2006

Learning Approach, Thinking Style and Critical Inquiry: The Online Community

Toby H. Klinger
Johnson County Community College, tklinger@jccc.edu

THE KOREAN JOURNAL OF THINKING & PROBLEM SOLVING
2006, 16(1), 91-113

Learning Approach, Thinking Style and Critical Inquiry: The Online Community

Toby H. Klinger
Johnson County Community College, USA

The study examined if a thematically designed online introductory psychology course set in a cooperative and collaborative learning environment led to deeper learning. Using the revised two-factor Study Process Questionnaire (R-SPQ-2F; Biggs, Kember & Leung, 2001), the study predicted peer and teacher guided asynchronous dialogue would lead to increasing students' self-perceptions of deeper learning approaches (DA) and higher levels of thinking. Individual thinking style (ITS; Sternberg & Wagner, 1992) was presumed to be an important mediator on both student pre- and post-DA scores. It was also hypothesized that thinking styles would influence student perceptions towards participating in a learning community, as measured by the Classroom Community Scale (CCS; Rovai, 2002). Contrary to the hypotheses, thinking styles didn't predict either pre- or post DA nor end of semester CCS scores. The two main hypotheses, premised on Vygotsky's theory of social constructivism and post Vygotskian thinking on conceptual learning, demonstrated mixed results. The expected increase in self perceptions of deep learning and a predictive relationship between DA and CCS to reflect this contextualized learning were not found. While post DA scores weren't significantly correlated with CCS, CCS was correlated with students' perceptions of which types of discussions guided their learning. Qualitative evidence from the online dialogue demonstrated deeper, conceptual and applied understanding than students' self-reports. What requires further study is whether students develop an explicit metacognitive understanding of how cooperative discussions aren't an added burden, but rather, a means of constructing a deeper meaning and approach to learning.

INTRODUCTION

A variety of educational organizations have been delineating guidelines for needed educational reform, including APA in 1997 with its 14 learner-centered psychological principles (APA). The shift in pedagogy to focus on students directing their own learning has been partially driven by the digital revolution. With the advent of computerized tutorials, although still young in development, the potential to scaffold individual levels of learning without formal lecture and then to expertly guide the student to higher levels of comprehension becomes increasingly possible. Instructors are encouraged to view themselves as consultants rather than "sages on stages" to build active peer-guided learning contexts, whether in the design for online or for the traditional classroom. Educational reformists are advocating for course redesign using

Correspondence concerning this article should be addressed to Toby Klinger, Psychology Department, Johnson County Community College 12345 College Blvd, Overland Park, KS 66210-1299; USA. E-mail: tklinger@jccc.edu

social constructivist principles to develop more active, deeper, thoughtful and applied knowledge and skills in students.

Defining Deep Thinking

Depth of knowledge can be defined in a variety of ways, ranging from Bloom's (1956) taxonomy where knowledge evolves from 'memorization to applied' and to the development of higher levels of analysis and synthesis. According to Perry (1970), students conceptualize knowledge in more relativistic way as they advance in their academic pursuits. Entwistle (2001) defines deeper learning as students actively transforming content and visualizing the conceptual connectedness. "Deep learners…

- Relate ideas to previous knowledge and experience;
- Look for patterns and underlying principles;
- Check evidence and relate it to conclusions;
- Examine logic and argument cautiously and critically;
- Are aware of the understanding that develops while learning;
- Become actively interested in the course content" (p. 10).

Biggs (2001) asserts that in certain learning contexts students may begin to recognize the intrinsic value to learning and begin to de-emphasize memorization as their primary tool for learning. Biggs' thesis suggests a metacognitive change to learning as individuals become deeper in learning approach. He also alludes to such thinking only occurring when depth of content replaces the usual emphasis of breadth in undergraduate education. The emerging research from the cognitive literature supports Biggs' position (e.g., Halpern & Hakel , 2003). Unlike Perry's prediction of cognitive development, Biggs and others in the critical thinking literature (e.g., Paul & Elder, 1997, 2001), depict that most students become increasingly surface and decreasingly deep in their orientation to learning during their undergraduate years.

Others propose a more collaborative, problem-based education will develop students' critical thinking abilities and deep learning approaches. Ennis (1989) specifically revised his theory of critical thinking to include how thinking becomes more advanced in a problem-solving community, a tenet in-tune with social constructivism as well as research supporting problem-based learning (e.g., Newble & Clarke, 1986).

Typically not addressed in the general theses on critical thinking is how the level of discipline-related content knowledge blends into evolving thought and collaborative meaning construction (Ennis, 1989). Only recently has Halonen's, et al. (2003) rubric suggested assessing learning, teaching and scientific inquiry in psychology across each level of undergraduate education. The rubric describes the expected outcomes and changes for several skill domains, including conceptualization, problem solving, scientific attitudes and collaboration. Students completing introductory psychology show imperceptible change towards developing any of these self-directed thinking skills.

Research on the Social Constructivist Classroom: Face-to-Face and the Online Contexts

In theory, social constructivism assumes rich real-life contexts guide the learning process. Premised originally from Vygotsky's social cognitive theory (1978), knowledge and thought emerge from social dialogue between a more able adult or peer working within the zone of proximal development of the learner. Scientific principles emerge

as students work on those practical activities that gradually build and deepen their understanding through cooperative contexts. These broad theoretical constructs have been operationalized by academia to include such learning contexts as:

- problem-solving—Problem-Based Learning (PBL) situations, particularly ill-structured problems (Clarebout and Elen, 2001; Biggs, 2001)
- case studies
- learning by designing (usually around a technical problem)
- cognitive apprenticeship (Enkenberg, 2001)

The commonality between all these approaches is the emphasis on peer-directed learning in meaning construction (Hacker and Niederhauser, 2000; Hathorn and Ingram, 2002).

Concern on how to apply social constructivism to teaching and learning has increased over the past several years. Some studies testing for constructivist predictions tend to find support. According to Hacker's and Neiderhauser's review of the research (2000), when students use their own words to explain their understanding of new information they are integrating and building on their former knowledge structures to increase their comprehension and metacognition. Yet, findings from PBL specifically designed courses are mixed and complex to evaluate. Much of PBL driven curriculum has been predominately used, and more importantly evaluated, in the training of physicians. Meta-analysis of research between 1970 and 1992 shows significant improvement on clinical performance, students' evaluation of programs as well as measures of their humanism when compared to students in more lecture-based medical programs; comparatively lower is the basic medical knowledge of PBL students (Leung, 2001). Further meta-analysis of studies published between 1992 and 1998, observed positive gains for clinical performance is also questioned (Colliver, 2000; Smits, Verbeek & de Buisonje, 2002). When there have been increases in knowledge and skills, researchers question the subject pool and other curriculum related controls: Medical students who select PBL programs are initially more independent in learning styles than those selecting more traditional programs; and, programs themselves differ in how they operationalize and apply PBL into their curriculum. Another limitation is the absence of research comparing graduates of PBL training from those in traditional curriculum (Leung, 2001). Newer research is emerging that controls for some of these confounding factors. Recently, McParland, Noble and Livingston (2004) found 4th and 5th year students from the same medical school and from the same cohort who enrolled in a traditional or a PBL psychiatry attachment did differ in learning outcomes. The PBL curriculum group scored significantly higher on the final exam and demonstrated stronger clinical skills than the traditional curriculum students. The study though was limited to one course comparison and students weren't randomly selected for each section.

