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Case Study of Connected Knowing in an Online Learning Environment

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Introduction

This paper reports a single-subject case study designed to investigate the role of group discussion in student learning. The group discussion took the form of contributions to a series of online discussion boards. And our analysis focuses on the contribution of one group member. We argue that this individual came to serve as a catalyst to learning for many group members because of the concomitant roles that she came to occupy.

Our goals in presenting this research are two-fold. First, as we argue, this case analysis provides a new model that helps advance our knowledge of the process of academic learning. Second it illustrates the important role of single-subject case studies. Since the work of Campbell and Stanley (1963), a deep and unjustified bias against single-subject case studies has taken root in the research community. Nevertheless, the methods of case study research—observing, interviewing, systematizing, and critically analyzing—are the methods that most of us use every day to obtain our knowledge of the world in general including, for those of us who work in education, where we

constantly analyze the processes of learning and knowing. To devalue such a fruitful methodology amounts to erecting a potentially insurmountable barrier to the normal process of knowledge growth.

Case Study Methodology and the Identification of Learning Processes

The present case study is part of an ongoing research program that seeks to identify underlying psychological processes and mechanisms to explain the remarkable facts of human learning. During the last 20 to 30 years, earlier explanations of learning, perhaps more than any other topic in psychology, have come to require fundamental rethinking. As Minsky (1985), Pinker (2002) and many others have argued, for most of the 20th century, psychologists and educators presumed a “blank slate” view of mind that either denied or minimized the innate and/or normally developing complexity of the human mind. They built an enormous edifice of theory of research into learning centered around such concepts of environmental influence as conditioning, stimulus-response connections, reinforcement, extinction, modeling, and imitation. As more and more researchers and professionals adopt a biologically-based view of mind in which complexity is a given, the earlier environmentalist theories seem less and less convincing. Instead we need newer and better explanatory concepts that explicitly acknowledge the role of learners as authors of their own knowledge.

The earliest and possibly best existing studies of “subject-centered” processes were

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conducted by Piaget during his “ethological” period (Piaget, 1952, 1954, 1962). This research consisted of case studies in which Piaget used his own three children as subjects. In spite of the alleged shortcomings of single-subject research design, this research has become recognized as a model of excellence in the behavioral sciences. First it offered a convincing account of how simple action patterns—what Piaget called schemes—became integrated into complex forms of behavior (e.g., eye hand coordination). Second it laid the foundation of cognitive constructivism, perhaps the most influential theoretical perspectives today in education.

Case studies such as Gruber (1981), Miller (1986), Lawler (1987) and Arnheim (2006) have offered descriptions of processes that contribute further to our understanding of how people learn. All of this research seeks to understand how the mind, through its own activity and through interacting in a normal way with the surrounding world, can recursively bootstrap itself in order to increase its own complexity and adaptiveness. Our research seeks to continue and expand this tradition.

In the name of rigor, researchers should satisfy three essential conditions as part of a case study: (a) There must be at least one clear and well-documented example of a change in knowledge (learning) over the course of the case study. We typically document this change by comparing what a subject thinks and knows at an early point in the case study with thinking and knowledge at some later time. (b) There must be evidence of the psychological reality of the proposed explanatory system, process, or mechanism (such as recurring evidence of its influence on a subject’s behavior). (c) Any claims of a causal relationship between presumed underlying process and learning must be consistent with our broader understanding of

learning as well as common sense.

We neither claim nor believe that this (or any) kind of case study research is a panacea; on the contrary, there is always a need to supplement qualitative research with quantitative methods. Nevertheless the unique advantages more than outweigh these potential problems. Clearly careful close observation of human beings in the process of learning is the only possible sources of concepts, discoveries, and theories needed to devise plausible explanations of the complexities of human learning.

