty and of taking individual initiative to be important. Our task area codes correlate with these codes: Asks for help (Code 5), Gives help or information (Code 6), and technical/logistical/procedural (Code 7). In the Introductions conference, the task is instructor and student introduction with personal background information and course expectations. We found evidence of coping with task uncertainty most frequently in Giving information (Code 6), with 15 instructor passages and 53 student passages found. Typically, students give information in their initial posting, or new post, in the conference. In their replies to the instructor or to one another, students give suggestions or opinions: *If you don't have project management experience, then I suggest you take the course Project Management. The instructor is a very experienced project manager.* The instructor might give task direction: *You can go to the directory and change your nickname to something more human that is easier for us all to remember.* In Asking for help or information, we found 12 student and 6 instructor instances. The instructor frequently asks a student to expand or clarify task information given: *I'm also interested in SW dev life cycle. Could you briefly describe "Rapid Application Development Methodology?"* Students ask for confirmation of their understanding: *I don't think this course will teach you how to be a project manager. Am I right on this?* In technical issues (Code 7), we found only one instructor instance and none from students.

We believe that this initial analysis shows that successful "virtual professors" establish community with their virtual groups by forming a unique kind of swift trust in the very first week of online classes. Would this swift trust carry over in the remainder of the semester? Would weeks one and two predict weeks nine and ten?

Later Communication: Later trust formation is characterized by predictable communication, according to Jarvenpaa and Leidner. We found this regular pattern of communication by comparing the instructor's General Discussion conference over the course, a conference specified for questions or issues that do not fit into the other topic-related forums. The frequency count table in Table II shows a fairly consistent pattern in General Discussion in weeks one and two and in weeks nine and ten. Later member actions that facilitated trust, according to Jarvenpaa and Leidner, are task centered. We found significant evidence of task focus in examining the conference Development Process discussion. The conference topic, management of software development process,

TABLE II
Swift trust coding frequency counts for Professor T

			New Posts	Replies	Total
Weeks 1 and 2	Welcome Conference	Students	36	24	60
		Instructor	1	25	26
	Café and Practice	Students	8	22	30
		Instructor	3	7	10
	General Discussion	Students	2	9	11
		Instructor	1	5	6
Weeks 9 and 10	General Discussion	Students	3	9	12
		Instructor	1	7	8
	Process Development Discussion	Students	1	63	64
		Instructor	0	22	22

relates to task. The tabulated new posts and replies in Table II show a rich pattern of discussion relating to a case-study assignment.

Ineffective Online Teacher For comparison, we selected Professor X's course on Computers and Society. Similar to Professor T, the instructor with the highest ranking, Professor X used a computer-mediated system in a "mixed" medium course that combined face-to-face and online interaction. Unlike Professor T, however, Professor X had only one discussion conference that included welcome and introduction as well as task instructions.

As we noted earlier, the Introduction conference is singularly important in establishing the atmosphere for the entire course. Here, the professor establishes her or his persona, sets the tone for the course discussion, and provides a model for the dialogue that follows. Professor X began his online discussion with this introduction: *Welcome. Please introduce yourself to the members of this conference. Tell us a little about yourself. (i.e., what's your major? why are you taking the class? what do you want to do after you graduate?, etc.)* He did not include any information about himself

TABLE III
Swift trust coding frequency counts
Professor X

			New Posts	Replies	Total
Weeks 1 and 2	One General Conference	Students	36	17	53
		Instructor	3	5	8
Weeks 9 and 10		Students	0	0	0
		Instructor	0	0	0

in this posting or in follow-up messages. Perhaps, it is not surprising that the first student response to his introduction was, *My name is XXX... you don't need to know my last name. ... I am CIS major and I have no free time to enjoy to myself. . I work and I got 15 credits to worry about.*

Early Communication: Using the swift trust coding scheme, we examined the conference transcript for examples of behaviors and actions that facilitate early trust formation. These early communication activities of social exchanges and social communication correlate to our coding categories of social emotional positive response to each other (Code 3) and social emotional negative response to one another (Code 4). Out of 129 coded passages in the conference, we found four instances of instructor social emotional positive and two instances of instructor social emotional negative. For student postings, we found 52 instances of social emotional positive and 6 instances of social emotional negative.

