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Integrating a Web-Based Discussion Forum and Student Peer Feedback into a High-Enrollment IT Class: Expectations and Outcomes

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ABSTRACT

This paper presents early results from using an asynchronous web-based discussion forum coupled with an integrated student peer rating system as one component of an Information Technology course taught in large section format. The potential for asynchronous discussions to enhance student participation and learner outcomes has previously been established (Anderson & Elloumi, 2004, Corich et al., 2004). However, providing students with pertinent feedback and assigning a graded component for student contributions remains problematic – especially for high-enrollment classes (e.g. classes with over 100 students) in which forum participation accounts for a significant portion of the overall grade in the course. To address these difficulties, an open source discussion forum was modified to include a peer rating capability inspired by consumer product rating websites such as epinions.com. Peer assessment was expected to provide more immediate and more extensive feedback than a single instructor could provide and thus increase student interest in and satisfaction with the forum. In addition, students' accumulated ratings were used as one factor in determining forum and course participation scores.

Keywords:

Instructional Strategy, Online Education, Web-based Discussion Forum, Student Peer Feedback, Student Engagement, Student Participation, High Enrollment Classes

INTRODUCTION

In high-enrollment classes where each course section averages in excess of 100 students, meaningful student engagement is difficult to accomplish. There are typically a handful of students who regularly participate in class discussions but many students are simply unprepared, passive, or silent (Felder, 1997; Bhagyavati et al., 2005). In order to promote topical discussion outside of the classroom, many instructors have employed online discussion forums (or simply, forums) which are web-based applications that provide the ability to host a persistent threaded discussion. The potential for asynchronous discussions to enhance student participation and learner outcomes has previously been established (Anderson & Elloumi, 2004, Corich et al., 2004) and forums are currently featured in course management systems such as WebCT and Blackboard. Forums have been found to promote development of online learning communities that exhibit a social structure supportive of collaborative learning.

When used in an educational setting, forum participation needs to account for a significant portion of a student's overall grade or it will not be taken seriously. Percentages between 30% and 50% have been suggested (Bhagyavati et al., 2005). For high-enrollment classes, the necessity of assigning participation scores becomes problematic. As class size increases and instructional resources remain fixed, the quality of feedback that students receive (if they receive any at all) inevitably deteriorates to the point of being superficial (Rust, 2001). To overcome this problem, a prototype forum was developed and deployed that includes a peer assessment and rating mechanism. Although peer assessment may at times be biased or more lenient than instructor feedback, it does provide timelier and more voluminous feedback than a single instructor can muster - advantages that greatly outweigh a certain degree of irregular quality (Nilson, 2002-2003). The forum used in this study can be viewed online at http://cisr.cob.csuchico.edu/forum301a/.

Use of peer review and ratings within the forum was expected to serve as a means to generate higher levels of student engagement while relieving the instructor from the burden of being the students' sole source of commentary or critical assessment. Ultimately, use of an enhanced forum is viewed as a mechanism by which high-enrollment classes might be offered in a purely distance education format while retaining much of the richness and engagement provided through traditional lower-enrollment classroom instruction.

BACKGROUND AND HYPOTHESES

Increasing the level of student engagement on university campuses has become a widespread goal as evidenced by the 500+ institutions that participated in the 2005 National Survey of Student Engagement (NSSE 2005). Engagement at the university (macro) level can be defined as having both a behavioral component, participation, and an emotional component, identification with the university (Finn & Voelkl, 1993). While participation and identification are important, at a course (micro) level, instructors are typically more concerned that students exhibit cognitive engagement – i.e. sustained, focused attention on a task requiring significant mental effort. In its highest form, cognitive engagement is manifested as self-regulated learning where students plans and manage their own learning and have a high degree of personal control and autonomy (Stoney & Oliver, 1995, Laurillard, 1999).

The role of dialogue in the construction of knowledge has been captured in a "conversational framework" for learning (Laurillard, 1999). Key components of the conversational framework are articulation, reflection, and feedback. Thomas (2002:352) suggests that forums provide a perfect vehicle for "an academic discourse which promotes increased student engagement, critical analysis and reflection, and the social construction of knowledge." By reflecting on their peers' contributions in an online discussion, it is believed that students perform higher-order mental processing. Then, through the process of articulating their understanding and beliefs, personal meaning is constructed which is, at least in part, a product of the interaction (Bates, 1995; Thomas, 2002).

