

Developing Responsible Learners: The Power of Intentional Mental Processing

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Abstract: Most college students do not habitually do the deep thinking that will allow them to take their learning beyond the acquisition of knowledge. This paper examines the findings from a phenomenological study of eight students involved in an interdisciplinary community focused on developing responsible, life-long learners. Students identified both the myriad ways the learning opportunities had been structured to engage them in thinking and the impacts of the resultant deep reflection on their learning. Implications are that educators must do more asking than telling until students learn to ask and answer the challenging questions on their own.

Keywords: reflection, intentional mental processing, deep thinking.

I. Introduction.

Learning from experience is powerful for most individuals, but rarely will they “extract all the potential meaning that is implicit or move beyond their current meanings without being challenged” (Caine and Caine, 1997). One key to helping students use their experiences to engage in deeper learning is active processing, which, according to Caine and Caine (1994), is:

...the consolidation and internalization of information, by the learner, in a way that is personally meaningful and conceptually coherent. It is the path to understanding, rather than simply to memory...The pervasive objective is to focus on the process of our learning and extract and articulate what has been explored and what it means. In effect, the learner asks in as many ways as possible “What did I do?”, “Why did I do it?”, and “What did I learn?” (p. 156-157)

(Note: Because of common misconceptions associated with the phrase “active learning,” we are using “intentional mental processing” in place of Caine and Caine’s phrase: “active processing.”) The more questions the individual asks and answers, the deeper the learning is likely to be as a result of the experience. As Perkins points out in the article “Learning as Biological Brain Change” (Leamson, 2000), “Learning is a consequence of *thinking*—it’s less the doing than the thinking, the reflecting on that doing that counts” (p. 37).

In their book *Connecting Leadership to the Brain*, Dickman and Stanford-Blair (2002) refer to a similar kind of thinking within a discussion about reflective intelligence.

If information patterns are the currency of intelligence, reflection is the compounding of returns on the original investments in their construction. That is, reflection is the ultimate stringing together of patterns of information through serious consideration—a conscious

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bending back—of constructed knowledge to proactively explore further configurations, implications, and applications thereof. In effect, the reflective qualities of your brain engage in examination of how that which is mentally constructed might best be invested—exploited might be a better word—to the advantage of survival interests. (p. 95)

While a full discussion of the reflective nature of intelligence is beyond the scope of this paper, the basic notion of engaging students in meaningful reflection fits with the active processing suggested by Caine and Caine (1994). It further supports rephrasing that notion as intentional mental processing. In addition to the questions of “What did I do?,” “Why did I do it?,” and “What did I learn?,” Dickman and Standford-Blair probably would add “How did I do it?” and “What if... ?” Indeed, from our own research we would add “What was/am I thinking?” and “Why was/am I thinking that?” The challenge for educators is to help students learn to ask and answer these kinds of questions consistently for themselves for most experiences—to engage in intentional mental processing as a habit of mind. This study examined the experiences of students in a program that was designed specifically to get students to take responsibility for their own learning by developing intentional mental processing as a habit of mind.

II. Background for the Study.

Recently, we had the opportunity to combine our knowledge of human learning and the principles of learning organizations in a program for students at a land-grant university in the Midwest. As part of the National Science Foundation (NSF) Scholarship for Service (SFS) program, students are awarded full scholarships in exchange for two years of federal government work following graduation. The NSF SFS program is an interdisciplinary effort involving students and faculty in computer engineering, computer science, mathematics, political science, management information systems, and education. Fellowship recipients participate in a two-year leadership development program in addition to the requirements of their majors. The program is designed with an emphasis on: (a) learning about learning, (b) learning about self, (c) purposefully developing community, (d) deliberately practicing and refining skills to support and encourage the growth of self and others, (e) practicing metacognition, and (f) engaging in intentional mental processing. The knowledge, skills, and dispositions desired as outcomes of this program are certainly outside the experiences and comfort zones of these students’ previous educational encounters. By the end of the first year, it was clear students not only were taking responsibility for their own learning, but they also were developing into a productive community of learners. We needed to find out what contributed to these developments.

III. Methodology.

A. Methods.

The desire to understand, from the words of the participants, key factors that contributed to their learning and development made this an ideal phenomenological research study (Colaizzi, 1978; Moustakas, 1994). We experienced the phenomenon of learning in community with the participants and witnessed their growth and development into avid learners and worthy team members. Therefore, we engaged in the phenomenological epoch process (Moustakas) to

identify our own beliefs, biases, and assumptions and set them aside to focus on the lived experiences of the participants.

