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Mindset about Intelligence and Meaningful and Mindful Effort: It's Not My Hardest Class Any More!

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Abstract

College students' implicit theories (or mindsets) about intelligence can affect not only their motivations toward learning, but also their cognitive habits and behaviors while learning thus impacting academic achievement. In this paper we describe learning experiences we used with our learning community to 1) introduce students to the concept of implicit theories (mindsets) about intelligence, 2) encourage them to move toward growth mindsets rather than fixed mindsets about their abilities to learn, 3) challenge them to identify learning as more than memorization and recall, and 4) hold them accountable for doing the work of the mind (meaningful and mindful effort) required for learning. Questionnaires given at the beginning and again at the end of the semester revealed increases in students' self-reported knowledge of mindset about intelligence and the effect it has on their abilities to learn, about the impact meaningful and mindful effort has on learning, and about the meaning of effort. More important, students also reported positive changes in behaviors as they took more responsibility for their own growth and development by practicing the work of the mind. Leaders of learning communities can use this set of learning experiences to help their students achieve even more academic success.

Keywords

learning community, mindset about intelligence, effort, achievement

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Introduction

Instead of focusing only on getting the good grades that typically mark success, what might happen if students confronted their own beliefs about intelligence and their understandings of making meaningful and mindful effort toward learning? Is it possible that they could learn even more throughout their post-secondary experiences? How could learning communities contribute to student development in this regard? We had the opportunity to explore these questions in a cross-disciplinary learning community, the Academy for Leadership and Learning.

As students transition from high school to postsecondary education, their past experiences influence individual beliefs not only about learning, but also about their abilities to learn. These implicit theories of intelligence predict how hard learners will work to master a given task (Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 2010). Psychologists have found two orientations toward intelligence that predict individual behavior: intelligence is innate and unchangeable (“entity” or “fixed” mindset); or intelligence can be developed and grown (“incremental” or “growth” mindset) (Blackwell et al., 2007; Dweck, 2006; Dweck 2010; Good & Dweck, 2006). With a fixed mindset (Dweck, 2010), individuals believe performance on a task reflects innate intelligence and ability. People with fixed mindsets believe that if they have ability, everything should come naturally. They tend to work harder on things they know they can do and shy away from challenges. Individuals with growth mindsets are more concerned with mastering the task and believe they can improve their skills with hard work. They tend to exert effort and persevere when they encounter setbacks.

In higher education, learning communities were established with the intent of increasing student success—both academically and socially (Laufgraben & Shapiro, 2004). Students entering post-secondary education bring with them a variety of experiences with and attitudes toward learning, thus those who lead learning communities are regularly presented with opportunities to help students link new learning opportunities with those prior experiences (Wiersema, Licklider, & Ebbers, 2013). Throughout high school, some students have been successful meeting expectations and getting good grades in most, if not all, subjects; others have excelled in certain classes; and some have struggled to meet minimum standards. These experiences form the foundations of beliefs not only about learning, but also about individual abilities to learn. Learning community leaders, then, have an opportunity to challenge students to confront their beliefs about learning and abilities to learn in a safe place in order to change their paradigms not only of learning but also of the ability to learn.

Theoretical Context

While effort is widely acknowledged as critical for educational achievement (Marzano, Pickering, & Pollock, 2001), most studies operationalize effort as time spent on academic activities such as studying course materials, attending class, and interacting with faculty (Michaels & Miethe, 1989; Svanum & Bigatti, 2006; Wyatt, Saunders, & Zelmer, 2005). The literature, however, is replete with support for the importance of deeper thinking to enhance learning. According to Caine and Caine (1997) 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” (p. 121). One way to help students use their experiences to engage in deeper learning is through active processing, which, according to Caine and Caine (1994), involves the use of questions to cause the learning to become personally meaningful and conceptually coherent. This leads to “understanding, rather than simply to memory... 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?’” (pp. 156-157). The more questions the individual asks and answers, the deeper the learning is likely to be as a result of the experience. According to David Perkins (as cited in 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).

Lovett (2008) connects effort with thinking through her work with first-year science majors. She found helping students develop growth mindsets about intelligence was essential for teaching metacognitive strategies. Students must first believe exerting effort is valuable rather than an indication that they are not smart enough. When students recognize challenge as an opportunity to learn and effort as evidence of learning, they will increase effort and, by extension, Lovett argues, performance will improve. A challenge for educators is to help students understand that effort is the work of the mind—not simply the “time spent” on studying.