Theoretical Rationale

In previous research (Kannan & Miller, 2004a, 2004b, 2006; Kannan, Miller, Salmon, & Candy, 2005; Miller & Kannan, 2004a, 2004b, 2005), we focused on the development of autonomy by individual learners in an online learning environment. Through this work, we came to appreciate that involvement in groups and communities plays a crucial role in the experience of autonomous learners so that we miss important information if we try to view the learner in isolation from his or her peers. Thus, in the current study, we wanted to begin to understand the influence of group discussion and more specifically in the contribution of emergent group leaders and other specific individuals.

During the last decade, research into the role of discussion groups in learning, sometimes called “connected knowing” (Belenky, Clinchy, Goldberger, & Tarule, 1996; Orr, 1996; Salmon, 2000) has focused on benefits available to all discussion group members rather than take into consideration the challenges and opportunities that heterogeneity can provide. Nevertheless, we can learn a great deal about how learning happens by looking closely at the individual group members. Typically, discussion groups include an assortment of learners with a distinct array of personal goals,

learning styles, and subject knowledge. Hence, an effective discussion group cannot be one in which all members contribute equally: Progress in understanding the role of group discussion requires attention not only to the dynamics of the group as a whole but also to the unique contributions and progress of specific individuals.

A primary interest of ours was to understand the relationship between the internal dynamics of the group, viewed as a collection of peers; and its role within the external context of an online course; in which members were expected to achieve (institutionally-defined) specific learning outcomes. Vygotsky's socio-cultural theory (Tulviste, 1991; Vygotsky, 1934/1986) offers perhaps the best perspective for understanding connections between in-course activities and large institutional and societal goals. Vygotsky portrayed the instructor as a *mediator* between methods of reasoning and knowledge acquisition officially sanctioned by society and the student.

A very different image of the peer group emerges from Belenky et al.'s (1996) concept of connected knowing. Belenky and her colleagues characterized the kind of "official knowledge" of interest to Vygotsky as "separate knowing" because it consists of universal rules understood without reference to interpersonal relationships. In contrast, they describe what they call "connected knowing" as the knowledge that forms out of dialogue and emerging trust and caring among peers.

An essential difference between the two theoretical perspectives is the source of authority that establishes the legitimacy and credibility of knowledge. In the case of Vygotsky's mediated knowledge, the source of that authority is society as represented by its official knowledge creating institutions. In the case of Belenky et al.'s connected knowledge, it is the network of relationships

among members of the peer group, relying on their respective subjective intuitions, personal insights, life experience, and academic study in an atmosphere of caring and trust.

What makes the institutional authority of the instructor and personal authority of group members' private intuitions work together? How is it that students come partially or largely to identify with the values and worldview that they associate with their instructor when having doubted or disagreed with them in the beginning? How does the authority of shared subjective experience begin to lead to conclusions similar to those of official knowledge?

There are probably many contributing factors to this process; nevertheless, a case study such as the present one can be useful by offering a description of one of these. We focus specifically on the contribution of a particular student whom we call Sandra. We argue that her well-developed skills as both a Vygotskian mediator and a connected knower made her uniquely effective as a catalyst for learning. Furthermore, because of her influence, group members were successful in harmonizing their private intuitions with larger conceptual frameworks and reasoning processes encouraged by the course.

Method

Course Description and Introduction to Case Study

This study is based on the observations and analyses of student learning in a freshman course in critical thinking, which was piloted in a hybrid learning environment. The class comprised 12 students (11 female, 1 male) all of whom came from an economically disadvantaged minority community. In addition to lacking prior experience with the Internet, email, or online learning, the group as a whole was

also academically weak and suffered from significant barriers to formal academic learning.

One student, Sandra, stood out in this group as an exceptionally promising student for three important reasons. First, despite her lack of experience with online learning, very early on in the course, she saw the power of the asynchronous online discussions as a useful tool for collaborative learning. Second, through her dedicated learning she demonstrated how she could use it within a group setting as an effective learning environment. Third, she took the initiative through the medium of the online discussion boards to enhance her learning and contribute to the learning of the group in her different avatars as leader, mentor, co-learner, and ethics-police.