B. Data Collection and Analysis.

Although the eight participants in the study were in the fourth semester of the NSF SFS program, the research was designed to focus on the learning experiences during the first two semesters. Consistent with the goal of phenomenological research to collect rich, meaningful information that accurately depict the participants' interpretations of the phenomenon (Merriam, 2002), data sources included a focus group interview comprised of all eight participants, individual interviews, journals, and written self-assessments. All interviews were audio taped and transcribed verbatim. Data were analyzed and interpreted following the steps suggested by Colaizzi (1978): read all data, extract significant statements, formulate meanings, organize into clusters of themes, integrate into an exhaustive description, and formulate the exhaustive description in as unequivocal a statement of identification of the phenomenon's fundamental structure as possible. Data were validated by returning the findings to the participants and asking for feedback. Also known as member checking (Merriam, 2002), this step provided no new data.

IV. Findings.

As referenced earlier, the last stage in the analysis of the data is to organize the themes into an exhaustive description of the phenomenon and formulate the exhaustive description in as unequivocal a statement of identification of its fundamental structure as possible (Colaizzi, 1978). In general, the themes that emerged were: self-identified growth and development, continuous reflection, metacognition, high expectations for addressing challenging tasks, interdependence, accountability, and supportive environment. Therefore, the fundamental structure of the phenomenon of learning in community, as perceived by these eight participants, is a self-recognized transformative development resulting from engaging learners in intentional mental processing before, during, and after challenging them with, and holding them accountable for, addressing complex, meaningful tasks in an interdependent and supportive environment over time. This complex statement gives rise to a multitude of possibilities of exploration with implications for educators and students. This paper explores the impacts of intentional mental processing in this transformative experience.

While it is not surprising that students would identify intentional mental processing as being key to their learning, what was surprising was the number of different ways they identified that we had structured the learning experiences so they had to think. We understand, as identified by Leamson (2000), that learning is a very private matter and happens only in the mind of the individual. This means external agents cannot actually cause learning, but can only influence the likelihood of it. Therefore, faculty do have a responsibility to guide and direct the thinking and actions of students, but it is the individual learner who "must think deeply and repeatedly about something" (p. 37) and in multiple ways before learning occurs. Although we are purposeful with every learning opportunity planned for students, revelations from the participants identified just how much our own habits of mind related to thinking causing learning guide almost all of our actions and behaviors related to students and their learning. In this paper we uncover, through the words of the participants, the kinds of expectations and experiences that contributed to the development of intentional mental processing as a habit of mind. In addition, we provide

insights that can be used by other faculty who seek to have their students become independent, intentional learners. We do this by first explaining overall expectations that made a difference for engaging students in thinking. Next, we describe specific experiences and identify the components of those related to intentional mental processing, thereby, providing insights for those in charge of developing intentional learners.

A. Expectations.

We view the leadership program as developmental in nature. According to Douglas Robertson (2001), development is a process of adding something, such as thoughts, feelings, or behaviors, to what was there already and, as that something is integrated, having the whole that it is joining, such as a perspective or frame of reference, be transformed. Students enter the NSF SFS program with different sets of thoughts, feelings, and behaviors based on unique experiences. We do not expect that they will all progress in the same way or at the same rate. We do, however, expect all students to take responsibility for their own growth and development—that they do their own thinking and own their choices of actions. We understand this as becoming intentional learners. Every learning opportunity is planned with that outcome in mind, and students are reminded continually that the assignments are for them, not the professor. The words of the participants reveal differences in our expectation and the kinds of expectations they were accustomed to meeting in order to get a desired grade:

In the vast majority of my other classes, I show up for class, jot down a few notes, do the homework, and take the tests. I am not forced to share thoughts of my own or involve myself with others. Indeed, most college classes allow students to work in isolation which is a grievous error. Leadership class is dramatically different. I am required to voice my own values and perform teamwork. I am not allowed to just sit back and listen. I must synthesize my own thoughts and express them.

When we were given the assignment I dreaded it. I knew it was going to be hard and that it was not something I could just do and get over with.

Without a doubt, meaningful learning is hard work, and we do expect students to fully engage in the hard work required for deeper learning. Our overall expectation that students take responsibility for their own growth and development is more fully clarified via the specific expectations of changing habits, thinking, coming to know self, and engaging in metacognition.

Changing habits. Most students (and many faculty) are deeply entrenched in the paradigm of learning where students come to class expecting to be told exactly what to do and how to think, check assignments off a list, take tests that measure how much information has been stored in (short-term?) memory, and then dump the information before moving on to the next class. The good grades received from such practices don't always translate into abilities to solve ill-defined, real-world problems students will face the rest of their lives (Huba and Freed, 2000). Faculty have a responsibility to help students break through that paradigm and to learn to do the thinking required to become intentional learners, but breaking old habits of being told exactly what to do and then checking things off a list to meet requirements for earning a grade does not come easily:

I have been having quite a bit of trouble with the interview assignment. I sort of wish there were clearly defined guidelines on what we are supposed to learn, because I'm used to that. This is sort of stepping outside my comfort zone, having to decide what I want to learn and all.

