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Fostering Critical and Creative Thinking through Classroom Discourse: The GNOSIS Framework

Hung Wei Loong, Chen Der-Thanq &
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INTRODUCTION

[N]othing is more fascinating than to follow out the relations of concepts and, by discovering unexpected relations among them, see them unfold into a harmonious system whose contemplation gives great aesthetic satisfaction. There is such a thing as playing with ideas. ... One of the great values of creative work, as in writing, painting, or any art, is that it promotes a constructive, although unconscious, playing with meanings in their relations.

Dewey 1933, p 182-183

The recent emphasis in Singapore's education system has been on critical and creative thinking (e.g. see *Straits Times*, February 1997). One of the means through which such thinking habits can be fostered is collaborative learning among peers (e.g. see Hung 1996). More recently, educational researchers are advocating social constructivistic principles to learning and instruction (e.g. Bredo 1994; Prawat 1996). The fundamental emphasis in this approach is the **social construction of knowledge** through the function and use of language for establishing inter-subjectivity, shared meanings, and understanding.

Concomitant with the above, we were concerned with implementing social constructivistic or collaborative learning principles in our classroom instruction at the National Institute of Education (NIE) (Singapore). Our observations of classroom discourse suggest that our instructional methods fostered a milieu of critical and creative thinking.

It is our aim in this paper to share with educational practitioners the approach we have adopted. According to our observations, students were engaged in a collaborative process of **Generating, Negotiating, Organizing, and Situating of Ideas and Strategies**. We coined the term **GNOSIS** (Greek equivalent of knowledge) to connote the processes

involved. Although our original intention of the GNOSIS process was a conceptualization of a framework for social constructivism (see Hung, Chen & Cheung 1997), we recognized on hindsight that the framework is eminently relevant to critical and creative thinking. Students were engaged in the exploration of many creative ideas, coupled with critical opinions of each other's views.

Situated around a problem-solving context, the GNOSIS framework emphasizes the social sharing and constructive dimensions of students' knowledge. Students are encouraged to explore, discover and discuss with their peers, with the teacher as a facilitator to the discussions. One major tenet of the GNOSIS framework is that only "seed" ideas and "seed" strategies are taught to students in order to scaffold their thinking with possible ideas and strategies to adopt. In such an environment, students are responsible to socially construct their knowledge and individually appropriate the knowledge gained into their own learning experiences.

BACKGROUND OF COURSE

The students engaged in our course were Year Two undergraduate students at the NIE. The objectives of the course include:

- engaging students in playing with varying design ideas, for example, metaphors and interactivity, through which they construct their design strategies or principles;
- situating and validating their constructed strategies and principles into actual projects or product derived from the course; and
- exploring multimedia technicalities suitable for instructional usage.

As class time was limited to 2-hour slots once a week for a period of only 9 weeks, we recognized that supporting infrastructure in terms of computer-mediated tools, must be accorded to facilitate the social construction of knowledge. These tools served as "scaffolds" for the social constructivistic learning process as students were not accustomed to such methods of discourse. We introduced e-mailing during out of class time and computer-mediated distribution through broadcasting (*PC-Semi system*) of students' projects for class time discussions. We felt that students must be encouraged to "socialize" through different means as far as possible. In addition, we also video recorded each of

the class discussions so that students could review the discussions on their own for deeper understanding.

THE GNOSIS PROCESS

As we reflected upon the discourse and interactions among students, we conceptualized the GNOSIS framework for the social construction of knowledge (Hung, Chen & Cheung 1997). Through the engagement of generating, negotiating, organizing, and situating of ideas and strategies, students are often engaged in critical and creative thinking processes.