The present paper reports a case study of this one subject, Sandra, because the example of Sandra offers new insights into how formal instruction and the individual's learning in a group setting can complement one another to create a positive learning experience.

Results

Sandra as a Mediator

During the entire course, there were several occasions when the nature and content of Sandra's interactions with the group members showed the skills of a mediator in the Vygotskian sense of the term. Examples provided below indicate that these traits of computer-mediated-communication would normally be associated with the role of the tutor in a formal learning situation.

- * Although it was not her responsibility as a student to monitor the work of her classmates, Sandra took on the role of the tutor by posting messages of encouragement to her fellow students. During the course, at four different points, she posted

comments nudging her peers to participate actively and post their assignments on time.

She also posted notes of praise and encouragement to students who were less active in their participation in the online discussions, with the intention of motivating them to contribute more. For example, in the comment to a student who was not regular in her posting of assignments, she wrote: "I admire how you have utilised this course to develop your independence in thinking." Of all the online responses to her classmates, more than 60% included comments that said something positive about the student's learning ("for someone so young you do your fair share to represent").

- * Sandra tried to take on the role of the tutor by posting questions and suggestions that would help a student develop his or her argument further. For example, she posted comments such as, "Do you agree?" "Do you have any suggestions as to . . ." and "So please check it out and get back to me with your viewpoint." One student in the process of developing an argument against cloning had raised the issue of "where to draw the line." In her response, Sandra suggested that this student read a particular article that she had found to get a better understanding of the issue.
- * Sandra tried to be the mediator between the instructor and a classmate who began to slacken in her submissions in the middle of the term. Sandra explained later to the instructor that she had a better understanding of the emotional problem that her classmate was

facing which was the cause of her inability to submit her assignments. Hence, Sandra used the discussion board to write an open letter of encouragement goading the student to get back on track. Eventually, this student did post all of her work.

- * Sandra's remarks were sometimes characteristic of a tutor comment: "I have carefully eyed your development." Later in her response to the same student's self-assessment as an online learner, Sandra wrote, "You neglected to discuss the contributions of your natural ability to be a great team player." According to Sandra, the aim was not only to provide feedback to this student but also highlight her strength as an online learner both to the group and the instructor.
- * By choosing to avoid any negative remarks and post only comments of praise, acknowledgment of a student's contribution to her growth ("you have opened my mind to at least examine some of the pros of cloning") and encouragement ("waiting for your posting"), Sandra took on the responsibility to create a positive and supportive atmosphere in the class to help promote learning.

Sandra as a Connected Knower

- * As a connected knower, Sandra often took the initiative to be responsive. Although the minimum requirement called for responding to one peer, she posted responses to more than one peer on six occasions and more than three responses within a threaded discussion on five occasions. When asked to explain the objective behind the high frequency of her responses to her peers, she commented that she felt a personal

responsibility to reach out and motivate the group. She also initiated a dialogue with the group during five of the seven online sessions.

- * Sandra had faith that she could use the online discussion board to create a network of learning. ("I can admit if I don't know something and then I will ask many people so I can examine many views.") The fact that she saw the group as a valuable resource pool for her learning rather than feeling threatened by the initial anxiety because of her limited computer experience shows her confidence in the collective intelligence of the group.
- * Sandra took it upon herself to mentor the classmates that she believed needed support. In her informal discussion with the instructor she stated that interacting with her classmates outside of the classroom gave her a better understanding of the emotional states of her classmates. For the benefit of the group, she used this as an advantage in her online discussions. For example, to one of her classmates she wrote: "I admire how you have utilised this course to develop your independence in thinking." Being the oldest student in the class, she went on to mother younger students ("for someone so young you do your fair share to represent").
- * By week five (right after the second online assignment), Sandra had identified from among her classmates two potential learning partners for the online discussions, Precious and Nicole. In explaining her choice of these students, she observed, that there was potential "to grow together" and that "there was magic between the three of us."