I feel much more comfortable now in these settings than I did in the past, and the reason is because I have had numerous opportunities to practice them. I think an important distinction is that I was not forced to do so once or twice because of assignments, after which I could breathe a sigh of relief and never worry about doing so again. Knowing that it would be more or less a weekly requirement to share my personal feelings with a larger group, I realized that it was not something I just had to get through, it was something I had to become better at.

To be sure, breaking old habits is not easy and it does take time. The time invested, however, reaps rewards as students begin to realize that learning is, in fact, a developmental process:

Over time, I'll think of things that I couldn't today, or later we'll learn stuff that I can apply that I didn't know to think about today. I think that is one thing about our class that is really important, and pivotal to our continual growth and learning. By assigning us to go back and look at things we've done or somewhat completed, reflect upon them and then apply new things to them we are learning more and getting more out of topics and materials. We don't just read a chapter and then never go back, we are required to apply those things learned to new assignments later on. It's a great way to commit those ideas, principles and facts to memory...

Those words written in a journal entry during the last week of September reveal that Kim was beginning to internalize two important concepts about deep learning—it is never finished (developmental) and thinking is critical.

Thinking. As referenced earlier, it is not the doing that causes the learning. It is the thinking about the doing that causes learning (Leamnsen, 2000). The challenge, then, for faculty is to help students develop a habit of thinking about all learning opportunities. The words of the participants reveal their understandings that we do expect them to engage in thinking before, during, and after class:

Coupled with the knowledge I have gained about how I am best able to prepare for such things [interactions during class] (journaling, jotting notes, some kind of critical thinking beforehand), I now feel much more at ease sharing things in this particular group.

...if we have an idea we've been talking about all class, I might reflect on it at a certain angle and that's another reason I like the go-rounds. Hearing what other people, I always like those go-rounds that say 'what are you going to think about more as a result of this class, this particular session', and just hearing what other people got out of it. Sometimes it's completely different than what I did, and it gives me something else to think about that I wouldn't have started thinking about otherwise.

Ever since Wednesday, I've been thinking about the group activity we did with the poker chips, surviving the cave...

As students do begin to change their old habits and being thinking before, during, and after classes, as they begin to develop reflection as a habit of mind, our next challenge is to get them to engage in deeper reflection—to move them toward intentional mental processing.

The goal of intentional mental processing must always be for deeper thinking and ultimately deeper learning. It is not just the final stage in a lesson or a time of reflection following an experience (Caine and Caine, 1997). It includes thinking critically, asking and answering probing questions, exploring alternative perspectives, solving real-world problems, and searching for big ideas and broad applications of new concepts. Intentional mental processing leads to deeper understanding, relevant insights, and mastery of the discipline. The following excerpts from students' journals reveal that they were beginning to do the type of thinking required for intentional learners:

I recognize the worth and impact this project had on me and that is the start to further growth and understanding. I learned that there is so much out there to be learned and I understand that in the grand scheme of things there is so much I do not yet understand. Expressing beliefs and values is more challenging than just thinking them. It takes more time and effort. You are discussing/reflecting on an event in the past and must then make future decisions based upon your new decisions (or affirmed beliefs). You can't be stagnant, you have to try and learn from the past and all the thinking that you did afterwards. The potential for growth and gaining a better understanding of yourself is huge; you just need to make sure you take advantage of that.

As Marti's words suggest, intentional mental processing leads to insights not only about experiences, but also about self.

Coming to know self. Once students become accustomed to a deeper kind of reflection, we try to "help them take advantage" of this opportunity to learn more about themselves by moving them deeper into intentional mental processing—investment of resources in personal analysis, critical thinking, and application of new knowledge to daily living. The next step is introspection, a detailed mental self-examination of feelings, thoughts, and motives:

Fortunately, reflecting regularly has put me better in touch with how I am feeling. I realize I have an innate inclination to withdraw. Ergo, I should be able to fight the urge and keep making forward progress.

I did not have a great sense of what my own values were in the early stages of my leadership training. I rarely ever stopped to reflect upon my learning experiences. I just moved on from one experience to the next without a second thought. As a result, my personal growth was very slow if not nonexistent.

As students come to understand more about themselves, they seem to like the control they have over their own growth and development. They become more willing to manage their learning and to own their choices and behaviors—to become the intentional learners they need to be:

My writings allowed me to get a handle on why I think and feel the way that I do. Plus, journals were an outlet for me to scrutinize my strengths, my weaknesses, my success, and my failures. Once I had that information, I could begin to work on bettering myself.