Learning theorists have confirmed that individuals exhibit two differential motivations for academic pursuits. Students motivated by learning seek to develop their understanding or mastery of a subject. For these students, learning is an end in itself. Students motivated by performance, on the other hand, are concerned primarily with demonstrating their competence (and earning a good grade) regardless of whether or not any genuine understanding is achieved (Midgley, et al., 2000). Learning motivation has been found to correlate with deep cognitive engagement and adaptive learning patterns. Performance motivation has been found to correlate with shallow cognitive engagement and maladaptive learning patterns (Green & Miller, 1996; Winters & Latham, 1996; Midgley, et al., 2000).

Green and Miller (1996) report that both learning goal orientation and perceived ability (task specific self-efficacy) are positively related to meaningful cognitive engagement, and that, in turn, meaningful cognitive engagement is positively related to performance outcomes. A portion of their model of student achievement (Greene & Miller, 1996:188) is depicted below in Figure 1.

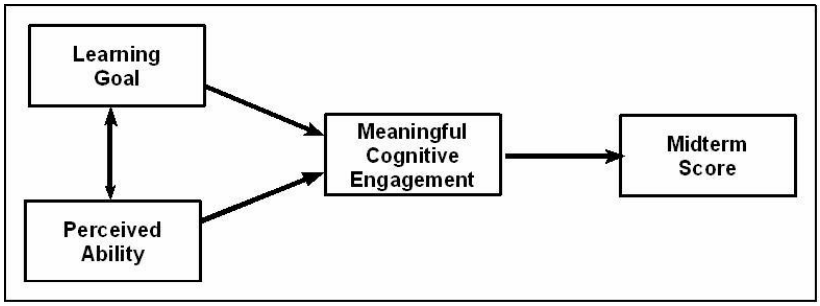

Figure 1. Greene and Miller Achievement Model – Partial

In order for an online discussion forum to stimulate higher-order mental processing, students must actually interact with the system (Davis, 1989). As with any IT-based system, forum users need to learn to perform tasks using the various features and affordances supplied. Research in technology acceptance (TAM) has well established that perceived ease of use is an antecedent of intention to use a technology (Davis, 1989; Davis et al., 1992; Venkatesh, et al., 2003; Lee, et al., 2003). Because actual use can be predicted from intention (Ajzen and Fishbien, 1980; Ajzen, 1991), we would expect that students who find a forum easy to use will actually use the system to a greater degree than those who find it difficult. Furthermore, TAM research has established that perceived ability and general comfort in using computers are both direct antecedents of perceived ease of use (Davis, et al., 1992; Lee, et al., 2003). We would thus expect that students who exhibit greater levels of perceived ability and general comfort in using computers will actually use those systems more frequently and to greater effect.

If students' perceived ability levels are expected to correlate with perceived level of meaningful cognitive engagement (MCE), it seems reasonable to expect that a measure of students' actual ability should also correlate with MCE. A possible candidate measure of students' ability might be scores from a standardized testing battery such as the Literacy Assessment

Information and Communication Technology (ICT) proficiency exam offered by Educational Testing services (www.ets.org)

For this study, a preliminary research framework was conceived as depicted in Figure 2 below. In all, six independent variables (learning goal orientation, performance goal orientation, demonstrated ability, perceived ability, computer comfort, and perceived ease of use) were identified. It was hypothesized that each of the independent variables would be a significant predictor of each of three dependant variables (meaningful cognitive engagement, actual system use, and overall satisfaction). The preliminary research framework generated eighteen hypotheses as detailed in Table 1. The 18 research hypotheses shown in the table are presented in coded form. For each hypothesis, H1a through H6c, higher measures of the individual independent variables are expected to reliably predict higher measures of the individual dependents variable.