Even sparser is research at other educational levels, from elementary school curriculum through various graduate programs of PBL effectiveness. Much of what is being said is theoretical, although some recent reviews of the PBL literature (Hmelo-Silver, 2004; Tan, 2005) find positive support. Moreover, the question remains as to whether such learning contexts increase the knowledge and skills of the less-able student (as measured by some type of pre-cognitive test). In one study where high school students assigned to a PBL economics class were compared with classmates in a traditional lecture course, Mergendoller, Maxwell and Bellisimo (2000) found that

limited academic ability PBL students performed the same as their counterparts in the lecture-based class. Only PBL students with less positive attitudes towards economics scored higher than their respective counterparts on the test of general economics knowledge. Mergendoller's, et al. findings support conclusions drawn from many medical studies in concluding that PBL groups score lower on post tests for knowledge.

The asychronized class experience potentially begets even more barriers to knowledge construction than the classroom-based PBL. Usually there is no face-to-face dialogue between peers or between student and teacher in ALN. Students self-teach using text and web lecture resources and then are expected to reflect, and at times, collaborate with peers in written dialogue. Some of the research here questions if weaker students benefit from either computerized tutorials (Maki & Maki, 2002) or from cooperative experiences with peers (Wang & Newlin, 2000). When cognitively stronger students do profit from the experience, their attitudes towards a discipline can be adversely affected (Maki & Maki, 2002). Others contend in well-designed ALN classes, where students perceive themselves as part of a learning community, interdependent knowledge building is observed (Gilbert & Driscoll, 2001; Hathorn & Ingram, 2002; Enkenberg, 2001). Controversy prevails though over defining, measuring and observing knowledge building in ALN contexts. The classic model from Gunawardena, Lowe and Anderson (1997) proposes a five-phase Interaction Analysis Model for the ALN milieu of:

- Sharing/comparing knowledge
- Discover/explore disagreements
- Synthesis via negotiating meaning
- Testing/modifying proposed synthesis versus schemas, theory, facts, beliefs
- Proofs of reaching agreements or metacognitive admitting changes in knowledge

But the model is criticized for whether it provides evidence for knowledge construction being directly caused by cooperative dialogue or whether knowledge of individual participants change because of the group (Aviv et al., 2003).

While a pedagogically-sound asynchronized class emphasizes dialogue and interaction, even defining exactly what is meant by interaction is difficult. Much of the actual research on interaction is limited to describing the number of postings individuals make (Hathorn and Ingram, 2002) or to self-reported satisfaction of students and of faculty based on their perception of social interaction (Picciano, 2002). Researchers advocate distinguishing between interaction and presence in order to better gauge knowledge construction. While interaction indicates a presence, it is possible for students (in presence) to interact only by posting a message but not to feel part of the group. Interaction and presence may affect student performance independently according to Picciano (2002). In an attempt to further operationalize interactive differences, Hathorn and Ingram (2002) propose discernable differences in behavior between participation and collaboration. First, interaction, not presence, prevails in collaborative groups. Students in collaborative learning are observed to explicitly or implicitly refer to prior substantive messages in a discussion while in participation, students post comments independent of others' postings. There is a demonstrated in-

terdependence in collaborative groups where they synthesize information to create new insights and act, according to Hathorn and Ingram, independent from instructor input. Hathorn and Ingram also distinguish between cooperative and collaborative learning: While both communication structures contribute to learning and thinking, in cooperative learning students solve parts of a problem where in collaborative learning, each student contributes to each part, allowing for debate and synthesis of information.

Hathorn and Ingram (2002) demonstrated in their study that groups of distance education graduate students told to collaborate were more likely to do so, but their product (a final paper evaluating a solution to a PBL situation) was of a lower quality than those who selected separate roles to solve the problem. Gilbert's and Driscoll's (2001) semester-long study supports Hathorn and Ingram conclusions. Graduate students were explicitly told to use course readings to build concepts in order to make connections with the collaborate task of examining a larger problem. Students reported feeling there were groups of teams, but not a community of learners (participants of the collective goal). Satisfaction with the cooperative dialogue was affected by students' schedules-- "the time element" (p. 71) with some students arguing "'reacting to these reactions' resulted in repetition of effort" (p. 71). The activities easily lead them to feel isolated. Students who were very positive about the experience at the beginning of the semester, tended to view it more negatively by the end when their team didn't work cooperatively or if the collaborative project seemed just an extra assignment. Gilbert and Driscoll concluded that several students never became self-directed and only at the team level was higher-order thinking demonstrated.

Unlike samples from graduate school programs, a review of research from studies of elementary and middle-school children (e.g., Bereiter and Scadamia, 1996; 1992; Scadamia and Bereiter, 1996; Bowen et al., 1992) tend to support constructivist-designed online classes increase individual achievement (measured by standardized tests), depth of learning, reflection, and an understanding about how to learn as well as increasing problem-solving ability (cited in Gilbert & Driscoll, 2001). Diverging from these conclusions are findings from the ParlEuNet project. Clarebout & Elen (2001) questioned if the collaborative context of PBL increased students' self-reported motivation for deeper levels of learning and metacognition, especially in the direction of student favoring collaborative, contextualized learning. Dependent on which group, the degree of change of instructional beliefs moved opposite as to what was predicted as did the epistemological belief that "effort pays off" (p. 460). Task-related knowledge also decreased. Only reflection of tasks (metacognition) remained stable.

RESEARCH STUDY: CLASS DESIGN, MATERIALS AND METHODS

The goal of this study was to examine several predictions from the social constructivist framework. The contextual question raised was whether online mediated learning leads to deeper student approaches to learning and higher order thinking because of guided and peer directed dialogue. It was also of interest to observe if a-priori thinking styles predicted perceptions of this learning context. Previous research on computerized learning has found no relationship between style and student success even when researchers differ in definitions of style (e.g., Maki and Maki, 2002; Wang and Newlin, 2000). Sternberg's and Wagner's Thinking Style Inventory (TSI, 1992), which has been shown to be correlated with both learning approaches and levels of thinking (Zhang & Sternberg, 2000; Zhang, 2004), has yet to be studied under this context.

Course Design

The online class used for this research designed web-lectures to scaffold the more conceptual links of Introductory to Psychology content by taking a linear text and creating a nonlinear Internet environment. The class was organized around thematic modules rather than the usual chapter approach with the assumption that themes would lead students in developing a more conceptual understanding of content as post Vygotskian Cultural-Historical Activity Theory (CHAT) would predict (Stetsenko & Arievitch, 2002). Many of the web lectures for this class emphasized research methods, major theories, and applications as areas in psychology were explored in either lecture or quiz form. In the process, students were exposed to research examples from these later chapters as they were learning about the steps, research methods and psychological theories.

The threaded asynchronous discussions (ALN) used weekly posed questions to probe student reflections on text and web readings and other assignments (linked articles, videos, simulations). While students individually selected from the variety of questions, ranging from the cognitive level of comprehension to more applied- and analytically-based, all assigned questions were required to be responded to by the team. This forum emphasized cooperative dialogue between team members and faculty member. Collaborative learning was observed through a class debate where students analyzed and interpreted a controversial topic based on their content knowledge drawn from the cooperative learning context (Klinger, 2002).