Eventually they begin to think more about their own thinking:

Interestingly enough... I have discovered something about myself. I have always thought of myself as a traditionalist in many ways. I never pictured myself as one of those new age thinkers... Not that I find anything wrong with the new way of thinking about things, but it is really not the way I thought I thought about things.

According to Huitt (1997), metacognition, thinking about one's own thinking, is an essential skill for learning how to learn. That supports our notion that intentional learners *must* practice metacognition as a habit of mind.

Engaging in metacognition. Apparently, students recognized our expectation that they practice metacognition:

Actually this, if I recall correctly, is a big objective of the whole leadership class idea. Most people (myself included) don't really think enough about their thinking. This can, and does, result in people doing a lot of things for reasons they're not really sure of themselves... I really think I have a much better understanding of why it is important to think about your thinking than I did before.

Metacognition means more than just thinking about our own thinking. It requires the wisdom to know one's ignorance and how one's patterns of thought and action inform as well as prejudice understanding (Wiggins and McTighe, 1998). These words of a student from a self-assessment provide evidence of this kind of thinking:

I think this process [metacognition] represented a gradual growth in my awareness of my unawareness. What I mean is that I think I began to realize that I didn't think enough about my thinking about the world around me... Near the end of the semester, I no longer seemed to be thinking as much about what we were doing as about what I was thinking. Not to say that I didn't have thoughts about what we were doing, but often I'd stop and think about where that thought was coming from.

Indeed, the analysis of the data confirmed our observations that by the end of the first semester students were beginning to question their old paradigms of learning and to embrace a different understanding of what it means to learn. They were well on their way to taking responsibility for their own growth and development. Going back to the data revealed numerous specific experiences that contributed to this phenomenon:

We have used reflection in a number of ways. The most prominent way is our journal, but we have done other reflection in class, such as jotting down thoughts after an activity or coming up with praise and suggestions for the second year students' security sessions. Throughout all of these activities, I have realized how much my understanding of the topic at hand improves after I have completed some reflection. Often the reflection brings up new questions or ideas that I had not originally considered, and these lead to the possibility of even deeper understanding.

As stated earlier, similar statements from the participants revealed just how much our own habits of mind related to thinking causing learning had influenced almost all of our actions and behaviors related to students and their learning. All our expectations did, in fact, require thinking. Our ultimate goal was for that thinking to evolve into intentional mental processing as a habit of mind. All learning opportunities were planned with that end in mind. The analysis of our data, in the words of the participants, revealed the following kinds of experiences that seemed to have the greatest impact on moving the students toward our goal: go 'rounds, team activities, dialogues, application of skills, self-assessments, and journals.

B. Experiences

For each kind of experience, first, we provide a brief explanation of the learning opportunity. Next, we offer illustrations, from the voices of the participants, to give insight about the impact for helping students develop intentional mental processing as a habit of mind. And, finally, we offer suggestions for post-secondary educators in charge of student learning.

Go 'rounds. To encourage both thinking and contributions early, we start and end every meeting with a go 'round. This is one of our favorite interaction strategies. The facilitator poses a question or a notion to elicit a response, and after individual think time, each person is expected to speak. A volunteer is selected to start the go 'round and to determine the direction around the circle following the first response. If an individual is not ready to speak when it is his/her turn, that person may pass until everyone else has spoken. Discussion is discouraged during the actual go 'round to provide all individuals the opportunity to reveal their thinking publicly without fear of being ridiculed or judged.

During the focus group interview participants were reflecting on those first classes and the early go 'rounds. One participant recalled how difficult it was to meet the expectation of speaking, "When you required us to talk, I was scared to say anything. I would always pass; well, not always, but a lot of the times." Another one recognized how much his willingness to speak up in other groups had changed. When questioned about the reason, he replied, "Having go 'rounds every week, you know, always having to say something once or twice every class." Kelly valued those go 'rounds that gave him the opportunity to hear what others were thinking because it often gave him more to consider:

...if we have an idea we've been talking about all class, I might reflect on it at a certain angle and that's another reason I like the go-rounds. Hearing what other people [are thinking], I always like those go-rounds that say 'what are you going to think about more as a result of this class, this particular session', and just hearing what other people got out of it. Sometimes it's completely different than what I did, and it gives me something else to think about that I wouldn't have started thinking about otherwise.

As students practiced the thinking required to express thoughts openly, they learned to think more deeply, to challenge the notions they were studying:

I have since become convinced that I am better off to form my own leadership philosophy rather than wholly adopt someone else's. That realization has caused me to think more critically about what I am learning. For example, in the last opening go-round

I questioned whether a person actually moves through stages of tolerance towards enlightenment as Exploring Leadership suggests. Seemingly, intolerance is a learned behavior. In the beginning of the semester, I did not think nearly so critically. I accepted what I read and heard at face value.