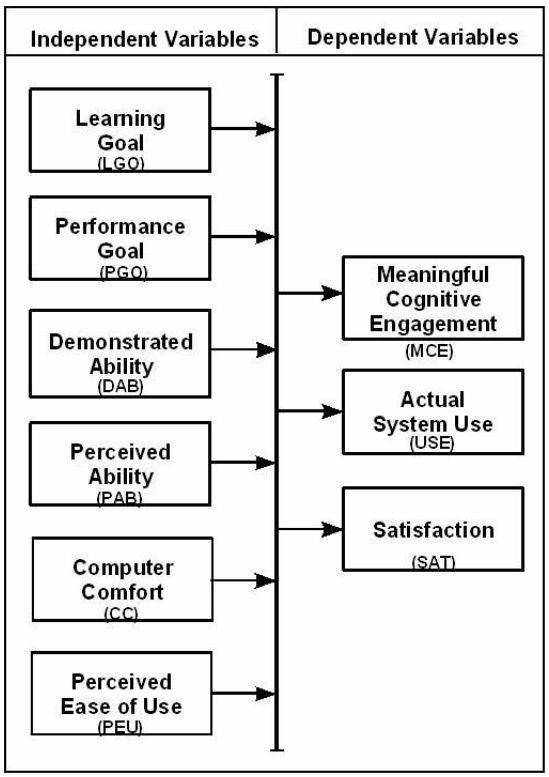

Figure 2. Preliminary Research Framework

	Dependent Variables		
Independent Variables	Meaningful Cognitive Engagement (**MCE**)	Actual System Use (**USE**)	Satisfaction (**SAT**)
Learning Goal (**LGO**)	**H1a:** +LGO => +MCE	**H1b:** +LGO => +USE	**H1c:** +LGO => +SAT
Performance Goal (**PGO**)	**H2a:** +PGO => +MCE	**H2b:** +PGO => +USE	**H2c:** +PGO => +SAT
Demonstrated Ability (**DAB**)	**H3a:** +DAB => +MCE	**H3b:** +DAB => +USE	**H3c:** +DAB => +SAT
Perceived Ability (**PAB**)	**H4a:** +PAB => +MCE	**H4b:** +PAB => +USE	**H4c:** +PAB => +SAT
Computer Comfort (**CC**)	**H5a:** +CC => +MCE	**H5b:** +CC => +USE	**H5c:** +CC => +SAT
Perceived Ease of Use (**PEU**)	**H6a:** +PEU => +MCE	**H6b:** +PEU => +USE	**H6c:** +PEU => +SAT

Table 1. Research Hypotheses

METHODOLOGY

The Business College of a mid-sized American university has traditionally delivered an Information Technology (IT) survey course in a large section lecture format with corresponding breakout activity (lab) sections. In recent semesters, two lecture sections have been offered, each with an enrollment of approximately 160 students. In addition, ten activity sections have been scheduled with an average enrollment of roughly 32 students apiece. In many semesters, one instructor is scheduled to

deliver the lecture component of both sections as well as coordinate instruction of the labs which are delivered by graduate teaching assistants (TAs). While some of the more clerical aspects of the course are handled by TAs, tracking and evaluating the performance of 320+ students remains an arduous and time-consuming task for the instructor.

In the spring semester of 2006 the instructor implemented a prototype online forum based on the open-source software product mvnForum (www.mvnforum.com). It was not possible to use WebCT, the course management system in general use at the University, because a peer rating mechanism was unavailable. Prior to deployment, the forum software was modified to include a simple peer rating facility similar to the product rating feature of consumer-oriented websites such as epinions.com or epicurious.com.

In the first week of class, students were tasked with locating 6 unique online articles over the course of the semester then initiating discussion threads in the forum by posting the URL of the article, a short synopsis, and, most importantly, a personal reflection concerning implications for individuals, organizations or society at large. They were also tasked with reviewing and rating eighteen 18 of the articles (threads) posted by their classmates. The simple one star to five star rating was to reflect the degree to which the article and originator's review was found to be interesting or helpful. An example discussion thread with associated reviews/ratings is provided as Appendix A

For each discussion thread, students earned 12 participation points. Students earned 4 points for each review/rating. If, on average, a discussion thread was peer rated at 3 stars, 2 additional points (14 pts. total) were rewarded to the originator. A thread which averaged 4 stars received an additional 5 points (17 pts. total) and a 5-star thread received 9 bonus points (21 pts. total). Factoring students' peer ratings into their overall scores for forum participation was viewed as a means to encourage non-trivial contributions. Students were allowed to post bonus threads or reviews not to exceed 150 percent of the minimum requirement. In total, it was possible for a student to earn 300 points (30%) of their overall course grade through forum participation.