A key, then, to deeper learning is for students to realize that learning only happens in their brains when they are engaged in thinking. One goal in developing responsible learners is to take these notions of meaningful reflection and active processing to the next level: intentional mental processing (Wiersema & Licklider, 2009). Intentional mental processing means deliberately and habitually (intentionally) engaging in the specific kind(s) of thinking required during and after all learning opportunities. Such thinking goes beyond the active processing suggested by Caine and Caine: What did I do? Why did I do it? and What did I learn? Intentional, responsible learners will further develop their reflective intelligence by automatically asking and answering questions such as:

- How did I do it?
- What if... ?
- What was/am I thinking?
- Why was/am I thinking that?
- How is this similar to...?
- How is this different...?
- What did I do?
- Why did I do it?
- What do I conclude about. . .?
- What is my evidence?
- Why does it matter?
- How does this connect/relate to...?

A challenge for those who lead learning communities is to help students learn to ask and answer these kinds of questions consistently for themselves, most of the time, until intentional mental processing becomes a habit of mind. The goal is to help students recast their understanding of effort that produces learning as not simply “putting in more time,” but a conscious investment of attention to different ways of thinking about the information. Regardless of the type of learning community, the community itself provides a safe place for learners to practice these new ways of thinking and to challenge each other to do more thinking.

The purpose of this paper is to share the practices we used to support the journey of our cross-disciplinary learning community as learners worked to be more successful in their courses. Learners moved toward growth mindsets about their intelligences, realized the importance of intentional mental processing, and practiced meaningful and mindful effort toward learning as much as possible in their most difficult courses.

Learning Community Context: The Academy for Leadership and Learning

In this paper, we report on strategies we developed to encourage students to confront their beliefs about mindset and meaningful and mindful effort in the introductory course of a learning community known as the Academy for Leadership and Learning. This two-semester, cross-disciplinary experience provides structured opportunities for students to develop responsibility for their learning and worthy team membership. The primary leader for the experience is a faculty member in educational leadership, assisted by two additional faculty members from agricultural science departments (the Academy for Leadership and Learning was established through a U.S. Department of Agriculture Higher Education Challenge Grant).

The experience is available to all incoming freshmen who enroll voluntarily when they register for their first semester courses. The focus in this first semester is on learning and the true development of community, with the intent of providing students who are in transition from high school to college the opportunity to practice and refine learning, teamwork, and leadership skills while they are being introduced to their disciplinary majors in other courses. The curriculum was designed to emphasize: (a) learning about learning, (b) learning about self, (c) purposeful development of community, and (d) practice and refinement of skills to support and encourage growth of self and others. The overarching goal within this cross-disciplinary learning community has always been to create responsible learners—individuals who manage and control their own growth and development. In addition to these emphases, specific learning outcomes have been established for moving toward a growth mindset about intelligence and monitoring individual effort toward learning. Specific student expectations hold students accountable for meeting the learning outcomes.

Early in their first semester, students often realize the transition from high school to college is not as easy as they anticipated. Many of the study habits from high school no longer help them meet their academic goals. Words reveal strongly held beliefs about individual intelligence—“I’ve never been good at math.” or “If I work harder, I will do better next time.” These beliefs are indicators of the kind of studying students will (or will not) do for challenging classes. Drawing on the work of Dweck (2006), who suggests students’ beliefs about intelligence set up a dichotomous pattern influencing interest in learning and approaches to challenges, our goal is to help students move toward growth mindsets about intelligence and so we hold them accountable for doing the thinking (meaningful and mindful effort) required for learning.

Learning Activities

Introducing the concept of implicit theories of intelligence

With any new learning, we first prompt students to examine their beliefs. After reading and thinking about the article written by Trei (2007), “New Study Yields Instructive Results on How Mindset Affects Learning,” students engage with a partner to discuss the article. These discussions are guided with specific prompts:

- Describe your initial reaction to the article.
- How were you able to relate to the information in the article?
- What does “intelligence” mean to you?
- What is your meaning of a fixed mindset about intelligence?
- What is your meaning of a growth mindset about intelligence?

- After reading the article, how do you think your schooling reinforced your idea of intelligence?