Helping students move from being afraid to voice their opinions to the group to being willing to critically challenge concepts they have studied takes time. Be patient. Set ground rules for go 'rounds and hold everyone to them. Ground rules we have found most useful include:

- Each person has the opportunity to talk without any responding.
- Honor each person's thinking.
- An individual has the right to pass. If one chooses to pass, go back to that person after the go 'round has completed the circle.
- No interruptions.
- No sidebar conversations.

Students will watch the facilitator closely; therefore, it is important to model expected behaviors. It is especially difficult, as the facilitator, not to respond to contributions, thereby breaking the first ground rule. Instead of commenting as each person finishes, address them by name and thank them. This honors the response and indicates that the go 'round is moving on. Only when necessary or helpful, ask probing questions for clarification or to redirect.

The question or the notion posed to elicit a response will determine the type of thinking for the student. It is important here to be purposeful. During the first go 'rounds our purpose is simply to get students to speak. It is important to keep the contributions as non-threatening as possible—so everyone will have a response and no one else can suggest it is wrong. Our first one is usually, “Tell us your name, where you are from, and something you are pretty good at doing.” This allows everyone in the group to start gathering information about their peers and it allows us to guide the next activity toward what they know about learning—“How did you learn or get good at what you shared?” From this point on, all the go 'rounds should serve a purpose and engage students in the type of thinking you desire of them.

Team activities. For years the study of learning was dominated by a psychological view that focused only on the individual and his/her thinking alone (Brandt, 1992), but current cognitive scientists consider learning to be largely a social process (Caine and Caine, 2001). Undeniably, much learning occurs through social interaction. This notion of learning through social interaction means more than just having students practice and recite terminology together (Caine and Caine, 2001; Leinhardt as highlighted in Brandt, 1992; Wiggins and McTighe, 1998). It means providing them the opportunity to make their implicit knowledge explicit—giving them the chance to explain their thinking to each other, listen to each other, and help each other explain. The words of the participants confirm the notion that it is not the activity itself (the doing) that causes the learning as much as it is the reflection (thinking) following the activity that causes the learning:

At the beginning of the semester I was pretty skeptical of the idea of doing icebreaker games for leadership training. I had never had an experience where I left an icebreaker game feeling like I had gained anything (maybe with the exception of the names of the people in the group) from the experience. For the first time in my life, I feel like I have learned from this type of small group activity... Each of these activities was designed to

teach the members something about leadership, and each of these points has stayed with me. I believe this is true because I reflected on the activities.

After reflecting on the exercise, I have learned a bit more about myself as it pertains to my contributions in a group setting.

As team activities became more complex, students realized the value of discussion for promoting deeper thinking:

I also need to work in a group to be at my best. Of course, group work needs to come after I have had some alone time so that I feel adequately prepared. Once I am prepared, though being in a group allows me to bounce ideas off of others. In a group setting, my train of thought gets revised. I incorporate other people's thinking into my own thought process and a synergy takes place. I get a much broader and clearer picture when I am put in a team.

Eventually they came to appreciate the importance of interaction not only during the activity, but also as they discussed interactions during the activity and set goals for the future. Kim's words reveal movement from simple reflection toward intentional mental processing with a focus on analysis:

For sure the way the three hour class periods are spent, because they're spent interactively talking most of the time, performing activities that are fun and then after you're done with the activity, talking about everything that happened in the activity, that was something that I never would have done before and that was probably the most valuable key as a group, was definitely the most valuable thing that we did. Just having to talk about everything, analyze what other people did, analyze what you did...

Putting students into teams and telling them to work together does not mean that they know how to interact or that they will do so even if they do know how (Johnson, Johnson, and Smith, 1991). We have found three critical components for increasing the chances that having students work in teams will promote learning: 1) students must have a reason to interact, 2) they need to learn skills that will allow them to interact effectively, and 3) they must process the interaction. Therefore, it is important to be purposeful in planning interaction, to deliberately teach specific interactive skills, and to develop specific questions to guide processing.

As with go 'rounds, we like to start simple and plan for success. Our favorite strategy is the turn to your partner (TTYTP), which we have adapted from the work of Johnson et al. (1991). The purpose of a TTYTP is to engage the brain of the learner. General steps for using this strategy include:

- Purposefully plan a question to cause the type of thinking desired.
- Allow time for students to formulate responses individually.
- Ask students to share their responses with their partner and listen to the response of their partner.
- Encourage students to reach toward a deeper understanding through discussion.
- Hold students accountable for their discussions by calling on them at random.

An appropriate interactive skill for students to practice as they engage in the TTYTP is active listening. Since we expect students to practice effective interactive skills, we do take time

to teach the skills—to help them understand our meanings and the steps involved for each skill. We also expect students to practice using the skills during class interactions and outside of class.