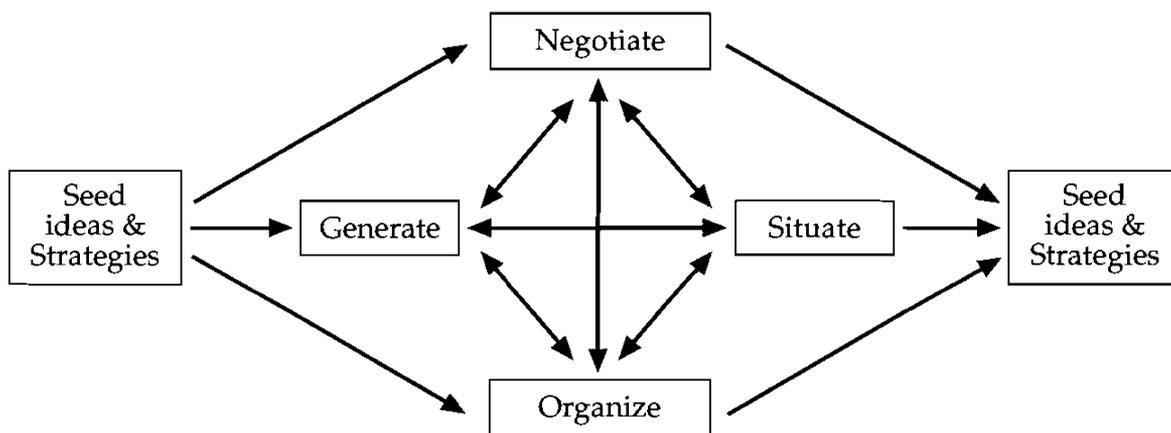


Figure 1: The GNOSIS Process

The thrust in the GNOSIS process (see Figure 1) is the social construction of ideas and strategies by the students themselves. The teacher serves as a facilitator, strategically engaged with the students in the thinking process. In such a context, teachers only provide "seed" instruction in order to get students started on a task. Students are encouraged to explore novel and creative ideas beyond the textbook. Here, ideas are broad general conceptualizations, notions, opinions, estimates, impressions, suppositions, conjectures, or objects of knowledge that relate the rich real world information to the context of the problem task (Gough 1989).

As depicted by the opening lines of this paper, Dewey (1933) illustrated that ideas have the potential of arousing an alert mind, carrying students to new fields, branching out into new ideas as a plant sends forth new shoots" (p 334). He expressed such efforts as "to anticipate together" (Dewey 1925/1981, p 141). The writings of Dewey suggest that discoveries and new horizons of knowledge spring from novel ideas anticipated by individuals and group discussions. Ideas, as

possibilities, instigate and direct the mind towards new proposals and plans for action, bringing new facts to light. Taking heed of Dewey's opinions, we conjecture that ideas are catalysts to new dimensions of creativity.

However, strategies are also useful for students' execution of the problem at hand. It is only when strategies are over-emphasized or over-used that students seem to **automatically** or blindly applying heuristics, procedures, and rules before a consideration for more elegant and creative solutions.

"Seed" instruction (teacher's intervention) can occur at the any stage of the GNOSIS process. In the event that students' discussions are at a seeming tangent to the main line of thought, our role as teachers is to provide "seed" instruction to "scaffold" the main ideas generated. For example, we introduced the notion of "seed" analogies or metaphors for our students' multimedia projects. An example of creative "seed" ideas is the use of "Mom's Kitchen" as a metaphor for illustrating nutritional fats, and the "Magic School Bus" metaphor to illustrate a field trip into the different parts of the human body. When stimulated to generate more ideas, students were able to create novel ideas such as a "magician" metaphor to represent the changes in size, shape, and states, and the "Simpsons" family (from an American cartoon series) to represent the different temperaments within a household.

Other instances of "seed" instruction, for example, in mathematics problem solving could take the form of illustrating creative and novel methods in which authentic problems have been solved. Students could then be led to discover and conceptualize the generic strategies used in problem solving (e.g. see Polya 1954).

Often, after the generation of ideas, students are engaged in a process of discussing whether the ideas generated were relevant to the design of instruction. Such a negotiation process is probably of unequivocal importance in such a context (Prawat 1996). The negotiations fostered within our class time created an environment where students were critical in their opinions as they analysed and evaluated each other's works. We have noticed many instances where students were able to discover new and creative ideas as they brainstormed on each others projects and metaphors used. Through commenting on each other's projects, students intrinsically learned to reflect on their own projects, thinking through their own design from a "third person's perspective."

In negotiation, students are usually engaged in explaining their ideas, defending their opinions, and trying to convince others of their thoughts. For example, concerning one of the projects entitled *The Human Body*, the project group had to convince the class that the metaphor used of entering into the human body stage-by-stage engaged the user (of the multimedia project) in the learning process. The contention raised was that the stage-by-stage entry did not provide flexibility to the user. After a considerable discussion, the class concluded that the design had to depend on the instructional objectives and flexibility to be accorded appropriately.

In the instance of mathematics problem solving, students could be arguing about the usefulness of heuristics and strategies in comparison with attempts on more creative ideas and novel solutions. Here, the argument is that the “blind” or **mechanical** application of procedural strategies could inhibit students from more critical and creative methods (Hung 1996). In such an instance, the teacher could well challenge students to come up with novel and creative solutions to authentic problems in relation to others attempting to solve the same problems using standard heuristics. In such a context, students could learn to appreciate the value of creative ideas as against the use of strategies.