The week following the discussion of the article, students were asked to respond in their reflective journals to questions intended to further challenge their own beliefs about intelligence. Additionally, one assignment was to think about their K-12 educations and bring something to class that represented a specific memory. The object brought to class provided an easy conversation starter for students to share experiences. More important was the pre-thinking guided by a reflective assignment (Figure 1). These assignments and the small group activity designed to engage the students in sharing past experiences evoked many memories that revealed why students held certain beliefs about individual intelligences. One young man said, “I never realized that one negative experience with reading continues to cause me to believe I can’t read.” At the end of class one freshman admitted, “It’s not that I’m bad at anything—I just have a bad attitude about learning!” After these discussions, students were more open to moving toward a growth mindset about their own intelligences.

Moving toward a growth mindset about intelligence

Students operationalized the notions of a fixed mindset about intelligence and a growth mindset about intelligence by engaging in an activity called “Mindset Matters” (Figure 2). After individual think time and time for partners to discuss, we used a whole class discussion to create lists on the board. These lists provided students the opportunity to examine their own words, actions, and behaviors related to theories of intelligence and, more importantly, provided them with specific things they could do and say to move toward a growth mindset. Students seemed to be engaged in these conversations. As one sophomore noted, “Although I claim to have a growth mindset about organic chemistry, my words and actions suggest otherwise.”

Realizing the importance of intentional mental processing

After students grappled with the idea that with effort they could develop new knowledge and skills, the next challenge was to help them understand that effort means more than time spent studying. It means doing the hard work of the mind—the kind of thinking required for the task. Early in the semester, students identified their most difficult course. We then challenged them to monitor their thinking and achievement during that specific class for a week (Figure 3). They first identified (and recorded) the specific learning outcomes for the class period—what they should be getting out of class that day. After class, they

Education in My Pocket

Describe a memory you have of a positive learning experience during kindergarten through 6th grade.

Describe a memory you have of a positive learning experience during middle school and/or high school.

Describe a memory you have of a negative learning experience during kindergarten through 6th grade.

Describe a memory you have of a negative learning experience during middle school and/or high school.

Journal question: Which of these memories is the one you remember the best? Why? How has the memory affected your perception of your own intelligence?

Figure 1. "Education in my pocket," an exercise used for students to explore their educational experiences in relation to their self-theories of intelligence.

Mindset Matters!

Write your *personal meanings* for the following:

Growth mindset about intelligence

Fixed mindset about intelligence

Having a growth mindset about intelligence...

Looks like <i>(nonverbal behavior)</i>	Sounds like <i>(things you say or think)</i>	Feels like <i>(emotions, attitudes)</i>

Having a fixed mindset about intelligence...

Looks like <i>(nonverbal behavior)</i>	Sounds like <i>(things you say or think)</i>	Feels like <i>(emotions, attitudes)</i>

Figure 2. "Mindset Matters," an exercise for students to record their reactions to and thinking about their self-theories of intelligence.

examined whether or not they had met the learning outcomes they had set for themselves. If they believed they had, we expected them to record evidence showing this. If they believed they hadn't, we expected them to describe why they hadn't met the learning outcomes. In either case, their subsequent step was to identify actions to take next.

Students struggled with this kind of thinking during the first week. We invested class time allowing them to share examples from their charts. Typical comments included: "I've never really thought about what I should be learning in class." "I realized that I was trying to memorize what I heard without really understanding the concepts." "Now I know what I need to do to be more successful next time." After the class discussion, learners began investing more time thinking about their own thinking and monitoring the results thereof. They continued tracking their thinking and achievement during class for a second week. By the end of the second week, both their self-monitoring notes and their comments in class suggested that they had begun to believe they were capable of understanding more in their most difficult course. For the next two weeks, students used the same format to monitor their thinking and achievement as they worked on assignments outside of class. By now, learners were realizing that by practicing specific kinds of thinking – intentional mental processing – their achievement could improve.

Practicing meaningful and mindful effort toward learning

We know that having high expectations for students and holding them accountable for working to meet those expectations is crucial for learning (Weimer, 2002; Wiersema & Licklider, 2008). We also know that changes in actions and behaviors take time. To help the students learn to manage their efforts, we developed a "Meaningful and Mindful Effort Chart" (Figure 4). Focusing on their most challenging course, students were expected to identify specific factors that interfered with learning as much as possible in that course and what could be done to overcome the challenge. They were expected to assess the results of their actions and make plans for continued growth. Charts were reviewed by course facilitators, and students were encouraged to provide specific evidence of the kinds of thinking they did and to distinguish between "time spent" and "effort invested."