Participants

Students taking first level psychology voluntarily enrolled for the online version of the course at a Midwestern community college. There was no face-to-face contact between students or teacher. They were asked to participate in the study by completing a series of pretests during the first week of the semester and then again upon completing the course. During pre-testing students had a general idea of class expectations, were able to introduce themselves under the discussion forum and begin to discuss beliefs to the class; readings or content-related team assigned discourse had not commenced. One class per fall, spring and two summer sessions were used for the study. The majority of the sample who completed both the pre-and-post questionnaires attended the 8-week summer term rather than the traditional 15-week semester. The n changed based on several factors. The CCS wasn't administered during the first semester (n=38). Some students only completed the post-questionnaire (n=56), and in total 49 subjects completed both questionnaires.

Demographic data was collected on age, educational attainment and gender (n=49). The majority of students were between 18 and 29 (n=37), had between 30 and 60 credit hours completed (n=25; 13 reported having junior-senior status at least in terms of credit hours completed) and the majority of the sample were female (n=34).

Data Collection

Three inventories were used for the study, Sternberg's and Wagner's Thinking Style Inventory (TSI, 1992), The Revised Two Factor Study Process Questionnaire (R-SPQ-2F; Biggs, 2001) and the Classroom Community Scale (CCS; Rovai, 2002). Each instrument is briefly described below. Other questions were constructed by the researcher, but weren't tested for reliability or validity.

Premised on his constructivist and systems theoretical orientation, Biggs proposes students' approaches to learning forms a Presage-Process-Product (3P) systems model.

"In the 3P model, student factors, teaching context, on-task approaches to learning, and the learning outcomes, mutually interact, forming a dynamic system...each factor affects every other factor, so that for instance the students' preferred approach will adjust to the particular context…" (Biggs, Kember & Leung, 2001, p.135). Biggs (1987) constructed the Study Process Questionnaire (SPQ) to measure how students approach information, either by viewing learning as being conceptually connected and applied (deep level of processing) or as isolated facts to be memorized (surface level of processing). In the Revised-Two-Factor Study Process Questionnaire (R-SPQ-2F: Biggs, et al., 2001), the achieving-related scales was dropped and the deep (DA) and surface (SA) scales were retained to measure overall learning approach and levels of motivation (DM or SM) and strategy (DS or SS). Biggs' (SPQ) has been shown to be high in overall validity. The R-SPQ-2F's DA and SA scales were used for this study.

According to Sternberg (1997) thinking can be distinguished by function, form, levels, scope and leanings. Analogous to how governments run, function includes legislative, executive or judicial. A legislative individual is creative and prefers to select their own activities, "or at least to do the activities chosen for them in their own way" (Zhang & Sternberg, 2000, p. 474). The executive style likes to implement tasks that have set guidelines while the judicial style prefers to evaluate others' efforts. Forms include monarchic, hierarchic, oligarchic and anarchic. A hierarchic style, for example, prefers to distribute their attention to multiple tasks as well as to prioritize each task's importance based on self-regulating goals. At levels, a global style attends more to the overall picture of an issue and to abstract ideas. One tends to be either more internal or external when it comes to scope of thinking. Those who are internal in scope of thinking prefer working independent, while an external style likes being engaged in tasks that allow for collaboration. Finally, one's leanings are either liberal or conservative. Liberals enjoy tasks that include novelty and ambiguity while conservatives thrive on tasks that follow existing rules and procedures. Sternberg's and Wagner's Thinking Style Inventory (TSI, 1992), has demonstrated construct criterion validity. Previous research finds certain thinking styles contribute significantly to prediction of academic performance over and above prediction of scores on ability tests (Sternberg & Grigorenko, 1997, cited in Zhang & Sternberg, 2000). Particularly relevant to this study was to observe if certain a-priori thinking styles (TSI), predicted subjects' general depth of approaching learning (R-SPQ-2F, 2001) prior to taking this class. Research by Zhang and Sternberg (2000) of two Chinese populations found significant correlations between thinking and approaches to deep learning. The majority of the correlations followed the expected direction, although significant, they were low: The surface approach was correlated with less complexity in thinking style, and negatively and significantly correlated with the legislative, judicial, liberal and hierarchical styles.

Rovai's (2002) Classroom Community Scale (CCS) specifically describes the online distance learning milieu of ALN. Composed of 20 questions, there is an overall classroom community score and two subscales; the classroom community subscale measures connectedness and the second subscale measures perceptions of learning. Rovai defines connectedness as students' connectedness, cohesion, spirit, trust and interdependence. Level of learning is assumed to be the second common underlying dimension of classroom community. "Learning represents the feelings of community members regarding interaction with each other as they pursue the construction of

understanding and the degree to which members share values and beliefs concerning the extent to which their educational goals and expectations are being satisfied" (Rovai, 2002, p. 207). The two subscales are statistically correlated.

Qualitative data was gathered from the online forum's cooperative and collaborative discussions. Levels of thinking and interaction were categorized by transcript analysis and by comparing students' behaviors and dialogue with Halonen, et al., (2003) rubric and Gunawardena, Lowe and Anderson (1997) Interaction Analysis Model for ALN.

HYPOTHESES AND FINDINGS

A series of questions were asked about the relationship between TSI and R-SPQ-2F:

If the pre-test TSI predicted subjects' pre R-SPQ-2F scores there would be evidence for the construct validity of subjects' self-reports on the R-SPQ-2F. No significant correlations between any of the thinking styles and the R-SPQ-2F were found. As past research has demonstrated, there was a moderate correlation within TSI between local style and conservative style $r(47)=.393$, $p < .01$. Because the class emphasized scientific thinking, it was further predicted that a positive correlation between post-DA scores with legislative and judicial functions of thinking would exist. (A post-test wasn't administered on TSI). No statistically significant relationships were found although while the correlation in the pre-questionnaire for legislative style and R-SPQ-2F was highly unpredictable, $r(47)=.22$, $p >.05$, the post DA with legislative style approached significance. The post subscale of SA showed support for previous research findings of a correlation ($r=.339$, $p <.05$) with the conservative thinking style. Finally, it was predicted that a social style would be positively correlated with post DA scores because of the contextualized cooperative and collaborative learning milieu. The hypothesis was rejected ($r(47)=-.07$, $p>.05$).

The main hypothesis for the study predicted DA would increase between the pre-and-post- questionnaires because of the contextualized course demands. A t-test was administered and found no statistical significance between the two measurements for deep approach to learning, $t(48)=1.61$ $p >.05$. What was observed was a slight decrease in the average DA score between the pre-and-post self reports. But when looking at individual questions on the post SA scale, there were several positive changes toward accommodating a deeper approach to learning. For example, when asked about "I learn some things by rote, going over and over again…scores decreased from an average of 2.8 to a 2.6 (scale=5.0). Similarly, "I find it not helpful to study topics in depth…" also decreased. In a paired sample correlation, subjects remained consistent in their learning approach, with a strong moderate correlation between the pre-post-tests, $r=.460$, $p < .001$. And, contrary to previous research from Biggs and others, students with more years of education weren't more surface in their approach as measured by the pretest (DA: $r(46)=.09$ $p>.05$; SA: .05, $p=.05$ $p>.05$).

Based on previous research it was also expected that females would score higher than males on the CCS (Rovai, 2002); this study did not find supporting evidence. The full scale was used to measure gender differences rather than just the subscale for connectedness, although Rovai assumes the subscale for connectedness predicts overall perceptions of learning. In further examination of the two CCS subscales, students rated the learning subscale higher than they did the connectedness subscale (figure I). The main hypothesis for CCS's significance to the study was the expectation that the

student-directed discourse of the course would be observed by a positive correlation between CCS and post- DA scores. No significant relation was found.