Professor X's early communication is difficult to characterize. In reply to one student who enthusiastically proclaims that America is a great place to explore, he genially inquires, *So, where have you explored already?* To a student who has lost a family member, Professor X is sympathetic, *I'm very sorry to hear about your uncle. What a horrible thing to have happened.* However, when students make mistakes with the conferencing system, he chides them: *You responded to your own comment? or You didn't write anything?!?* Professor X's longest posting in the conference is a failed attempt at humor: *One of the things we'll have to work on this semester is bringing you out of your shell. You have to learn not to hold back and to say what is on your mind. Yes, I'm being sarcastic. I can't wait to hear your opinions on the articles. (That is not sarcastic.)* This message, less than a week into the semester, was the professor's last response to students' introductions.

In the instructor's absence, however, the students continued to post their introductions, giving the

TABLE IV
Indexes for measuring course effectiveness

	(A) (%) Excellent	(B) (%)	(C) (%)	(D) (%)	(F) (%) Unsatisfactory	N	Mean	SD	R with total
<i>Instructor's mastery of subject matter</i>	63.7	26.6	7.8	1.0	1.0	1335	1.49	0.76	0.73
<i>Instructor's preparation for class</i>	61.6	26.5	9.5	1.6	0.8	1322	1.53	0.79	0.75
<i>Instructor's regularity of attendance or participation</i>	70.8	18.8	7.3	1.7	1.5	1300	1.44	0.82	0.67
<i>Instructor's ability to explain course material clearly</i>	54.2	29.7	10.0	3.9	2.2	1331	1.70	0.95	0.81
<i>Instructor's communication skills (clear speech and/or writing)</i>	58.7	27.7	8.9	2.7	1.9	1334	1.61	0.90	0.77
<i>Instructor's ability to stimulate interest in course material</i>	41.7	31.7	17.4	6.2	3.0	1330	1.97	1.05	0.81
<i>Instructor's ability to stimulate student participation</i>	39.6	32.4	19.1	5.8	3.1	1318	2.00	1.05	0.79
<i>Instructor's respect for student responses</i>	63.1	25.8	6.9	2.1	2.0	1324	1.54	0.87	0.70
<i>Availability for help and consultation</i>	51.1	29.5	13.1	3.6	2.7	1320	1.77	0.99	0.72
<i>Enthusiasm for the course</i>	55.4	29.2	11.4	2.8	1.3	1334	1.65	0.88	0.77
<i>Quality of the instructional materials (textbook and manuals)</i>	37.1	35.3	19.4	5.6	2.6	1336	2.01	1.01	0.53
<i>Promptness in grading assignments and exams</i>	48.7	30.0	14.6	4.4	2.4	1331	1.82	1.00	0.64
<i>Fairness of exams and grading procedure</i>	51.1	29.7	12.8	4.2	2.2	1327	1.77	0.98	0.65
<i>How strongly would you recommend this instructor to your friends?</i>	51.5	27.6	12.3	4.3	4.3	1343	1.82	1.08	0.80
<i>Overall performance of this instructor</i>	56.5	29.5	9.3	3.0	1.7	1337	1.64	0.90	0.87

All items were reversed in scoring to make the high numbers equal "best."

Cronbach's Alpha = 0.95

information that was requested and making a social emotional positive greeting or welcome. Typical is this student's introduction: *Hello!!!! This is XXXX. I am CIS major at Rutgers. Hope you are having fun in this class. Bye.* Communication that conveys enthusiasm, which correlates with our code of positive expectations about the course (Code 1), was found in ten student new posts and replies: *...I am looking forward to the rest of the semester...Hope you are having fun in this class...I have a feeling that this class is going to be interesting and it will be fun to be with everybody in the class. This is my first semester taking classes here but I feel good with the class.*

Task-Related Communication: In the first two weeks of the conference, students coped with technical and task uncertainty by asking for help and giving help to one another. Our task area codes correlate with these: Asks for help (Code 5); Gives help or information (Code 6); and Technical/logistical/procedural (Code 7).

A requirement of this course on computers in society is to post articles in the conference regarding ethical, legal, and social issues for computing systems. Therefore, the most frequently used code is Code 6, which gives information. In addition to students giving information in their initial posting in the conference, as well as in giving information to fulfill an assignment, students also gave help or information to students who asked. For example, in response to the question *Hey do you know how to find the article*

that he gave us today? another student responded: *Just do the same with the previous assignment. Go to ACM and just search it.* Other students offered advice about obtaining the articles from home computers or from another campus: *I just downloaded the article from ACM and if you login from home through NJIT to Internet, you are able to download the articles directly to your pc You asked if we can telnet to Pegasus from NJIT. Yes, you can. You have to telnet at telnet.pegasus.rutgers.edu.*

