Magna 20 Minute Mentor

Supplemental Materials

What are Five Methods to Help Students Become More Effective Learners?

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MAGNA

Portrait of a Good Learner

Program Outline

The Portraits

- Of a good learner
- Of an ineffective learner
- Think of the portraits as opposite ends of a continuum, most students are somewhere between the ends; not all students in a course are at the same different spots on the continuum
- The goal: move students closer to the good learner side of the continuum

How can teachers help students become better, if not good, learners?

1. Work to develop metacognitive awareness
    a. Students need to know more about learning
    b. Students need to encounter themselves as learners
    c. Examples of activities that promote both: post-test review activity (Andaya, et. al. 2017) and post-test analysis (Favero and Hendericks, 2016)
2. Help students understand the important role self-efficacy plays in learning (Bartimote-Aufflick, et. al., 2106. A summary of this review of research is included in these supplementary materials.)
    a. Self-efficacy refers to "a person's perception that he or she has the skill and capability to undertake a particular action or task" (pp. 1918-19)
    b. Self-efficacy is strongly associated with academic achievement: in a meta-analysis of 241 studies, it was the strongest correlate with GPA among 50 different measures (Richardson, et. al., 2012)
    c. One of the main findings from Bartimote-Aufflick, et. al.,(2016): "Teachers can intervene to raise student self-efficacy." (p. 1922)
3. Cultivate the love of learning
    a. Show yours
4. Share information about evidence-based study strategies (Dunlosky, et. al. 2013), demonstrate them in class and challenge students to use them outside of class
    a. Distributed practice
    b. Self-testing
    c. Explanations
    d. Interleaving
    e. Study groups (McCabe and Lummis, 2018)
5. Deal with the downsides
    a. Need for self-regulation
    b. Most learning isn't easy; it's hard, messy work
    c. Expect failure and frustration; both are opportunities for learning
    d. Most of the time learning isn't fun; sometimes it is

Portrait of Good Learners

Good learners are curious – They wonder about all sorts of things, often about things beyond their areas of expertise. They love the discovery part of learning. Finding out something they didn't know provides momentary satisfaction, but their curiosity is addictive with the next fix only a question away.

Good learners pursue understanding diligently – Occasionally the learning is easy but most knowledge comes with effort and good learners are willing to put in the time. They search out information—read, analyze and evaluate what they've found. They talk with others, ask questions, read more, and search out experts. What they don't understand they carry around them, thinking about it in bed, at the gym, on the way to work and sometimes when they should be listening to others. Good learners are persistent. They don't give up easily.

Good learners know that learning isn't always fun – When all the pieces finally fit together, it's fun. But the journey to understanding generally isn't all that exciting. Some learning tasks require boring repetition; others a mind numbing attention to detail; and still others periods of intense mental focus. Backs hurt, bottoms get tired, clutter covers the desk, the coffee tastes stale—no, most learning isn't fun.

Good learners fear failure but they don't fall apart in the face of it –When faced with failure, a mistake or the inability to figure something out or get it fixed, good learners carry on. They ride the strong emotions that accompany failure: frustration, anger, exasperation, sometimes self-doubt and the desire to give up. But good learners know, there's more to learn from failure than from success. The lessons of failure are deeper, more intense and remembered longer.

Good learners make new knowledge their own – Good learners change their knowledge structures to accommodate what they are learning. They bring new knowledge inside and use it to tear down and rebuild explanations, to finish up what's only half understood and to construct additions that will accommodate what they now understand. They end up with bigger and better knowledge structures.

Good learners never run out of questions – There's always more to know. Good learners are never satisfied with how much they know about anything. They are pulled around by questions—the ones they still can't answer, or can only answer part way, or the ones without very good answers. Those questions follow them around like day follows night with the answer bringing daylight and the next question darkening the sky.

Good learners share what they've learned – Knowledge is inert. Unless it's passed on, knowledge is lost. Good learners are teachers committed to sharing with others what they've learned. They write about it and talk about it. Good learners can explain what they know in ways that make sense to others. They aren't trapped by specialized language. They can translate, paraphrase and find examples that make what they know meaningful to others. They are connected to the knowledge passed on to them and committed to leaving what they've learned with others.