The last two hypotheses addressed if higher order thinking was related to either DA or CCS scores. Higher order thinking was measured by type of discussion forum questions students reported to be most helpful to their learning of content. Under the post-questionnaire one question gave students the option to select from factual, theory, application, or all of above (none of the above was also an option). A statistically significant relationship, tested with a one-way between-subjects ANOVA, was found between type of questions and CCS ($F(4, 33)=3.88$, $p<.01$, $n2=.32$) which indicates a moderately strong relationship between students sense of community and discussion type (figure 2). A nonsignificant relationship was found between question type and the post-DA.

QUALITATIVE DATA ON HIGHER LEVEL THINKING

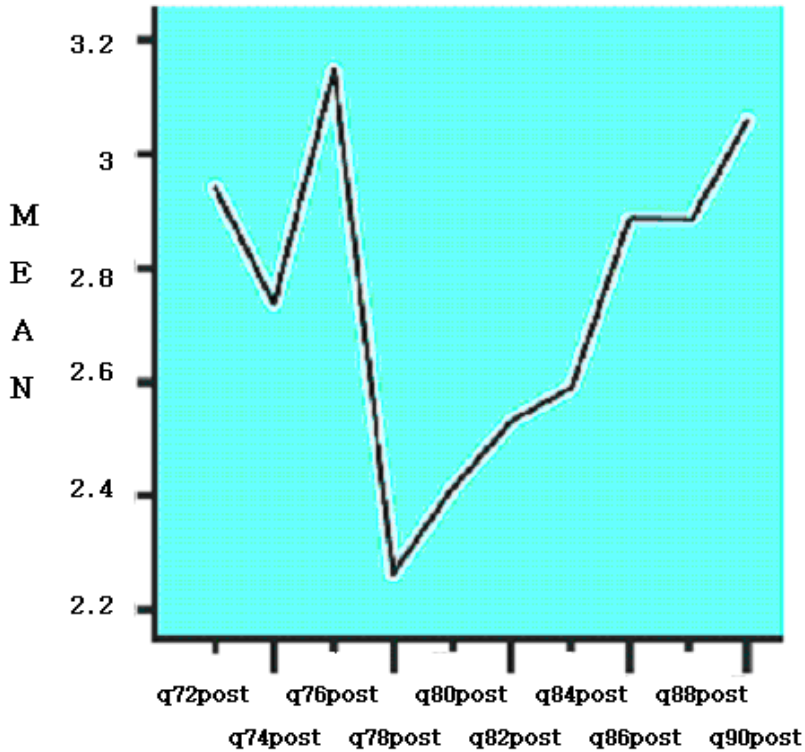
Cooperative Learning

From the onset, teams differed in whether their dialogue in the weekly discussions reflected presence or interaction. Some teams only had presence. Their motivation was to complete the task and to maximize their own individual points. Their responses were predominantly definitional and a regurgitation of text or pasting of web lectures. Students were neither reflective in thinking nor demonstrated an applied understanding.

Those teams, and some individuals in the more 'interactive teams,' consistently and only used surface strategies; some students didn't contribute at all. Other teams immediately began to demonstrate elaborative concept building as they applied and analyzed content through their cooperative dialogue. Similar observations of consistencies in group processes find support in qualitative studies (e.g., Chernobilsky, Decosta and Hmelo-Silver, 2004).

Appendix A provides prototypical examples of several teams who demonstrated strong student-directed learning. They moved from definitional to deeper learning. Example I especially depicts motivation for knowledge sharing and in the team dialogue under Example II, students consciously and spontaneously made connections between questions and peer discussions; they transformed the cooperative dialogue into something more collaborative. Artifacts such as these seem to question Halonen, et al., (2003) assumptions that introductory level students rigidly adhere to authority directing the process and don't find creative alternatives to a structured situation. These students demonstrated higher level cognitive skills and peer scaffolding of conceptual knowledge building than the rubric predicts.

When faced with grasping scientific concepts, teams (Example III) demonstrated a solid understanding by finding examples of the concepts; more so, some teams (Example IV) worked to develop an even deeper conceptual understanding of the same principles by selecting the more cognitively difficult questions to publicly explore. Neither team was in their comfort zone yet both advanced understanding at different levels. Unlike Halonen, et al., expectation for students in an Introductory to Psychology class avoiding exposure to complex and ambiguous information, these students developmentally extended themselves. Somewhat corroborating the qualitative evidence is their self-report on question 78 on the CSS (Figure 1): They weren't necessarily afraid of exposing their knowledge gaps.



For items: 74, 78, 80, 82, 84, 88, 90 Weights: Strongly Agree = 0, Agree = 1, Neutral = 2, Disagree =3, Strongly disagree = 4
Sample Questions from the Learning Subscale:
#76 = I feel I receive timely feedback
#78 = I feel uneasy exposing gaps in my understanding
#90 = I feel this course doesn't promote a desire to learn
*Note: The assigned question numbers were those based on the full post-questionnaire students took not the

Figure 1. Classroom Community Scale (CSS): Subscale for Learning

In summary, individual students and several of the teams were observed as being capable of higher level thinking than that proposed by Halonen's, et al. rubric. Overall, student contributions fit more appropriately under 'developing' rather than 'introductory' competencies. In applying Gunawardena's, et al., (1997) ALN Interactional Analysis Model to higher functioning groups, the cooperative dialogue at least attained the first three levels of sharing/comparing knowledge, discover/explore disagreements and synthesis via negotiating meaning.

Collaborative Learning

For the class debate, students collaborated as Hathorn and Ingram (2002) would define the process. Students were assigned by the faculty member to a side based on observations of their previous contributions under the small group cooperative assignments. At least several of the students were assigned to a position opposite of their

predisposition (e.g. opposite to their beliefs as determined from an introductory assignment). The assignment is problem-based and a relatively unstructured exercise compared with the cooperative context. The objective is for students to spontaneously and critically apply the principles and methods studied under the cooperative discussion forum. They posed the questions (scaffolds) rather than being guided by the faculty-directed questions of the cooperative forum. Appendix B demonstrates a prototype from a 'no' side's private discussion.

None of the observed classes exclusively used opinion—they did look for and used evidence, although not always from preferred refereed studies. Unlike Halonen's et al. prediction for communication and collaborative learning, contributing students did not argue solely from personal experience. They did practice the scientific attitude. Contrary to the rubric's prediction, many students at least acknowledged that conclusions are tentative based on the evidence (see Appendix B). Most conflicts were addressed peer-to-peer.

Individual students and high functioning sides definitely demonstrate advanced (developing) domain skills for description, conceptualization, communication (i.e., relating content from several sources), and collaborative problem-solving. High performing classes achieved four of the five expectations from the Interactional Analysis Model during the public debate; the highest level, that of metacognitive awareness, admitting changes in knowledge or belief, were observed from individual student papers afterwards.

DISCUSSION

The present study didn't find that a contextual, peer-centered online learning environment led to increases in students' self-perceptions of deeper learning based on Biggs' et al. (2001) R-SPQ-2F. This finding supports previous research from face-to-face PBL (McParland, Noble & Livingston, 2004; Nijhuis, Segers & Gijselaers, 2005) and from online contexts (Clarebont & Elen, 2001). Similar to this present study, McParland et al. measured deep learning approach with Biggs' SPQ Inventory (1987) only to find the PBL context didn't increase DA compared to the traditional curriculum group. Also using the SPQ with second-year International Business Studies students, Nijhuis, Segers and Gijselaers (2005) found that students in a redesigned PBL section actually had higher SA and lower DA scores than the assignment-based learning section.