Achievement Rubric

- 4 I exceeded the learning outcomes for this assignment.
 3 I met the learning outcomes for this assignment.
 2 I met a few learning outcomes for this assignment.
 1 I did not meet the learning outcomes.

Monitoring achievement in _____

Date	Topic of Class	What should I get out of being in class today? (by the end of class, I will...)	Did I meet those learning outcomes? If yes, do it here or describe what you did:	What did I do that helped me meet the learning outcomes? If I didn't, why not?	Action steps
9/6	Atomic structure and intermolecular forces	<ol style="list-style-type: none"> Name three major types of subatomic particles Describe how valence electrons facilitate bonding of atoms Illustrate 3 types of bonding. 	<ol style="list-style-type: none"> YES: Atoms = protons, neutrons (these form nucleus and make up most of atomic mass), electrons (zoom around the nucleus) YES: Valence electrons = outside shell. Atoms always want to have [x] electrons in their valence shell, so they bond with other atoms whose electrons they can borrow to help theirs add up to [x] whatever the valence level is (sometimes 8 -> octet rule). NO: See drawings in class notes for today for ionic and metallic bonds, but I didn't understand what they were saying about covalent bonds. <p>Achievement Rubric: 2</p>	<p>I read and thought about the section of the text on valence electrons before class, so objective #2 was really easy. But I thought I remembered the bonding stuff (#3) from high school chemistry so I skipped that section. In lecture, what the professor was saying was unfamiliar, so I started taking notes and copying the drawings too late and couldn't keep up. I missed out on covalent bonds.</p>	<p>I am going to look over the textbook's diagrams about <u>covalent bonds</u>. If I'm still confused, I will talk to my TA <u>before or after the next lecture</u>.</p>
	(Followed by additional cells to be filled in by students....)				

Figure 3. Framework for students to use to monitor their thinking and achievement in a specific class for a week.

Meaningful & Mindful Effort

My most challenging class _____

Date: _____

What interferes with me learning as much as I possibly can in this course?	This is what I tried:	Date:	This is what happened:	This is what I will change or continue:
I can't keep up with the lectures. I get behind in taking notes. Then I get discouraged and just give up.	I found out I could get the notes online before the lecture. I made a copy and took them to class.	9/17	It really helped. I was able to focus on and think about what was being said. I added to the notes by putting things in my own words.	I will continue to get the notes before lecture AND I will read and think about the notes before I go to class. I'm sure I will understand even more.
(Followed by additional cells to be filled in by students....)				

Figure 4. "Meaningful and Mindful Effort" worksheet completed by students to examine the effort they invest in learning activities.

During class, time was planned for students to share their experiences monitoring their efforts and achievements with two or three other students. These exchanges also provided opportunities for students to learn with and from others within the learning community—and it was clear that our whole learning community was invested in the effort to develop meaningful and mindful efforts. It didn't take very long before students began to notice that when they did the thinking, they could meet the challenges. More than once during the semester we heard a student say, "It's not my hardest class anymore!" Discussions within the small groups revealed that students were not only changing their behaviors in their most difficult courses, but in other courses as well. As one student said, "I noticed this week that I am doing more thinking in all of my classes." Students had started on the path of becoming responsible learners—those who manage and control their own growth and development—in the company of others (Licklider, Hendrich, Wiersema, Thompson, & Haynes, 2010; Wiersema, Licklider, & Ebbers, 2013).

Students' Perceptions of Effectiveness

While the journey we embarked upon with our students was not designed as a formal research study, we did administer questionnaires at the beginning and the end of the semester to gather information about students' perceptions of their experiences. Eleven items with a 6-point rating scale measured how much students thought they knew about mindset, learning and effort as well as how often they engaged in meaningful and mindful effort or behaviors (Table 1). Students' responses from the beginning and end of the semester were matched using an anonymous identifier. Means were calculated for each question using Microsoft Excel. Two-tailed, paired t-tests were conducted for each item to compare students' responses at the beginning and the end of the semester. Statistical significance was declared for $p < 0.05$. Students' self-reported beliefs, knowledge, and actions related to learning reflected changes we observed as well.