In the 12th week of the semester, the instructor posted an online survey regarding forum use. The survey consisted of 53 Likert-style questions, one yes/no question, and an area for non-specific comments. Although participation in the survey was voluntary, students were encouraged to participate with an incentive of 50 class participation points, a 5% bonus. Over the first week the survey was posted, 182 students (56%) submitted complete survey responses. A copy of the survey can be viewed online at http://cisr.cob.csuchico.edu/ForumSurvey.html.

In addition to the survey data, two objective measures were obtained. First, total forum participation points earned were calculated and used as the measure of students' actual system use. Second, scores from a college IT skills assessment initiative were used as measure of actual or demonstrated ability. The IT skills test, a customized version of the Prentice Hall Train and Assess IT (TAIT) exam, was administered during the first week of class during all lab sections associated with the course. The TAIT exam tested students' elementary skill levels using MS Office products (Word, Excel and PowerPoint) as well as their generic IT knowledge. Table 2 presents Cronbach's alpha reliability coefficients and descriptive statistics for each scale or measure employed in the study. Appendix B lists the survey items used to form each composite measure.

Scale or Measure	Reliability	Mean	SD	Range
Learning Goal (**LGO**)	.822	5.59	0.77	4.00 – 7.00
Performance Goal (**PGO**)	.888	3.91	1.07	1.33 – 7.00
Demonstrated Ability (**DAB**)	n/a	57.7	13.2	20.0 – 89.6
Perceived Ability (**PAB**)	.735	4.26	1.13	1.33 – 7.00
Computer Comfort (**CC**)	.826	5.18	0.95	2.00 – 7.00
Perceived Ease of Use (**PEU**)	.735	4.87	1.01	1.50 – 7.00
Meaningful Cognitive Engagement (**MCE**)	.808	4.45	1.00	2.17 – 6.67
Actual System Use (**USE**)	n/a	99.5	85.5	0.0 – 280.0
Satisfaction (**SAT**)	.853	4.68	1.06	1.50 – 6.50

Table 2. Cronbach's α and Descriptive Statistics

RESULTS AND ANALYSIS

Table 3 provides a summary of the hypothesis tests based on the 182 responses from the week 12 survey of student perceptions. Of the 18 initial hypotheses outlined above, only 7 were supported through simple linear regression. The hypotheses that learning goals are positively related to meaningful cognitive engagement (H1a) and satisfaction with the forum (H1c) were strongly supported. Learning goals were not reliably related to increased forum use (H1b) at the $p<.05$

level although that relationship was significant at a p<.1 level and it is certainly possible that greater significance might be found in a different course context. Demonstrated ability as measured by the TAIT skills test was found to significantly correlate with cognitive engagement (H3a) and satisfaction (H3c) but the relationship was negative rather than positive as hypothesized. Because Greene & Miller (1996) had found that perceived ability was positively related to meaningful cognitive engagement, actual ability was expected to be an even better predictor. One possible explanation for the negative relationship might be that students who exhibit significant IT skills perceive no particular benefit from a required course whose primary purpose is to build knowledge and skills that, to a large degree, they already possess. In other words, skilled students believe that the course is a waste of their time. Finally, perceived ease of use was found to be a strong predictor of engagement (H6a), actual system use (H6b), and satisfaction (H6c).

Hypothesis	Supported?	Standardized Beta Coefficient	F	Sig. * p<.05 ** p<.01
H1a: +LGO => +MCE	Yes	.385	31.33	.000**
H1b: +LGO => +USE	No	.134	3.30	.071
H1c: +LGO => +SAT	Yes	.290	16.49	.000**
H2a: +PGO => +MCE	No	.144	3.81	.053
H2b: +PGO => +USE	No	.090	1.48	.225
H2c: +PGO => +SAT	No	.139	3.55	.061
H3a: +DAB => +MCE	Yes	-.173	4.55	.035*
H3b: +DAB => +USE	No	.022	0.07	.788
H3c: +DAB => +SAT	Yes	-.164	4.09	.045*
H4a: +PAB => +MCE	No	-.051	0.47	.492
H4b: +PAB => +USE	No	.103	1.93	.167
H4c: +PAB => +SAT	No	-.029	0.15	.701
H5a: +CC => +MCE	No	.089	1.42	.234
H5b: +CC => +USE	No	.090	1.49	.224
H5c: +CC => +SAT	No	.144	3.80	.053
H6a: +PEU => +MCE	Yes	.348	24.80	.000**
H6b: +PEU => +USE	Yes	.444	44.23	.000**
H6c: +PEU => +SAT	Yes	.504	61.38	.000**