From the feedback of the class discussions, students (who were willing to learn) had to organize (or reorganize) their content knowledge, including ideas and strategies earlier conceptualized. By organization of ideas and strategies, we mean the process through which students consolidate their knowledge and subsequently form abstracted norms which could be in the form of refined ideas and strategies. However, the “validity” of their constructed knowledge can only be substantiated when applied or situated through personal experimentations (see Hung 1996). Here, teachers could provide more problem tasks for students to think about in order to concretize their conceptualizations.

We recognized the importance of situating their knowledge, that is, ideas and strategies, appropriately. When they have validated their knowledge, students again go through a process of negotiation through which shared ideas and strategies are derived (refer to Hung, Chen & Cheung 1997 for examples of shared ideas and strategies). The shared knowledge reflects the discussions and experiences of the students themselves. Such knowledge becomes the “personal knowledge” acquired by students, which is to be desired for meaningful learning. Similarly, Vygotsky (1981) describes the process of personalizing knowledge as **internalization** from the intermental level to intramental level.

Finally, although we presented the GNOSIS process as generally linear, that is, from **generating** to **situating**, an important point is that there is no distinctive sequence to these processes as students could be engaged in an interplay of the various processes. At any stage of the learning process, students could be organizing their knowledge or situating their ideas in various contexts, without a distinctive sequential process of generation or negotiation.

ISSUES AND CONCERNS

In the GNOSIS process, the teacher's role is to facilitate students' critical and creative thinking processes. However, we recognized that certain conditions are needed to facilitate the process at the classroom level. As each instructional situation is different, we refrain from delineating guidelines that are too detailed.

The following points are some considerations:

- students must come to class prepared for discussions on their projects, which means that they have to spend out-of-class time working on their tasks;
- students come to class prepared to ask questions;
- teachers must be competent on the subject matter to facilitate the discussions;
- teachers must first allow students to respond before he/she makes the contribution;
- teachers must facilitate a general atmosphere of willingness to share and exchange knowledge;
- teachers should have a good assessment of individual students' knowledge and competencies as they contribute; and
- teachers should make an effort to consolidate the shared knowledge gained through the discussions as a closure to each lesson and to prepare students for the next class discussion. Where possible, the teacher should "engineer" the class discussions such that the generated knowledge matches (as far as possible) with the

required content knowledge that students must minimally acquire before the end of the course.

An important point to be addressed is the issue of assessment. In the project-based course which we conducted, a student's performance is judged based on his/her continual performance throughout the course, including his/her contributions in class discussions and out-of-class discussions through e-mail. Journal reports were to be written by students and these jottings were to be handed in as part of their final reports. Students' fears of "competition" were allayed as we emphasized that their contributions whether through e-mailing or class discussions would count towards their final assessment. Creativity of ideas generated was another significant criteria to assessment.

Another consideration is that time must be given to students. Often, it is the pressure to complete assignments (including assignments from all the other courses) which causes students to resort to non-creative means. If we are to make a difference in students' thinking and creativity, fundamental changes in assessment criteria and curriculum infrastructure must be considered. However, as major changes in our education system cannot be implemented "over-night", we can devise creative means of facilitating students' thinking. As we complemented our instruction with the creative use of tools such as e-mail and *PC-Semi*, we recognized that students' tensions of "finishing projects" were gradually reduced and a general atmosphere of critical thinking and creativity resulted.

CONCLUSION

The GNOSIS process is important as traditional education seems to emphasize the "pouring" of products, for example, conceptualized strategies, into students' heads. We recognized that the instructional approach of rote learning is limiting, but we conjecture that a certain degree of "seed" ideas and strategies has to be taught in order to facilitate the collaborative thinking and learning processes. As described above, the GNOSIS framework depicts an instructional and learning process where teachers and students are both situated within the milieu of critical and creative thinking, with a balance of what is taught and what is to be discovered.

We also recognize that the curriculum and instructional process of our Singapore educational system at the current moment would

probably not facilitate the GNOSIS process. Our aim of this paper is just to provide teachers and educational practitioners with seed ideas of how critical and creative thinking can be fostered through social constructivistic learning. We hope that teachers would find the GNOSIS process useful and develop their own strategies through which such thinking and learning can be fostered among students.

Finally, it is our conviction that idea-based social constructivism (Deweyan philosophy, see Prawat 1996) is of paramount significance to critical and creative thinking. However, strategies have a complementary role in “scaffolding” students’ thinking and learning. Especially in complex or difficult problem solving situations, students require some guidance as to find the “light at the end of the tunnel”. Hence, the significance of ideas and the usefulness of strategies are both necessary to students’ thinking and learning processes. An extreme slant in either directions would mean an incomplete and unwholesome approach to thinking, learning, and instruction. We hope that the GNOSIS framework has provided seed ideas and strategies to both teachers and educational practitioners concerned with fostering critical thinking and creativity among Singaporean students.

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