As most of these researchers have concluded, several factors may have influenced the outcome of self-reports on deep learning after participating in a student-centered class. To perform the type of learning expected for this class, it is doubtful that students can employ the same learning strategies they may be accustomed to using in traditional classroom settings. If students truly make the experience a more collaborative experience, they need to acquire, expand and connect knowledge using class resources and peer-to-peer and teacher dialogue. Under Appendix A, one of the cited students alluded to the same point when she noted the learning process for this class was so different from her previous experiences she needed to acclimate to its expectations. Lecture style teaching develops a surface strategy for students, and while they may think they are learning, they are mirroring teachers' knowledge, not their own constructed knowledge and problem solving. It may be that while students assume they do apply deep strategies in learning, when faced with the demands of a contextualized class experience, they regress towards their belief that knowledge acqui-

sition is teacher led. Many in the present sample probably haven't been much exposed to conceptual-based learning because of their limited college experience of having less than 60 college credits. Research (e.g., Schwartz, 2004) supports this supposition by showing that introductory classes tend to emphasize definitional learning and instructor centered approaches. Because the class design emphasized theoretical and methodological themes, as well as applied understanding, it was a new challenge for most as the following students' comments seem to suggest:

> *" I really enjoyed this class. It is probably one of the most difficult courses I have taken though. I am so use to my answers being black and white (being an engineering student) that all the analyzing in this course is about to kill me!:-)"*

Another student wrote (note this student earned a top grade for the class but her response seems to reflect that not all assignments were based on right and wrong answers):

> *"Although I do not feel like in terms of letter-grade I did all that well (when I'm used to a 4.0!) but, I think my knowledge base has grown significantly. In the grand scheme of things, that's what is most important"*

A third student relates:

> *"Schoolwork has always come easy to me—But I actually had to work hard at this one. But I have never enjoyed a class more or learned as much!"*

In contrast to these students who seemed to have cognitively changed, even if not in learning approach, the following student's comment probably reflects the sentiment of far too many others:

> *"I don't have any other experiences to base this on since this is my first psychology class. I like to deal with factual information and I can learn and memorize factual information. I guess I was expecting this to be more memorizing facts in an intro class. I found the tests difficult because I sometimes had difficulty applying all the information…"*

While lower course level experiences may be most related to students' expectations, even individuals who have almost completed their bachelor's degree still found this class a more challenging one. The engineering student quoted above was entering into her fourth year at a major University. Below is another student's similar appraisal:

> *" I can't believe this course is basically over. I am nearly in tears at the thought of turning in my final to you. I think these are tears of achievement—I can't believe I did it! This course has been one of if not THE most difficult of my entire degree program. I laugh now, that my initial assumption was that Psych would be an easy class. WAS I WRONG! I think I didn't expect it to be so scientific, more applied possibly.... Yes, it has been extremely difficult for me and sometimes overwhelming, but I feel a great sense of accomplishment… I've found that I have been applying concepts that were learned via the course material and discussion to real life… So, really, I want to thank you for making this class so tough. I feel like I've really evolved as a student, (too bad this comes at the end of my degree experience-at least my Bachelors, anyway!)…"*

Parallel to the unfamiliarity of the learning context itself, is the factor of time. One has to allocate more time to this experience to be able to succeed. But time is an issue with a majority of students in this sample because of their multiple obligations. The majority in the sample (n=29) were over 20, but under the age of 40. Most had two or more dependent children and worked either full-time or part-time, while trying to take, on the average, 2 to 3 classes. Many registered for the eight-week summer semester version of this class. Several questions under the DA scale (e.g., I find most new topics interesting and often spend extra time trying to obtain more information about them) emphasize free time. But student time for learning is uncompromisingly limited under such personal constraints.

While Biggs theorizes that the R-SPQ-2F measures underlying metacognitive processes, this study questions if students consciously realized they are being exposed to a learning context demanding a deeper approach. There were several statistically relevant quantitative analyses in this study which might have provided support for students' developing a deeper approach to learning, but no support was found, including the main hypothesis that DA scores would increase from the pre-to post-test. The most interesting question raised here was why applied type questions posed under the cooperative dialogue correlated with CCS (figure 2), but not to DA, if one accepts that applied thinking is a higher, more effort- requiring level of thinking than is memorizing facts. Further, if there had been a statistically significant link between CCS and DA, it would have provided some evidence to validate that the R-SPQ-2F measures metacognitive awareness of how knowledge is actively constructed through peer dialogue, which again demands a deeper approach to learning. Rather, most students remained consistent in approach; there was a moderately significant correlation between individual's pre- and post-test scores on deep learning both in the present study and from findings in McParland, et al., (2004). It may be that individuals have developed their own style of interpreting expectations for a variety of learning experiences and don't readily change preferred learning approach, although implicitly they recognize learning communities influence higher level comprehension skills.

There were several limitations to the study's R-SPQ-2F measurements. One may be that if the subscale on learning strategy (DS or SS) was used, more subtle changes might have been observed, although McParland's et al., (2004) didn't find a differrence between their cohorts. Second, the study didn't measure possible differences between team composition based on TSI or pre R-SPQ-2F and whether these factors predicted levels of cooperative interaction and qualitative measures of higher levels of thinking. Team comparisons might have also painted a different picture on the various measurements of DA in this study. Another limitation was that the research didn't administer the R-SPQ-2F directly after the debate. This might have documented shifts in DA based on a stronger collaborative context. A recent study by Yan and Kember (2004) found that group scores do shift (engager versus avoidant group dynamics) based on changes in the learning context.

While this study would like to conclude that higher level thinking increased for individuals because of the cooperative and collaborative context, it can not from its research design. The more academically prepared student may be spontaneously creating their own questions as they learn; the social dialogue might actually be unnecessary for both how they approach learning and in their ability to think conceptually. The less academically prepared student or one disinterested in the discipline may just do rather than think about why they are participating in such social (or self) dialogue.

Perhaps a future study would experimentally manipulate learning context where students are randomly assigned to team discussions or not (the control group would have only the lectures and text without the guided questions or the line of questioning but without social interaction) in order to observe if cooperative dialogue changes not only self reports but also the actual learning of content. Only with such controls can social constructivist assumptions be more directly examined. Another possible manipulation would be that prior to being expected to learn actual content, students are directly trained on the expectations and processes of group learning more generically-speaking (Wood, 2003, cited in Tan, 2005) to observe for DA changes and team differences in interaction.

Yet, would online students be missing out on something bigger in the schema of teaching and learning if they work in isolation? Further research needs to be done to measure the validity of this study's finding of students implicitly understanding that group processes help them learn at higher levels of thinking (as shown by the CCS; Figure 2). An inventory based on disciplinary content knowledge and thinking expectations or a global thinking inventory like the California Critical Thinking Disposition Inventory (CCTDIP; Facione & Facione 1992, cited in Zhang 2003) would be a more valid measurement for the types of thinking expected by the end of the course and its predictive relationship with an instrument like the CCS. Such measurements could corroborate the present finding and more objectively measure thinking ability, especially if compared to a more traditionally designed class section.