Table 3. Summary of Hypothesis Tests

Although only 7 of the original hypotheses were supported by data, there were 10 additional correlations among study variables that were significant at a p<.05 level or better. Table 4 presents the matrix of Pearson correlation coefficients and Table 5 presents the results of post hoc regression tests between each pair of significantly correlated variables not examined in our original hypothesis set.

	MCE	USE	SAT	LGO	PGO	DAB	PAB	CC	PEU
MCE	---								
USE	.328**	---							
SAT	.742**	.481**	---						
LGO	.385**	.134	.290**	---					
PGO	.144	.090	.139	.271**	---				
DAB	-.173*	.022	-.164*	-.196*	.130	---			
PAB	-.051	.103	-.029	-.057	.129	.495**	---		
CC	.089	.090	.144	-.071	-.036	.386**	.649**	---	
PEU	.348**	.444**	.504**	.040	-.033	.110	.295**	.436**	---

Note: * p<.05; ** p<.01

Table 4. Pearson Correlation Coefficients

Post Hoc Test	Standardized Beta Coefficient	F	Sig. * p<.05 ** p<.01
1. USE => MCE	.328	21.75	.000**
2. USE => SAT	.481	54.25	.000**
3. MCE => SAT	.742	221.12	.000**
4. PGO => LGO	.271	14.24	.000**
5. DAB => LGO	-.196	5.49	.016*
6. DAB => PAB	.495	47.93	.000**
7. DAB => CC	.386	25.89	.000**
8. PAB => CC	.649	131.19	.000**
9. PAB => PEU	.295	17.13	.000**
10. CC => PEU	.436	42.33	.000**

Table 5. Summary of Post Hoc Regression Tests

Among the more interesting results of the post hoc regression tests was (3.) the strong positive relationship between meaningful cognitive engagement and satisfaction. Students who reported higher levels of satisfaction with the online forum were, for the most part, the same students who reported experiencing high levels of cognitive engagement. Overall, students who actually used the forum (i.e. accumulated more participation points) reported both higher levels of cognitive engagement (1.) and overall satisfaction (2.). In combination, the significant correlations among the various constructs suggest a network of effects that can be represented as a causal model. Figure 3 presents a proposed research model based on a combination of empirical evidence from this study, technology acceptance model (TAM) theory and learning theory. Note that the correlation coefficients depicted in the proposed model are beta coefficients from a simple regression of one variable upon another rather than true path coefficients. The standardized beta coefficients indicate the total effect of one variable on another but do not account for indirect effects achieved through other paths in the model.