Among the reasons that she gave for choosing these learning partners, two were particularly striking: (a) Nicole and Precious seemed more “open to learning,” “original in their ideas,” and there was much potential to “grow together.” (b) Sandra felt that other students posted just for the sake of posting since they were only interested in the grade. However, in Sandra’s opinion, Sandra and Precious were “serious about learning” and wanted “to go beyond the grade.” She felt that they could be effective learning partners for her because of the congruence between their learning goals and hers.

- * Sandra perceived her partnership with Precious as highly beneficial to her own learning. After week seven, Sandra maintained a more steady partnership with Precious, opining that she and Precious shared similarities. “In the beginning, Precious was shy and I was shy . . . Just as I saw myself blossom from shy to confident, I saw Precious too.” Sandra consciously used Precious as an effective learning partner by constantly building a loop of threaded discussion for the rest of her online assignments. From this mid-point, Sandra stuck to using Precious as her dominant learning partner: According to Sandra: “We respected each other’s opinions when we disagreed.” The quality of mutual respect that Sandra perceived in her partnership with Precious is what one would expect between two connected knowers.
- * Later in the course, when Nicole’s online submissions began to slacken, Sandra took the effort to motivate Nicole to get back to the online assignments. Sandra gave two

reasons for doing this: (a) Sandra expressed her care and concern for Nicole; (b) Nicole’s lack of participation was limiting her own growth. In Sandra’s opinion, Nicole was an important factor in opening her mind to alternative viewpoints.

- * Sandra shared her joy of learning in the online environment with the rest of the group. On different occasions, she posted comments such as “I really enjoyed doing the research for this topic;” “This is an absolutely fascinating topic;” and “everyday I look to see if anyone has posted, it is like being on a high.” As a connected knower she was of the opinion that sharing her enthusiasm and positive experience with the rest of the group was important.
- * Sandra shared information from her Internet search with the rest of the class on four occasions by listing ideas for writing, posting links to Internet web sites, and summarizing research information that she had collected. She said that since she was interested in learning for the sake of learning, she did not believe in keeping new knowledge that she had acquired to herself. In her self-report, she affirmed that she viewed sharing on the online discussion board as useful in building a collaborative learning atmosphere.

Catalyst for Learning

As a result of the leadership that she showed in taking on the roles of a mediator and a connected knower, Sandra turned out to be effective as a catalyst to the learning of other group members. To highlight a few observations:

- * In week seven, when asked to take a stand on the controversial topic of euthanasia, Sandra realized that all

the students in the class were against euthanasia. Hence, she urged Precious, her classmate to take an opposite point of view so that she could have a “chance for an argument,” “get a discussion going,” and create “more activity on the discussion board.”

Sandra was emphatic in asserting the need to extend this personal learning goal of hers to the group as well. In response to this trigger from Sandra, Precious posted three responses within a week, in the form of short arguments: the first response was 6 lines long, the second 12 lines long and the third, 19 lines long showing a developmental process in writing an argument, which was not visible in her previous two tasks.

Toward the end of the course, Precious acknowledged that Sandra’s motivating comments had given her the “inspiration to go beyond and do the best I can” and how she had “personally learned so much” from the “positive things put forth” by Sandra. She added in her self-assessment that she had learned much from the online discussions and that her “ability to write a good argument had improved.”

- * For their penultimate task, the class was asked to respond to a reading on the topic of grade inflation. Having been concerned about sporadic cases of plagiarism in the institution, Sandra used this assignment as a forum to thrash out her concerns that were in alignment with the institution’s goals. She emphasized the need for honesty among her fellow students and for discussions on such topics as ethics. She tried to garner support for her argument from

some classmates. Thus, she brought to light serious issues of authenticity in student work and aimed to raise the bar for ethical standards within the group.

This debate evoked a positive response from another classmate, Nicole. Nicole supported Sandra outright: “I agree with you 100%,” she wrote and alluded to acts of plagiarism as “a cop out, fraud, and unforgivable.” “When you get grades you don’t deserve, what kind of person do you grow up to become? Regardless of whether or not we want the grade, we have to be strong enough to deal with the cards we are dealt, for that makes us better individuals.”