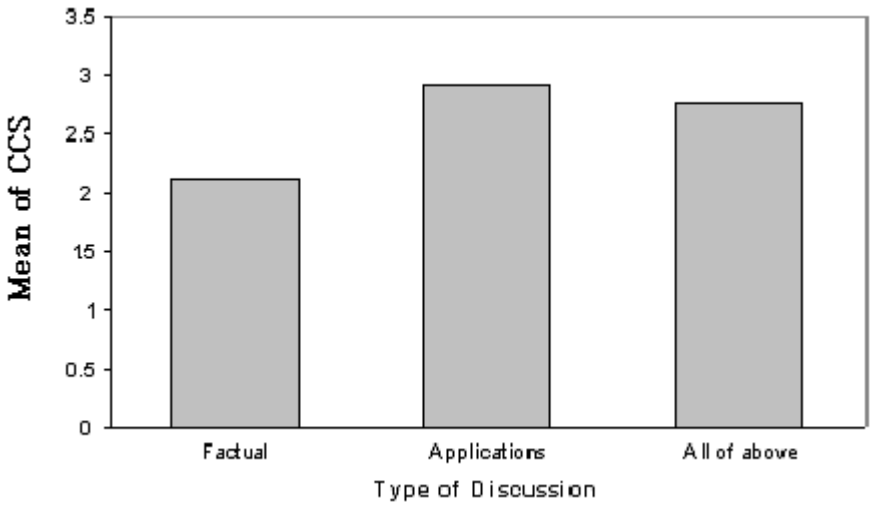


Figure 2. Mean Score on CCS and Rating of the Most Helpful Discussion Questions

While the qualitative dynamics from this study seemed to demonstrate some degree of a learning community, self reports on the subscale measuring community were lower than on the subscale measuring perceptions of learning (Figure 1). Students didn't necessarily feel part of a 'family' of learners. The study didn't compare teams; it may be possible that some teams did feel more familial than others. The study also didn't compare CCS scores in cooperative context with that of the collaborative con-

text. It may be that collaborative learning context did change their perceptions about community, seeing the whole class was expected to participate. The following student's comment reflects the sentiment of the other highly engaged students on the meaning of a learning community:

> *" I really did enjoy this class because I still felt connected with other classmates. We split up the discussion questions so that everyone contributed and helped each other which was great! I was just as comfortable with this class as any on campus class. I made friends and we worked on assignments through messenger and even met at the JCCC library a few times to work on lab and other assignments so we could help each other out. One last thing: I really liked that if one person had a question, another person, even if it wasn't the professor, would answer it soon…"*

Although the study didn't demonstrate a relationship between pre-DA and TSI, it may be that thinking styles did influence students' predispositions for interacting with this class's pedagogy. Some evidence for this conclusion comes from the study's finding that conservative style predicted post SA scores. But which thinking styles are more important to higher level thinking as well as cooperative learning seems more complex to answer when looking at others' research findings. While the legislative style has been shown to be correlated to DA, as well as academic success (Sternberg & Grigorenko, 1993 cited in Zhang & Sternberg, 2000), more recent research seems to show that a variety of thinking styles are equally important to academic achievement including hierarchical, judicial, and monarchic. The hierarchical thinking style is typically recognized as being the most significant predictor over across a variety of disciplines (Zhang, 2004). Students in this sample were shown to have more of a legislative style than any other (note that the average scores weren't in the high disposition for any of these styles, yet overall, both male and female students scored the highest on legislative style over local, judicial, conservative or external); the hierarchical style was not measured. It might be that the cooperative discussions were too structured for those who are legislative and who according to Sternberg (1997) are more creative and like to make their own learning context. On the other hand, the legislative style came closer, but still non-significant, in predicting post-DA than it did for the pre- DA scores for this study. Cognitive speaking, without structured discussions, there could have been major negative outcomes for many students whose range of proximal development need to be guided regardless of thinking style. Overall students did feel, rather strongly, that they learned (Figure 1). Other research (Whipp, 2003) and literature reviews (Mayer, 2004) seem to support the need for discussion prompts as well as faculty comments in such learning contexts, hence, the approach to structured context used here.

Finally it might have been relevant to administer the TSI again during the later part of the semester to see if students' scores were similar or changed as an indication of a more conceptual connected approach to learning. Zhang's study (2003) concluded that most styles (with the exclusion of the executive and monarchic styles) contribute to various critical thinking dispositions. Given the course design for this study, the thinking demands might have changed students' preferred style, but to know in which way is purely speculative. One of the implicit goals of this Introductory to Psychology class is to develop, if not a preference for analytical thinking, at least an ap-

preciation of its role to the educational goals of the sciences (Zhang, 2004). The cooperative and collaborative dialogue in the study pointed to individual students and some teams accommodating an analytical thinking style.

CONCLUSION

This study's qualitative findings and data from the CCS learning subscale demonstrate that online sociocultural experiences do potentially increase deeper learning for some students and teams in introductory courses, but not their self report on deep learning approach nor their explicit awareness of thinking being enhanced through dialogue. Challenging students' perceptions of learning being that of only acquiring factual information seems necessary when the course focus is on critical thinking and knowledge construction through cooperative and collaborative dialogue—whether face-to-face or online. Making overt the role of active, peer-directed learning might not only increase participation and the quality of interactions, but additionally, deeper learning approaches, desired academic thinking styles and content understanding.

REFERENCES

APA (1997, November). The learner-centered psychological principles: A framework for school redesign and reform. Workforce of American Psychological Association. Retrieved from www.apa.org/ed/lcp.html

Aviv, R. Erlich, Z., Ravid, G & Geva, A.(2003). Network analysis of knowledge construction in asychronous learning networks. *JALN, 7*(3). Retrieved from http://www.sloan-c.org/publications/jaln/v7n3/index.asp

Biggs, J. (2001). Assessing for quality in learning. In Suskie, L (Ed). *Assessment to Promote Deep Learning: Insights from AAHE's 2000 and 1999 Assessment Conferences*. American Association for Higher Education, pp. 65-68.

Biggs, J., Kember, D., & Leung, D. Y. P. (2001). The revised two factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology, 71*, 133-149.

Bloom, B. S. (Ed.). (1956). Taxonomy of educational objectives: The classification of educational goals: Handbook I. Cognitive domain. New York: Longmans, Green.

Chernobilsky, E., Davcosta, M.C. & Hmelo-Silver, C. (2004). Learning to talk the educational psychology talk through a problem-based course. *Instructional Science 32*, 319-356.

Clarebout, G., & Elen, J. (2001). The ParlEuNet-project: Problems with the validation of socio-constructivist design principles in ecological settings. *Computers in Human Behavior, 17*(5-6), 453-464.

Colliver, J.-A. (2000**).** Effectiveness of problem-based learning curricula: Research and theory. *Academic Medicine, 75* (3): 259-266.

Enkenberg, J. (2001). Instructional design and emerging teaching models in higher education. *Computers in Human Behavior, 17*, pp. 495-506.

Ennis, R. H. (1989). Critical thinking and subject specificity: Clarification and needed research. *Educational Researcher, 13*, 13-16.

Entwistle, N. (2001). Promoting deep learning through teaching and assessment. In Suskie, L. (Ed). *Assessment to Promote Deep Learning: Insights from AAHE's*

2000 and 1999 Assessment Conferences. American Association for Higher Education, pp. 9-19.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *The American Journal of Distance Education, 15*(1), pp. 7-23.

Gilbert, N.J., & Driscoll, M.P. (2002). Collaborative knowledge building: A case study. *Educational Technology Research and Development, 50*(1), 59-79.