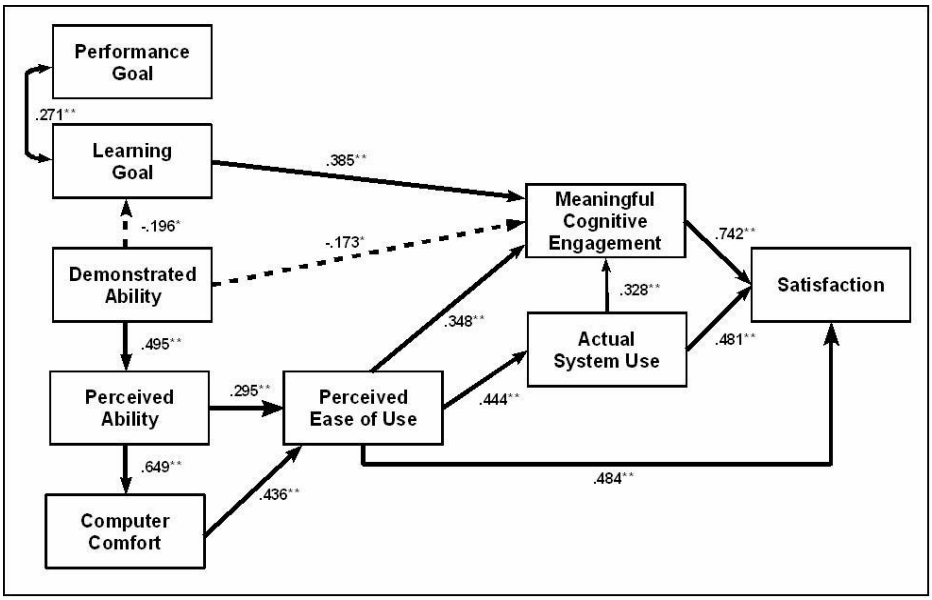

Figure 3. Proposed Research Model

DISCUSSION AND IMPLICATIONS

Alavi and Leidner (1999) suggest that the most significant challenge for knowledge management in today's organizations is not its creation, but its capture, sharing, and integration. The use of current events as a teaching tool, a commonplace approach in both K-12 and tertiary education, encourages students to develop information seeking and sharing habits. The widespread availability of digital news media such as Internet-based magazines, newspapers and blogs makes the use of online discussion forums an attractive mechanism for supporting a community of learners in sharing and discussing current

events. Original information sources can be accessed via a simple hyperlink and students can participate in a conversational mode of learning that encourages critical thinking, discussion, and debate (Thomas, 2002; Laurillard, 1999, Stoney & Oliver, 1999; Hopkins, 1998).

Discussion forums, however, present a number of challenges. Thomas (2002) suggests that the quality of students' interaction (i.e. the level of students' cognitive engagement with the dialogue posted in a forum) can be insufficient to promote a truly conversational mode of learning. Thomas further suggests that the asynchronous and distributed nature of an online forum makes it difficult to sustain an interactive and academic discourse. While forums use is expected to be conversational in nature, in reality, their use is primarily transactional. Contributions to an online forum often resemble monologue rather than dialogue (Thomas, 2002).

While it may be difficult to address the disjoint nature of discourse in a forum, is should be possible to otherwise address the issue of quality. This is an important task given that fully 30% of first year students (those students most likely to take high-enrollment classes) report doing as little academic work as possible (NSSE, 2005). For the current study, a generic open source forum was modified with the addition of a rudimentary peer rating capability. Peer assessment or rating was then used to support a grading scheme that rewarded individuals for making interesting and meaningful contributions. As well, peer assessment was expected to play a significant role in the learning process. Hopefully, students would accept the responsibility for fairly and accurately judging their peers' contributions (Dochy. et al., 1999). Two of the questions on the forum participation survey prompted students' to respond to the following statements:

1. The ratings I have received for my postings in the forum seem reasonable to me.
2. I am thoughtful and conscientious when I review and rate posting from other students.

The average response to question #1 above was 4.35 (sd=1.290) on a 7-point Likert scale anchored with strongly disagree and strongly agree. The average response to question #2 was 5.86 (sd=0.996). In essence, students believed they had acted responsibly when rating their peer's postings but were somewhat suspicious that their peers may have acted capriciously in return. Of even greater concern was the fact that some student postings attracted significant student interest and the associated peer reviews while others generated no review traffic at all. Three subject areas that generated significant interest during the semester were iPods, RFID and GPS systems. Of significantly less interest to students were topics related to organizational or enterprise software such as decision support systems (DSS) and enterprise resource planning (ERP). The "nonlinear" or unbalanced "branching structure" of online discussion is another factor which limits its usefulness for conversational learning (Thomas, 2002:36). One way to insure that all students receive a minimum number of peer reviews would be to randomly assign a small number of reviewers to each newly posted discussion thread. Imposing such a structure on the forum environment would, however, be expected to reduce its usefulness for self-directed, self-motivated learning.

The peer review mechanism and reward structure implemented in the forum was nonetheless insufficient to eliminate trivial postings – either in the original threads or in subsequent reviews. It was not uncommon to encounter a succinct and shallow review such as "Sounds good." or "It is very interesting article." One option would be to impose minimum word requirements. This idea was rejected because without some form of automated or manual content analysis, students would still be able to trivialize the forum exercise by posting longer strings of words equally devoid of meaning.