Thus, Sandra has mobilized three members in the group to focus indirectly on the topic of education values such as honesty and integrity as part of the online discussions. To give one example of the positive effect of this exchange: In the final online session, Nicole, in her peer assessment of another student’s work, focused on the virtue of honesty as an important criterion for successful learning. She remarked, “Honesty is truly the best policy. I like the fact that you were honest, that’s all that counts.”

- * Sandra’s classmate Nicole had initially been active in her online participations (posting 1 to 2 messages responding to Sandra in the first two online tasks). However, Nicole’s postings not only began to dwindle in the middle of the course (around week 7) but were also posted late. Sandra believed that Nicole became upset with the feedback from the instructor and gradually withdrew from the online

discussions. At this point, Sandra who saw much potential in Nicole as a learner felt that it was her responsibility to draw Nicole back into the fold.

With the intention of motivating Nicole (and with no prompting from her fellow classmates or the instructor), Sandra then posted a lengthy (2 page) note of encouragement directly to Nicole in week 11. This posting was non-academic in its style and tone and partially written in Ebonics (See Appendix). Ironically, in this message, she appealed to Nicole to value the need to write college assignments in an academic style and to participate in the online discussions. This message from Sandra successfully brought Nicole back on board. Thereafter, Nicole did complete all of her remaining online assignments and improved her learning performance.

Nicole's very next submission was more than a page long—the longest assignment that she had posted so far. She had divided her written presentation into three sections with relevant sub-headings and showed greater analysis through the use of examples when compared with her previous submissions. In discussing her experience of online discussions for this task, she was able to highlight significant features of learning within the group. She wrote: "I was shocked about the amount of respect we had given each other on our disagreement. We were able to make comments to one another without hurting one's feelings." Note that the affective tone of Sandra's message of support was at least as important

to Nicole as its substantive content. As Nicole wrote in the same assignment, "We are responsible for each other. When someone's absent I feel the need to find out why they are out."

For the next assignment (which was the final online activity), Nicole responded to six peers—the highest number of peers she had responded to for a single task. Nicole also mentioned in her self-assessment report how the respect that she had experienced in the online environment had boosted her confidence as a learner.

What Made Sandra Effective as Catalyst?

In order to understand what made Sandra an effective mediator, connected knower and a catalyst in the group, one may consider these converging factors.

Sandra's personal background

It was clear that Sandra's ability for mentoring was influenced by her previous life experience. Having grown up in a foster home, she believed that she had developed traits of a counselor since childhood. Also, she had been deeply influenced by a school psychologist's role modeling in high school. After being punished at home at the age of 12 for publishing a story that dealt with drugs and sex, she felt unable to write creatively again for 30 years. Hence, she was supportive of peers who might have had similar distressing emotional experiences that had proved detrimental to their learning. Although Sandra stated that she did not intend to be a leader at the beginning of the online critical thinking class, the excitement that she derived from learning had moved her to a mentoring position.

Features of the group that may have aided Sandra

The class as the whole was small with only 11 students. But for one male student, the rest of Sandra's classmates were all female. Interestingly, all of the female members of this class belonged to the Black minority even though not all of them were American by birth. But for Sandra, they were all in their 20s or early 30s. Sandra was in her late 40s and the oldest student in the class.

In Sandra's self-image, she was a born listener with an innate skill for counseling. This helped her reach out to her classmates unconsciously. On being questioned about the need for her to play a coach to her classmates, she replied with genuine affirmation, "That's who I am. That's who I have been—always. I have always played the role of a listener and I am comfortable with it."

Sandra's personal philosophy of effective education

From the self-reports and interviews it becomes evident that Sandra's personal philosophy of education was characterized by a strong belief in academics being an empowering force. As a pedagogical principle she believed that it was more important to inspire students instead of instructing them. Moreover, she felt that a good education system must inculcate the practice and maintenance of ethical standards. Anger over race issues including frustration over the "discrimination faced by black people," were crucial factors that motivated Sandra to show concern for her classmates' learning as well as for her own.