As students become comfortable working with a partner, we increase the number of individuals on the teams and the complexity of the activities. Regardless of the size of the team or the purpose of the interaction, it is critical to be always mindful that it is the thinking that causes the learning. Students must engage in thinking about the team activity and must learn how to engage in discussion about the interaction. Faculty must continue asking the questions that will cause the students to engage in the kind of thinking and discussion desired until the students learn to ask and answer their own questions. This does take time, but the time invested reaps rewards as students learn to engage in deeper discussions with less structure.

Meaningful discussion. According to Bandura (1977), environments that support and promote interpersonal interaction are more likely to result in greater reflection. The social interaction may increase motivation, prolong on-task engagement, produce more information, and stimulate additional ideas—all contributing to deeper thinking about the experience. Our challenge is to facilitate a discussion following the social interaction that encourages students to reveal their thinking to others. During the focus group interview participants revealed that they had come to value such discussions:

One thing that I would like to see not change is just how much group discussion there is on everything, whether it be the readings or creative writings or the go-rounds. I like the amount we just talk together.

I kind of enjoyed the current events, talking about things, especially if you have something like an election going on, I think to hit that and really discuss what really is going on, takes yourself out of the classroom aspect and more into the world aspect, and anytime you do that I think it's effective...

Not only did participants seem to value the discussion, they also came to understand that experiencing “interesting, intellectual discussions” may lead to an increase in confidence, resulting in a willingness to take more risks:

I feel like I've developed more confidence through the course of the program. It is the first real opportunity I've had, or at least taken advantage of, to be involved in interesting, intellectual discussions... Doing some of these activities from week to week has built up a confidence in me such that I know I am capable of doing these things, even if I do not always feel up to it. Getting past the fear of putting myself out in front of everyone, and of being responsible for other people's learning, has been a big hurdle for me to overcome. I feel that in the future I will be more willing to take risks in these areas...

As students embraced the notion “of being responsible for other people's learning,” our jobs became easier. Students learned to challenge one another to think more deeply:

In addition to their good advice, my classmates completed their job of making me reflect deeper. I believe Adam asked me why I was bothered. After all, someone else acting out has no bearing on me. I had to think hard about that one, but I think I have an answer.

On top of improving my own thinking, I have helped my classmates think more deeply. In talking about my own struggles as a leader earnestly, I gave my classmates problems to which they could relate. They were then able to think about my dilemmas and determine what they might do in my situation. By causing my cohorts to think more deeply, I received excellent advice from them. I have come a long way from the first few Leadership sessions in respect to challenging other peoples' thinking. I only posited my own ideas rather than eliciting higher thinking from others in the beginning.

Without a doubt, students were beginning to move toward the kind of interactions Senge (1990) believes important for leaders in education, business, and industry who seek ways to turn their institutions into learning organizations, "where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together" (p. 3).

Helping student learn how to engage in such meaningful discussions takes time. As with the go 'round and team activities, start simple and plan for success. Structure opportunities where students will experience a supportive environment as they risk making their thinking public. Engage them in discussions about reading assignments where they have had time to prepare responses prior to class. Ask the type of question that will elicit the type of thinking desired. Challenge their thinking by asking them to support their claims. Continue asking questions until they learn to challenge themselves and others. The key, then, to helping students move toward intentional mental processing by engaging in meaningful discussion is the same as learning any skill—having the opportunity to use the skill.

Application of skills. A major aim for undergraduate education is for students to use all they learn in their post-secondary education to solve the problems they will face in the future. This transfer of learning—using concepts in a situation different from where they were learned—is one of the most powerful principles of learning (Sousa, 2001). However, it is critical to understand that while the brain does many things automatically, transfer is not one of them (National Research Council, 2000). Using learning in a situation different from that in which it was learned requires intentional mental action on the part of the learner. Faculty must help students learn how to do the kind of thinking required for transfer of learning.

As students worked to change their old paradigms of learning, they seemed to understand the impact of deliberate practice of new skills on their own growth and development:

One of the most important aspects of all the development I have experienced is that I was given the opportunity to practice different skills many times. Rather than just reading or talking about a conflict resolution skill, or how to improve group interactions, we actually had quite a few chances where we either explicitly focused on practicing, a skill, such as some of the in-class activities, or we were given other tasks to do, like security education sessions, service learning projects, and while working on those tasks we were able to put the things we learned about into effect.

A practice strategy we like to use to promote transfer of learning is our adaptation of role-playing. We refer to it as "working a role." We ask students to work a role as honestly and sincerely as possible to help all of us learn as much as we can. Students come to know the value of such practice:

I can see the value in role-playing certain controversial situations in order to learn more about myself. I hadn't previously realized that fairness was such a strong value to how I view things.