Overall, increased forum use did reliably correlate with increased cognitive engagement and satisfaction with using the forum. In addition, the positive relationship between meaningful cognitive engagement and satisfaction was surprisingly robust. Further research is needed, however, to determine the degree to which the peer rating mechanism contributed to meaningful cognitive engagement over and above what would have been realized through use of a forum without such a mechanism. An experiment contrasting multiple sections of the same course using different forum features might provide a clearer answer to this question.

Perhaps the most valuable contribution made by this research is development of the proposed research model (Figure 3). Although anecdotal evidence abounds, there is limited empirical evidence to confirm that forums can be used to increased student engagement and promote higher order thinking skills (McLaughlin & Luca, 2000). Evaluation of the proposed model through subsequent research should contribute to our understanding of how to deploy asynchronous text-based communication in support of increased cognitive engagement, enhanced student experiences, and improved learning outcomes.

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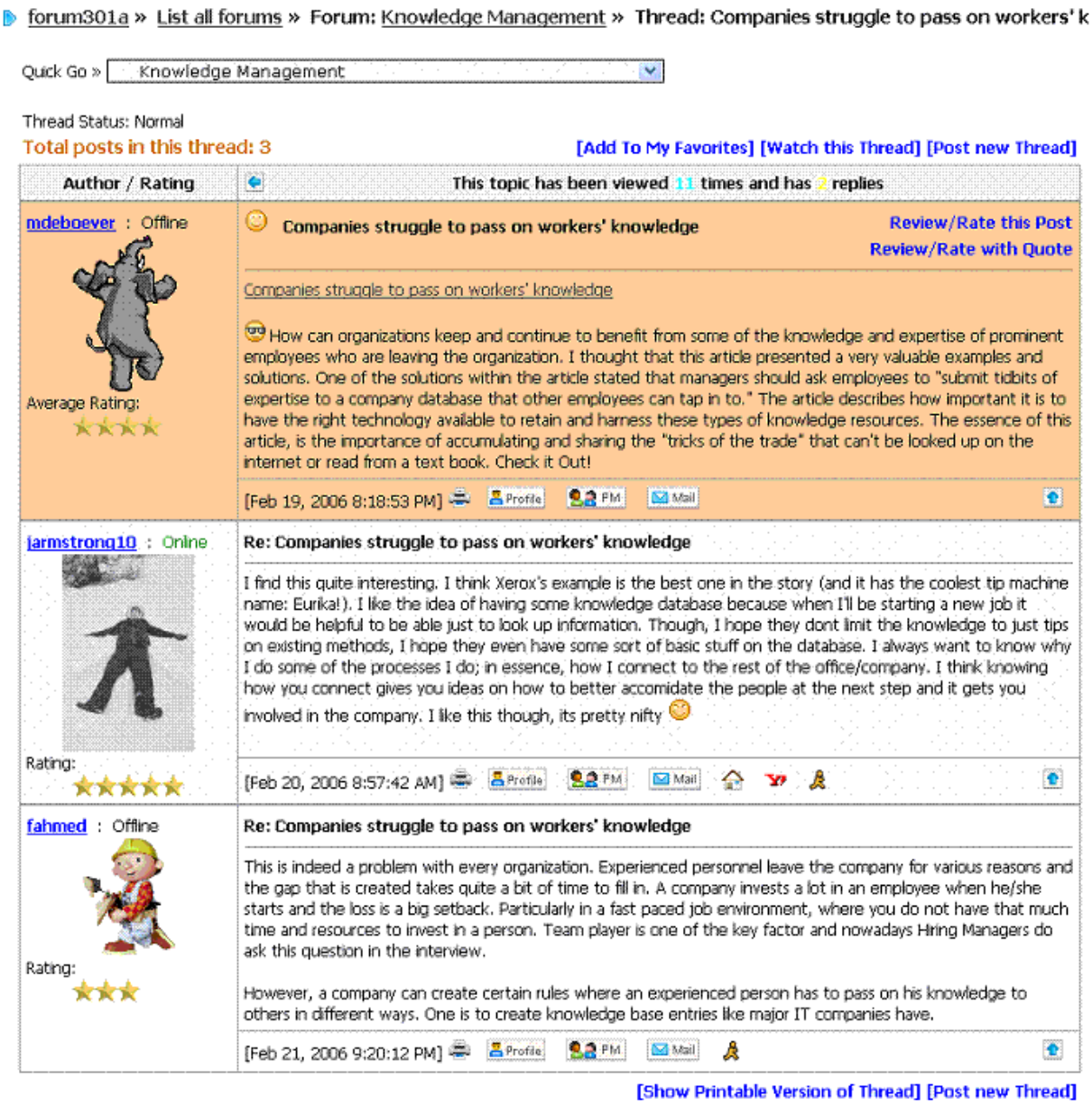
APPENDIX A – Example Discussion Thread with Ratings