In analysis of the course, there is little evidence to suggest that the class ever formed a team, other than the artificially prescribed gathering of students posting assignments that also include introductions. Students seem to sense that the discussion board was an academic exercise not integral to learning, as suggested by the first student's response indicating he had no free time and a later reply from another student *This conference is way too cluttered with postings. Watch NASCAR Winston Cup racing; it's a good sport.* We know that early communication is critical to establishing trust, yet the instructor does not appear until after the course begins. He exits the discussion within a week of the initial posting, to appear again only in week three to post a new task. We examined the conference transcript in weeks nine and ten for an example of later trust formation. However, there were no postings during that period. There are scattered postings during the last weeks of class with

TABLE V
Items included in the virtual classroom overall index

Did use of the system increase the efficiency of your education (the quantity of work that you can complete in a given time)?								
Definitely yes (%)		Unsure (%)			Definitely not (%)			
1	2	3	4	5	6	7		
16.7	17.0	22.9	27.3	5.1	5.1	5.9		
N=707		Mean=3.26			SD=1.63			
Did use of the system increase the quality of your education?								
Definitely yes (%)		Unsure (%)			Definitely not (%)			
1	2	3	4	5	6	7		
16.2	18.9	20.6	25.2	7.4	5.2	6.5		
N=705		Mean=3.31			SD=1.68			
Comparison to Traditional Classrooms								
	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	N	Mean	SD
<i>The online or virtual classroom mode is more boring than traditional classes.</i>	8.1	18.3	27.5	30.7	15.5	717	3.27	1.17
<i>I would NOT choose to take another online course.</i>	7.0	9.8	22.1	27.5	33.7	716	3.71	1.22
<i>I learned more because of the use of Virtual Classroom software.</i>	7.4	25.8	43.0	15.9	7.9	705	2.91	1.01
<i>I would have gotten more out of a traditional course.</i>	9.1	16.3	42.0	22.8	9.8	712	3.08	1.07

All items were reversed in scoring to make the high numbers equal "best."

Cronbach's Alpha = 0.83

this final conference posting, *Just wondering how we could get our grades. The next semester is just a few days away, and we still haven't gotten our grades yet.*

CONCLUSION

Our initial analysis shows that swift trust can form in a successful virtual learning community, but with unique communication and behaviors as compared to face-to-face groups. If faculty members become successful "Digital Socrates," they overcome the coldness in the electronic medium with social communication clues in the conferences. The most effective online teachers get a good start in the very first week, which is the essence of swift trust, with online communication. Once established, swift trust will carry over into the remainder of the semester if high levels of action are maintained.

These analyses yield strategies that are applicable to all who are concerned with building trust and establishing community in virtual teams. The following are four more suggestions.

- (1) Establish early communication. Team members need to perceive the instructor's presence as soon as they enter the course.
- (2) Develop a positive social atmosphere. Team members respond to perceived caring in

instructional context. Instructors need to model solidarity, congeniality, and affiliation.

- (3) Reinforce predictable patterns in communication and action. Students need carefully structured activities and regular responses and feedback.
- (4) Involve team members in tasks. To sustain early trust formation, group members need to be involved in meaningful tasks. Instructors need to motivate, encourage, and require participation.

Our research has many limitations. We have analyzed the conference transcripts of only one professor who was rated the most effective online instructor and one who was rated very poorly, at one institution, and in one field of study (information systems). To see if our findings are able to be generalized would require similar content coding of several courses with varying degrees of measured "success" at different institutions and with different fields of study. However, we believe that based on the evidence of the importance of community, relationships, and trust evidenced in all twenty of the faculty we originally interviewed, and the initial analysis of communication between and among instructor and students, we can conclude that swift trust does form frequently in virtual learning communities and can predict the success of the remainder of the virtual group work.

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Nancy W. Coppola (M'98-SM'01) researches the communication of online pedagogy and technology transfer. She directs the Master of Science program in Professional and Technical Communication at New Jersey Institute of Technology (NJIT) where she teaches all of her undergraduate and graduate technical communication courses online.

Starr Roxanne Hiltz is a Distinguished Professor at NJIT. She has spent most of the last 25 years researching applications and social impacts of computer-mediated communication. Her latest book on online learning (co-edited with Ricki Goldman) is *Learning Together Online: Research on Asynchronous Learning Networks* (Erlbaum, expected publication 2004).

Naomi G. Rotter is a Professor of Management in NJIT's School of Management. She received her Ph.D. in Industrial and Organizational Psychology from New York University. Her interest in asynchronous communication extends from research in the workplace using telecommuting to education using distance learning. In particular she has studied what behavioral changes occur as the result of remote links between manager and employee and between professor and student with the focus on the manager and the professor. Her homepage is <http://eies.njit.edu/~rotter>.