Gunawardena, C., Lowe, C., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining the social construction of knowledge in computer conferencing. *Journal of Educational Computing Research, 17*(4), 397-431.

Hacker D. J. & Niederhauser, D. S. (2000). Promoting deep and durable learning in the online classroom. In R. E. Weiss, D. S. Knowlton, & B. W. Speck (Eds.), *Principles of effective teaching in the online classroom* San Francisco: Jossey-Bass, pp.53-64.

Halonen, J.S., Bosack, T., Clay,S., & McCarthy, M. (2003) A rubric for learning, teaching, and assessing scientific inquiry in psychology. *Teaching of Psychology, 30* (3): 196-207.

Halpern, D, & Hakel, M.D. (2003). Applying the science of learning to the University and beyond. Teaching for long-term retention and transfer. *Change, 35* (4). American Association for Higher Education.

Hathorn, L. G. & Ingram, A. L. (2002). Cooperation and collaboration using computer-mediated communication. J*ournal of Educational Computing Research, 26* (3), 325-247.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16* (3): 235-266.

Kember, D., Biggs, J, & Leung, D.P. (2004). Examining the multidimensionality of approaches to learning through the development of a revised version of the Learning Process Questionnaire. *British Journal of Educational Psychology, 74* (2).

Klinger, T. (March, 2002). The context for integrating critical thinking into introductory online college courses. *Online Classroom: Ideas for Effective Online Learning*. Magna Publications.

Leung W. C. (2001). Differentiation and undergraduate medical education. *Medical Teacher; 23*(1).

Maki,W.S. & Maki,R.H. (2002). Multimedia comprehension skill predicts differential outcomes of web-based and lecture courses. *Journal of Experimental Psychology: Applied, 8* (2), 85-98.

Mergendoller, J.R., Maxwell, N.L. & Bellisimo, Y. (2000). Comparing problem-based learning and traditional instruction in high school economics. *Journal of EducationalResearch, 93* (6): 374-382

Mayer, R. (2004). Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction. *American Psychologist 59* (1), 14-19

McParland, M., Noble, P. & Livingston, G (2004). The effectiveness of problem-based learning compared to traditional teaching in undergraduate psychiatry. *Medical Education 38*(8), 859-867

Newble,D. & Clarke,R.M. (1986). The approaches to learning of students in a traditional and in an innovative problem-based medical school. *Medical Education, 20* (4): 267-273

Nijhuis, JFH, Segers, M.S.R., & Gijselaers, W.H.(2005). Influence of redesigning a learning environment on student perceptions and learning strategies. *Learning Environments Research, 8*(1); 67-93

Paul, R. & Elder, L. (2001). A miniature guide For students on hw to study & learn a discipline. *Foundation for Critical Thinking.*

Perry, W. G. (1970). Forms of intellectual and ethical development in the college years. Oxford, England: Holt, Rinehart & Winston.

Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks*. 6(1), 21-40. Retrieved from http://www.aln.org/publications/jaln/v6n1/v6n1_picciano.asp.

Recker, M. and Pirolli, P. (1995). Modeling individual differences in learning strategies. *Journal of the Learning Sciences*, *4*(1), 1-38.

Rovai, A. P. (2002). Development of an instrument to measure classroom community. *Internet and Higher Education 5* (2002), 197–211.

Schwartz, S. (2004**).** Time to bid goodbye to the psychology lecture. *Psychologist, 17* (1), 26-27.

Smits, P.B.A, Verbeek, J.H. and de-Buisonje,C. D. (2002). Problem based learning in continuing medical education: A review of controlled evaluation studies. *BMJ: British Medical Journal, 324* (7330), 153-156.

Sternberg, R. J. (1988). Mental self-government: A theory of intellectual styles and their development. *Human Development, 31*, 197-224.

Sternberg, R. J., & Wagner, R. K. (1992). Thinking Styles Inventory. Unpublished test, Yale University.

Sternberg, R. J. (1997). Thinking styles. New York: Cambridge University Press.

Stetsenko, A. & Arievitch, I. (2002**).** Teaching, learning, and development: A post-Vygotskian perspective. In Claxton, G., Wells, G. (Eds), *Learning for life in the 21st century: Sociocultural perspectives on the future of education.* Malden, MA, US: Blackwell Publishers, pp.84-96.

Tan, Ai-Girl (2005). A review of the effectiveness of problem-based learning. *The Korean Journal of Thinking & Problem Solving, 15*(1), 29-46.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Wang, A.Y. & Newlin, M.H. (2000). Characteristics of students who enroll and succeed in psychology Web-based classes. *Journal of Educational-Psychology, 92* (1), 137-143.

Whipp, J. L. (2003). Scaffolding critical reflection in online discussions: Helping prospective teachers think deeply about field experiences in urban schools. *Journal of Teacher Education***,** *54* i4 321(13).

Yan, L. & Kember, D. (2004). Avoider and engager approaches by out-of-class groups: The group equivalent to individual learning approaches. *Learning and Instruction, 14* (1): 27-49.

Zhang, L.F. and Sternberg, R.J. (2000). Are learning approaches and thinking styles related? A study in two Chinese populations. *Journal of Psychology, 134* (5): 469-489.

Zhang, L.F. (2003). Contributions of thinking styles to critical thinking dispositions. *Journal-of-Psychology:-Interdisciplinary-and-Applied, 137* (6): 517-544

Zhang, L. F. (2004). Revisiting the predictive power of thinking styles for academic performance. *Journal of Psychology: Interdisciplinary and Applied,* 138 (4): 351-370

Received January 26, 2005
Revision Received January 15, 2006
Accepted February 24, 2006

Key Words: Social constructivism, Vygotsky, Post Vygotsian theory, Leanring approach, Critical thinking, Thinking styles, Problem-based learning, Learning community, Asynchronous online classroom, Metacognition, Developmental psychology and educational psychology

APPENDIX A
COOPERATIVE INTERACTIONS

Example I:

Student I begins the discussion with definitions of the various concept: *Psychology is the scientific study of individual differences in behavior and mental processes.* **Student II** student not only acknowledges their peer's accurate definitions, but then compares it with her own: *Great examples for basic and applied psychology. After looking at your definition of comparative psychology, I realized I was way off. But, I do remember reading the definition you gave***. Student III**, extends an understanding to the first definitional posting with elaborations of a linked study: *Dr.Salzinger's article discussed the "giving away" of... He pointed out that this suggestion had contributed to more use of what I would classify as "pop psychology", wherein lay people get a hold of a theory and run with it, thinking they have the expertise to apply it. He pointed to the popularity in recent years of the self-esteem theory. Our own discussions have on this subject reveal that most of us agree that self-esteem is very necessary for positive development. I think Dr. Salzinger would say this proves his point, that it was a theory that someone threw out and society as a whole grabbed hold of it and ran--before there was any evidence to prove the theory... I thought the article provided a good example of how much applied psychology can impact society, and how eager people can be to accept a theory before there is any empirical data to support it (through basic psychology).*

Example II:

Student I: *Eric, you did really well with explaining number three. Originally I had went through the questions and felt like #1 was my strongest contribution but so did everyone else! But I have a question as far as philosophy and #3 goes… on Psychology's roots, it talks about philosophy and nature vs. nurture, if you are a quote philosopher, are you suppose to side with either nature vs. nurture? I mean basically that question kind of gives the definition to the different perspectives and subfileds of psychology, right? The only reason why I ask this dumb question is because I really just fall in the middle of the two. I can see why it is such a controversy! The only elaboration I think I could do on #3 would be to talk more about Locke the behaviorist and Decartes…From what I understood he tried to separate the mind and the body but I have a question that maybe you could answer Toby… where do hormones come in under that concept? They affect the mind AND the body??* **Student II**: Another student who obviously has more educational background chimes in…*Amanda--I agree with you...I, too, fall somewhere in the middle of the nature v. nurture debate. I think that the fact that so many people these days agree that the two are intrinsically connected is testimony to the progress science has made in biology and (especially) genetics. I have yet to hear of a modern scientist who fully rejects one side of the "debate" while adhering to the other. Such a thing is no longer an option.(If you're interested in this, there is a book by Matt Ridley called NATURE VIA NURTURE that you might like. ..PS--As to your hormone question, I am curious as well. Professor, do you have a specific suggestion on where we could look for info on hormones and how they fit into the psychological field?* **Student III**: Here the student started out slow (a week behind the others in terms of discussion postings, but she makes a very critical connection to the style of the class—where concepts are built through a synthesis of

resources, including peer guided-learning: psychology with : *Good points. This is the first time I have jumped into the discussion so I apologize for the delay. It took me a while to figure out how the lectures, discussions and readings all tied together, but I finally got it. .Anyways, wouldn't the hormones come under the physiology and biology concepts of psychology? Those are the areas that we typically don't think about as generally being part of psychology but in fact they play a big role, I think. That would be more of the science or nature aspect of the psychology field as opposed to the nurture part...*

Example III:

Student I: *Web page example:The PDF worksheet PsychSim shows a positive correlation between room size and the average satisfaction rating. Intelligence Chapter: A lineman's weight has a positive correlation to his success in the league.* **Student II**: *Power point: Violent TV viewing-Aggresive Behavior; Chapter 11: Head size and intelligence test scores, brain size and test scores).* **Student III**: *Positively correlating hypothesis, the more tired my four year old son gets the more he melts down and whines. Negatively correlating hypothesis, the more kids you have the less your single friends will come over and visit with you.* **Other students** then amusingly react, as well as demonstrate peer scaffolding, to the student III's examples…**Student IV**: *I would have to agree with you Robert on #7. Thanks for the laugh I needed that today. I needed that laugh too…thanks for putting it into words for me to understand.*

Example VI:

Student I: This student's presentation addresses the conclusions one can draw in correlational research by providing very specific examples: *The example of self-esteem and depression uses the hypothesis that depressed people have low self-esteem. This is a good example of why a correlational study cannot be used to show a cause and effect relationship. It also does not account for the possibility that another variable altogether may be involved. In regard to intelligence, there is a correlation between boys and higher test scores for math and sciences. But if the hypothesis is that boys are superior in math and science, generally speaking the data would support this.But it does not answer the question of whether boys are genetically predisposeed*….This same student then discusses a linked article's research, and demonstrates a deep understanding of the methodology behind the study (although my originally wording of the question kind of threw her off): *If we're assuming, based on the wording of the question, that there is a correlation, I would say it's a negative one, given that the data indicated that a greater amount of money spent did not increase patient satisfaction. However, I would call it a weak correlation given that the data did not show that as the amount of money spent increased, patient satisfaction decreased, or that as spending went down patient satisfaction went up. Still, I have a hard time seeing how much of a correlation exists… Does anyone else see something I'm missing?* **Student II**: Another student implicitly answers her question, by saying: *I think the studies are correlational because they were observing and measuring the predictive relationship between spending and outcome. Even though they were trying to prove that a correlation doesn't exist they still had to use the Correlation Method and thus it was a correlational study.. The results were that no significant correlation did exist*...**Student III**: Another student adds levity to what she thinks is way to

complex a discussion with: *A marriage has better divorce rate the less a couple has sex.(Sorry, I had to get away from the boring ordinary stuff though, I hope no-one takes offense)" and she then goes on to sayI feel like the stuff I am reading in this class is in such a different hard to comprehend language than in all of my other classes…*

APPENDIX B
COLLABORATIVE LEARNING

The dialogue from the No Side: Private:

Student I*: I think it was Katie who made mention of PBS and positive influence? I just was thinking about that...and I would say (tentatively) that we should steer clear of any suggestions to the other side that highlight TV influence AT ALL. I think they would jump on that. If we acknowledge POSITIVE influence, wouldn't we also acknowledge influences of other kinds?* **Student II***: Good point, Jenna. I tend to agree--we'd better to avoid the issue of TV having any real tangible influence one way or the other. (Although I don't think we'll have much choice as far as conceding to this point…* **Student III:** *But I don't think we should offer it. We'd be conceding a bit in that there is some affect on behavior -- would that work? I think it'd be similar to saying that gravity caused a ball to drop, because no it didn't -- gravity and greater pressure above than below caused it to drop.* **Student IV:** *But would they be able to say that violent programming… causes violent actions, and just forget the rest?...* **Student I**: *Thanks for the input guys. Sam...you are way too smart for me. HEEHEE! Ok we can save the jackpot for rebuttals… Sure we can combine but my questions are so long that I don't know if you want to add to them. I guess just write four questions of your own and you can use the basic ideas of mine or other people and make it better. Then maybe your question will get chosen to be submitted..--the fact that we may have to concede that viewing TV violence can be an INFLUENCE. We need to be able to make a strong point that, in spite of that, it doesn't CAUSE violence.* **Student V**: *I understand this is a debate and we need to support our side, but if we throw all rational thought and logic out the window just to stand our ground, we'll get eaten alive. The key is to know where the gray areas are so we can use them to our advantage instead of giving them an open door to use them against us.* **Student VI**: *The actual point we're debating is "Does television (media) have negative EFFECTS on children and adults?" We need to define EFFECT. An effect implies a causal relationship, not merely an influential one-- a point we need to stress, as previously mentioned. Also, seeing as how there is a "(media)" included here, maybe we need to rely a little more heavily on any research that pulls this away from television… I know I saw things out there that say video games in particular are not a precursor to violence, despite how gruesome some of them are. The other side may not be as prepared to debate these issues.* **Student I***: OK after reading everyone's responses, here are my four questions: 1. How reliable and valid are the studies conducted about the relationship between viewing violence and acting violent? Where there not certain variables that did not get operationalized… 2. "There is a lot more violence on Japanese TV (than American TV) and almost no murder in the streets"… If violence on television influences aggressive behavior, then how do you explain the situation in Japan?...3. While statistics might show that children viewing*

violence have a higher potential to become violent, Singer said… "That doesn't mean that violence on television is causing kids to have problems." … 4. Most of the studies done concerning the relationship between viewing violence and committing it are done in controlled laboratory settings? Does this not affect the results because… **Student III**: *Correlation does not prove causation. It comes down to this...who is watching the most violent programs, and could it not be that aggressive people are drawn toward viewing acts of aggression, and not vice versa… There were a group of studies done in 2002 comparing the TV watching habits of an AGG group of aggressive boys (deemed so by parents/teachers/etc) and an NAGG group of non-aggressive boys. It was found they watched the same amount of TV with the same level of violence in programming. Also, when physiologically monitored during the viewing of violent television scenes, there was a slight difference perceived… If both groups watch the same TV, and one group is more aggressive while the other isn't, how can you blame the TV for the aggression?...***Student I***: It looks like a few people, including me, agree that this would be a good first question…*