APPENDIX B – Scales and Survey Items

Note: Except as noted, 7-point Likert scales expressed as (1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neutral, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree) were used for all survey questions.

Learning Goal (LGO), α=0.822: (from: Midgley, et al., 2000)

LGO1 - It is important to me that I learn a lot of new concepts this semester.
LGO2 - One of my goals in class is to learn as much as I can.
LGO3 - One of my goals is to master a lot of new skills this semester.
LGO4 - It is important to me that I thoroughly understand my class work.
LGO5 - It is important to me that I improve my skills this semester.

Performance Goal (PGO), α=0.888: (from: Midgley, et al., 2000)

PGO1 - It is important to me that other students in my class think I am good at my class work.
PGO2 - One of my goals is to show others that I'm good at my class work.
PGO3 - One of my goals is to show others that class work is easy for me.
PGO4 - One of my goals is to look smart in comparison to the other students in my class.
PGO5 - It's important to me that I look smart compared to others in my class.
PGO6 - It is important to me that I don't look stupid in class.
PGO7 - One of my goals is to keep others from thinking I'm not smart in class.
PGO8 - It is important to me that my teacher doesn't think that I know less than others in class.
PGO9 - One of my goals in class is to avoid looking like I have trouble doing the work.

Perceived Ability (PAB), α=0.735: (from: Greene & Miller, 1996)

PAB1 - My knowledge of computers and Information Technology (IT) is better than that of other students in this class.
PAB2 - I do not perform computer-related tasks as well as I would like. **(R)**
PAB3 - When it comes to using computers, I consider my skills to be... (1 = Excellent, 2 = Good, 3 = Above Average, 4 = Average, 5 = Below Average, 6 = Fair, 7 = Poor) **(R)**

Computer Comfort (CC), α=0.826: (from: Compeau, 1992; Webster & Martocchio, 1992; Jarvenpaa & Staples, 2002)

CC1 - It scares me to think that I could cause the computer to destroy a large amount of information by hitting a wrong key. **(R)**
CC2 - I hesitate to use a computer for fear of making mistakes that I cannot correct. **(R)**
CC3 - I feel apprehensive about using computers. **(R)**
CC4 - Computers are somewhat intimidating to me. **(R)**
CC5 - Computers make work more interesting.
CC6 - I enjoy interacting with computers.
CC7 - I use computers for fun.
CC8 - Working with computers is fun.

Perceived Ease of Use (PEU), α=0.822: (from: Venkatesh, 2003)

PEU1 - Interacting with the forum required a lot of mental effort. **(R)**
PEU1 - I found the forum to be hard to use. **(R)**
PEU1 - It was easy to do what I needed to do in the forum.
PEU1 - It would be easy for me to become skillful at using the forum.

Meaningful Cognitive Engagement (MCE), α=0.808: (from: NSSE, 2005; Greene & Miller, 1996; *used only in this study)

MCE1 - Using the forum caused me to examine the strengths and weaknesses of my views on a topic or issue.
MCE2 - While using the forum I learned something that changed the way I think about an issue or concept.
MCE3 - Using the forum caused me to examine a particular case or situation in depth and consider its ramifications.
MCE4* - I found it interesting to read my classmate's postings in the forum.
MCE5* - A requirement to participate in the online forum helped keep me interested and engaged in the class.
MCE6* - My level of interest and engagement in this class has had little to do with the forum. **(R)**

Satisfaction (SAT), α=0.853: (from: Alavi, et al., 1997; *used only in this study)

SAT1 - I am satisfied with the way the forum was used in this class.
SAT2 - The forum was an effective addition to this class.
SAT3 - The requirement to participate in the forum was fair.
SAT4 - The forum was well monitored and coordinated.
SAT5* - An online forum would be useful in some of my other classes.