To encourage students to practice new skills outside of class, we set the expectation that they will practice, and we hold them accountable for doing so. Asking students to commit to their own growth and development during a final go 'round is a simple way to set the expectation, "Tell us one thing you will do during this next week to enhance your own learning." The opening go 'round during the following week can be used for accountability, "Tell us what you did and how it went." A typical response might be:

I sometimes have trouble remembering things, especially where school is concerned, so after last week's class I was ready to try activating my semantic memory lane and really focusing on remembering more things I learned in class. Surprisingly, it seemed to work fairly well.

Another favorite strategy we use to encourage students to transfer their learning is a "practices inventory." Learners record insights about learning, identify habits or behaviors that are congruent with the insight, identify habits or behaviors that are incongruent with the insight, and develop plans to use the insight to enhance their own growth and development:

I did an okay job on the practices inventory. I filled in as much as was required of me, but I did not go any further beyond that. I did spend a lot of time thinking and writing about the insights that I had. Consequently, I filled the practices inventory up with a brutally honest look at my behaviors. The amount of thinking I did behind the writing was probably the most beneficial to me.

Michael's last statement reveals the key—"The amount of thinking I did behind the writing was probably the most beneficial to me." Critical for helping students learn to use skills in new situations—to transfer their learning—is to engage them in intentional mental processing. Faculty owe it to students to help them learn to ask and answer the following questions:

- How is this similar to something I already know? How is it different?
- How have I used this kind of information in the past?
- In what other situations might this be useful?
- What implications are there for me as a professional?
- How might this knowledge or skill impact my professional development?
- What impact does knowing this have on my future?

As students learn to transfer their skills into real-world situations, they begin to think of themselves as professionals—to identify strengths and to set goals for improvement:

Admittedly, I have spent time in introspection and outlining goals for myself but have a tendency only to see what's in front of me. I do, however, see the value of looking at how far one has come. Positive reflection on past successes gives one a sense of confidence, making future goals seem less intimidating and more surmountable.

This willingness to engage in self-examination sets the stage for students to learn to critically assess their own growth and development.

Self-assessments. An emphasis on self-assessment is consistent with our goal for students to take responsibility for their own growth and development. Not only do students need to learn to do the thinking that will empower them to manage their own learning, they need the ability to critically assess themselves as professionals when they enter the work force. Therefore, we require students to formally assess their own learning and progress at the end of each semester. An excerpt taken from one student's self-assessment written at the end of the year reveal the ability to think critically about self growth and development:

The final major area of development worth noting is my journaling. After reading through last semester's journal entries and comparing them to this semester's, I noticed quite a difference. The first is my topic of writing—last semester it seemed pretty sporadic, and now the focus has improved quite a bit, as noted in my analysis. I also do not recall ever writing about current leadership issues in last semester's journal, and I have learned it can be useful to keep up to date with both good and bad leadership examples, and be able to recognize the differences between them through journaling and critical thinking. Other improvements include thinking through decisions and rationalizing their outcomes, and increasing my depth of reflection overall.

Once again, the words of the participants reveal the key to self-assessment—intentional mental processing. Students need to engage in deliberate thought about what they are learning and how they are learning it (National Capital Language Resource Center, 2004). This kind of reflection allows them to step back from the learning process and think about their own learning strategies and their own progress—an important step in becoming independent learners. Self-assessment at the end of each semester is a critical strategy for moving students in this direction.

When completing the semester self-assessment, students typically find that their journals provide solid evidence of their development as learners:

One of the best places to look for evidence of learning and growth is my reflection journal. At the beginning of the semester, many of my entries did not contain much depth. I would simply write down an idea and not think fully about all the possible viewpoints. However, as time progressed and I reviewed the rubrics, I slowly began to use a more in-depth process in my decision-making and justification of ideas.

“We know the power of self-reflection to deepen learning for adults... One of the strongest motivators is the opportunity to look back and see progress” (Chappuis, p. 42, 2005). Chappuis' words support our findings that being required to record thoughts regularly in a journal is one of the most powerful experiences for helping students develop intentional mental processing as a habit of mind.

Journals. Faculty typically ask students to do mental processing in different ways, such as responding to teacher-directed questions, discussing with team members following activities, or sharing their thinking during large group discussions, but it has more meaning for students if they actually record their thinking on paper:

Journal writing connects students with their emotional selves and core values. Through writing, students become aware of the relevance of their belief systems. Through writing, they begin a healthy habit of reflecting on moral values as they consider problems and issues that come up in their studies and in their daily lives. I have found that students *want* to discuss topics that touch on important moral questions. (Wanket, 2005, p. 74)

This is the purpose of the reflection journal as students take responsibility for their own learning and development within the community of learners. Students often engage in deeper thinking while recording thoughts in their journals. In addition to framing and guiding their thinking throughout the course, the journals provide evidence of growth and development along the journey.