Conclusion

In spite of substantial evidence that peer discussion contributes substantially to the growth of knowledge, there remains a significant question about what makes it

work successfully. One of the most prolific researchers on the subject, Gilly Salmon (2000) emphasized the importance of skillful and knowledgeable e-moderators in promoting peer learning. Whereas this is a useful starting point, it fails to take into account how the diversity among group members affects learning outcomes. We believe that a deeper understanding of online discussion will have to take factors such as goals and background knowledge of group members, members' comfort and skill with technology, interpersonal dynamics within the group, course content, and course goals into account.

The present case study advances our understanding of how individual contributions with a group affect the success of online discussion. It does this by presenting a model of how a single student who takes on a pair of related roles, those of a connected knower and a Vygotskian mediator, can act as a catalyst for learning within the group as a whole. It shows as well how this student, herself, simultaneously benefits from assuming these roles.

The value of such a model is two-fold. First, it advances our theoretical understanding of social learning in general and online learning in particular by adding a new process-type to the existing array of learning process models. (An example of another type of social learning is "scaffolding" [Vygotsky, 1934/1986].) Second, it can contribute to the improvement of both online and offline discussion management. As instructors gain a robust collection of successful learning models, they will become increasingly able to select interventions likely to be successful for a variety of courses and different types of learners.

Note that the dual-status model presented here (Vygotskian mediator and connected knower) relies for its effectiveness on the combination of two

roles. This model applies to groups similar to the one in this study which contain a unique individual who wants and is able to combine them both. Although it does not equally apply to all online discussion groups, it has particular relevance to ones that are heterogeneous. Furthermore, this study can potentially serve as a starting point for future research that identifies the contributions of other distinctive individuals who contribute in other important ways to the success of discussion groups.

Other recent models of effective learning have also relied on a similar combination of status. The most influential of these (Papert, 1981) argued for the effectiveness of certain computer programs such as Logo in mathematics education because of their dual status. He argued that they act simultaneously as everyday physical gadgets (similar in this respect to television sets and home entertainment systems) and systems that embody an abstract mathematical structure. More recently, Feinberg, Kannan, and Miller (2006) have argued that visual media such as film are educationally effective in helping students master classic literary and philosophical texts because of this dual status. In this case, the two roles are those of media product on the one hand and representation of an educationally significant text on the other hand. The success of the concept of dual status in modeling such diverse cases of successful learning suggests that it may deserve further attention in the future.

Single-Subject Case Study as a Research Methodology

Since Campbell and Stanley's (1963) famous statement that "such studies have such a total absence of control as to be of almost no scientific value" (p. 6), the research community as a whole has become skeptical of the single-subject case study

research design. In our opinion, this skepticism has become so exaggerated that it has come to serve as a significant impediment to the growth of knowledge.

Although Campbell and Stanley (1963) are correct in warning about the dangers of making strong causal claims on the basis of a few case studies, there nevertheless remain important places within the process of research when single case analysis may be not only valuable but essential. The generation of new models and other potentially explanatory concepts is a case in point. We see our field of study, that of human learning, as an excellent illustration. We have made painfully slow progress in understanding how people master complex domains of knowledge, such as mathematics, philosophy, and foreign language and consequently have contributed little to solving the vast educational problems that many societies face, including our own. Why has progress been so slow? The reason, in our opinion, is that prevailing methodological strictures systematically discourage precisely the kinds of investigations, such as single subject case studies, that will lead to developing a rich enough conceptual infrastructure.

The dual-status model presented here in our opinion is a small but real contribution to the conceptual core that we need to understand learning as it normally happens. We hope that more researchers will take up the challenge of expanding this repertoire to the point that we can successfully explain and enhance the phenomena that we seek to understand.

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