Responses at the end of the semester revealed increases in students' self-reported knowledge about the impact mindset about intelligence has on abilities to learn, about the impact meaningful and mindful effort has on learning, and about the meaning of effort. We did not detect a change in student knowledge about what gets in the way of their learning (item 4, Table 1), possibly because their initial score was relatively high. Better evidence of learning, however, was apparent from items 8, 10, and 11, which revealed self-reported changes in behaviors as students practiced the work of the mind required for learning. Our experience suggests that providing opportunities for students to examine their own beliefs about learning within the safety of a learning community and exploring the various kinds of thinking required for learning may have led to the changed attitudes and behaviors revealed in the pre/post questionnaires.

Table 1.

Student responses to pre- and post-course questionnaire items using a Likert scale for knowledge (1 = “Nothing” and 6 = “Enough to apply confidently”) and actions (1 = “Never” and 6 = “Always”) related to their self-theory about intelligence and efforts toward learning.

Question item	n = 27	
	Pre-course mean	Post-course mean
How much do you know about....		
1. your mindset about your intelligence?	4.3	5.1***
2. the impact meaningful and mindful effort has on learning?	4.3	5.3***
3. what constitutes meaningful and mindful effort for high achievement in this class?	3.7	4.9***
4. specific things that get in the way of your learning and/or achievement?	4.7	5.1
5. how your level of interest in a class or topic impacts your learning and/or achievement?	5.2	5.8**
6. How believing “I’ve always been good at this” or “I’ve never been good at this” impacts your learning and/or achievement?	4.8	5.4*
How often do you....		
7. seek challenging learning opportunities to develop your own intelligence?	3.6	4.1*
8. intentionally apply meaningful and mindful effort to enhance your learning and/or achievement?	3.9	4.6**
9. intentionally use specific strategies that will result in higher learning and/or achievement in this course?	4.3	4.7*
10. take specific actions to overcome what gets in the way of your learning and/or achievement?	4.1	4.9***
11. do specific things to ensure you are thinking about your coursework as you study?	4.1	5.0**

*, **, and *** denote statistical significance using paired t-tests at the 0.05, 0.01, and 0.001 levels, respectively.

Summary

Our experiences with this cross-disciplinary learning community are consistent with the growing evidence that classroom activities focused on students' abilities to learn can have positive effects on academic achievement (Aguilar, Walton, & Wieman, 2014; Miyake, Kost-Smoth, Finkelstein, Pollock, Cohen, & Ito, 2010; Walton & Cohen, 2011). Such activities focus on students' subjective thoughts, beliefs, and feelings about school and learning (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009). Education researchers have also noted that these experiences often create an upward spiral, in which the trajectory of increased academic performance resulting from greater effort creates positive momentum with lasting effects (e.g., Yeager and Walton, 2011).

By designing experiences intended to cause learners to examine their own beliefs about their intelligence, it is possible to help them move toward growth mindsets. Once students understand they can get better (at math, or any other subject) with the right kinds of effort, the next challenge is to help them understand effort as more than memorizing or rereading (without thinking) or using more passive study strategies. Instead, the right kind of effort relies on thinking. Effort is the work of the mind—not just the amount of time spent!

Professors or leaders of nearly any course could use these experiences to help their students exert appropriate meaningful and mindful effort for more academic success. The message is clear: those who lead learning communities can provide the safe environment and opportunities for 1) helping students develop growth mindsets about intelligence, 2) allowing them to explore specific strategies to practice engaging their brains through meaningful and mindful effort, and 3) holding them accountable for effort toward learning. As learners develop new habits, these habits will likely lead to increased growth and development throughout their post-secondary experiences.

Further, this set of experiences could serve as the basis for a research study. The observations that students articulated indicating that their most challenging course was not their hardest course anymore, and the information they provided about changes in their mindsets and actions related to effort, point to a phenomenological study. In such a study, students would help identify what, within this journey, made a difference for them. The results would give leaders of learning communities and other educational leaders insights into what to do to help students put forth the meaningful and mindful effort necessary for enhanced academic success.

We will continue to use this sequence of learning experiences with our learning community and monitor the results. Leaders of other learning communities could use these practices to create experiences beneficial for their students. We believe it is worth the effort!

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