For many students in the NSF SFS program keeping a journal was a new experience. It was necessary for us to persist longer than they resisted before they would realize the benefits of doing the thinking and investing the time required to record their thoughts:

When I first heard we were going to be doing a journal I was apprehensive and a little disconcerted. I have never done any journaling before, and I was a little reluctant to do it fearing I wouldn't be able to put my thoughts to paper. However, as it turned out, it is a great learning tool for me, more so than I would have thought initially. I figured at first that it would be something I'd slog through and do as well as I could, but I didn't really expect great returns on the time I invested.

In the case of the leadership journal, at first I did it simply because it was a requirement of being in the class. Over time it developed into a valuable tool for me, but the problem is that I wouldn't have done it in the first place if I wasn't "forced" to.

Eventually, students were able to identify specific examples of how writing in their journals contributed to their growth and development as intentional learners:

Additionally, the encouragement of reflecting on different things happening inside and outside of class helped me to solidify my thinking more, and think more critically about the things that happened. I think the hardest part of reflection is making yourself do it, but making it an integral part of the leadership development courses has helped motivate me to put my thoughts on paper.

...by forcing myself to sit down and come up with nearly a page or more of writing about a semi-focused topic, I definitely develop that idea more than I would with only mental thoughts; I think it is easier to push oneself to find more insight in this manner.

Now that I have spent a semester keeping a regular journal about various issues relating to our coursework... I have developed a great appreciation for the value of putting thoughts down on paper and giving more critical consideration to them. There were many journal entries that I started writing with one idea in mind, and by the time I finished I had come to a completely new, unexpected realization.

Students will bring a myriad of experiences with keeping journals and a variety of attitudes. Some students will welcome the challenge, but others likely will resist. Most important

in overcoming the resistance is setting the expectation that students will keep a journal and holding them accountable for doing so.

Once students understand that they will be held accountable for recording their thoughts in journals they will likely need direction to develop skills leading toward intentional mental processing. Two simple suggestions offered by Wanket (2005), a high school English teacher, are applicable for learners of all ages: date every entry, and write without ceasing. The journals will become logs of their thinking. Students will learn to read through their journals and track their own growth. There will be times that dates of an entry are important to them. In addition, early on, students likely will need to force themselves to make entries. Specific dates will be reminders of minimum expectations set either by self or by instructor. "Write without ceasing" helps remove the burden of perfect writing. Some students are likely to be inhibited by their perceived skills as writers. Encouraging them to go wherever their minds wander usually will lead to more original insights and creative thinking.

Once the students get used to the idea of recording their thoughts in journals, they will be more receptive to additional guidance. Our experience has been that one of the most important notions to help students internalize is the idea that they are keeping the journal for themselves – not for us. Students have become so accustomed to having instructors tell them how they did and how to improve that they often hesitate to think for themselves. It is not until the student truly embraces that idea of ownership that he/she is ready to explore and expand her/his own thinking. At this point, providing prompts to inspire deeper thinking is important:

- How can I use this?
- Why did I react that way?
- How is this similar to something else I understand? How is it different?
- What other applications might there be? What are the implications thereof?
- What does this mean for me as a professional?

V. Conclusion.

Indeed, the students recognized that they were developing intentional mental processing as habit of mind:

Everything we do from our journaling to class participation to our interview projects has involved diligent reflection. And because of this I have been able to weigh and consider all of my actions, thoughts, beliefs and the information gathered from outside sources to enhance my learning and growing experience...

This understanding about the importance of reflection is something I can use in almost any situation in the future, especially in difficult times, to explore my thoughts and understandings further.

Faculty have the responsibility to help their students develop abilities to solve ill-defined, real-world problems they will face the rest of their lives. This requires the ability to learn continuously and to think critically. Moving students from simple reflection to intentional mental processing (identified above as diligent reflection by one of the participants) as a habit of mind will better equip them to have a positive impact on the world.

In doing our own intentional mental processing about what these participants had to say, we realized the key to helping students become responsible learners is in doing whatever it takes

to get them to think. In reflecting about “whatever it takes,” we concluded the foundation of every strategy we employ is asking questions and expecting students to develop answers. Even if faculty feel ill-equipped to engage students in some of the learning experiences we have described, they can work on purposefully planning and asking the questions to promote deeper thinking in students. Key questions might include: What do you think about...? Why do you think that? How is this similar to...? How is this different...? What did you do? Why did you do it? What do you conclude about...? What is your evidence? Why does it matter? How does this connect to...? What have you learned about...? What is your evidence that you have learned it? What are the implications of...? What difference will this make in the/your future? Eventually, students will learn to ask and answer challenging questions on their own, and their emerging intentional mental processing as a habit of mind will support their development as responsible learners.

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