Good learners don't stop learning about learning – They realize that learning consists of skills and their development is a continuous process. They know how they learn, what skills are their strengths and those that develop less easily. They work on both. They understand that the learning task must be matched with the skills needed to master it.

Portrait of Ineffective Learners

Ineffective learners lack confidence – They have what they've been given. These learners believe natural ability trumps effort and persistence. If they don't have the gift, they can't do it, so there's not much point in trying. If forced—say they have to write a paper or take a math course--they start out dead sure they'll do it poorly. And even if they've never studied something or done a particular task, they may give it a try but they're not betting on success.

Ineffective learners fear failure – Many students are dreadfully afraid of making mistakes, especially if they make a one in front of their peers and end up looking stupid. They won't volunteer to answer a question unless they know the right answer—no venturing a guess, or taking a chance on answer. The only thing to be learned from mistakes is how to avoid making them.

Ineffective learners are easily distracted – First and foremost they're distracted by their devices which are with them in class and when they study after class. But they're also easily distracted by life. They have to work, they have their friends, a social life, perhaps responsibilities at home. They respond to what's pressing at the moment and that's often not studying which can be done at the last minute with the phone on and with text messages coming in.

Ineffective learners are satisfied with less than their best – If it's a required course, one they see no reason to take, one with content that's of no interest, they usually don't expend much effort. Assignments are things to get done and out of the way as quickly possible. They're in the course to get the grade; learning is not the primary, sometimes need even a secondary, objective, They do what's required, but it won't be their best work or work they can be proud of.

Ineffective learners strongly prefer easy learning – They don't want courses or assignments that tax their mental muscles too much. Let the answers be obvious and solutions easy (preferably just like the ones done in class). They've been known to applaud when classes are cancelled and exit happily when the period ends early.

Ineffective learners want to be told – Ineffective learners aren't into making decisions. They'd rather be told how long the paper should be, how many references they need, what fonts are preferred and if they should avoid the first person. They don't like to make decisions about what they should do or what they need to know because if they make the wrong ones, then it's their fault. And because they lack confidence and don't have a lot of experience making decisions, chances are good, if called upon to make some, they won't always make good ones. .

Ineffective learners don't love most of what they're having to study in school – There are things they have learned that they do love--favorites sports, electronic games, multiple kinds of social media—but reading textbooks, doing homework problems, writing papers, working on projects in groups, not so much. Courses in their major do get more attention, but even there what they need to know for tests doesn't seem all the useful, so it's learned for the test and then laid to rest.

Ineffective learners have poorly developed basic learning skills – These learners don't know a lot about learning. They rely on study strategies research recommends they avoid—they reread the text, go over their notes, they highlight excessively and do most of their study right before exams. They don't endorse new strategies with much enthusiasm preferring to continue doing it the way they've always done it.

Self-Efficacy: It's Relationship to Learning

The definition of self-efficacy is straightforward: "a person's perception that he or she has the skill and capability to undertake a particular task." (p. 1918) It's important to teachers because of its "consistent" and "demonstrable" links to student learning outcomes. If students believe they can they can learn the content (that they're smart enough) or execute the skills, that significantly increases the chance they will accomplish the learning task.

And the amount of research that supports the role of self-efficacy in learning is convincing. Findings in the meta-analysis highlighted here are based on 64 different studies. The meta-analysis builds on another review of research published in 2011. Another review of research (published in 2012) looked at 50 different measures believed to influence learning as measured by grades. It looked at 241 studies and found self-efficacy was the strongest correlate with GPA among all 50 of the different measures. The nature of these beliefs students have about what they can and can't learn merits our further exploration.

Here's the first message that emerged from this 64-study review: **self-efficacy is strongly associated with student achievement, as well as self-regulation, motivation and strategy use.** (p. 1923) Researchers report that the relationship between self-efficacy and achievement was significant in 92% of the studies they analyzed. These studies were conducted in seven different countries (including the US and Canada) and across a wide range of disciplines. Also of note, self-efficacy was not just associated with achievement. The research found strong correlations between it and 20 variables they deemed relevant, things like: self-regulation, metacognition, locus of control, intrinsic motivation and learning strategy use. In other words, students with high levels of self-efficacy do the behaviors that promote learning. They're motivated and willing to devote time and effort to the task. They're self-regulating and disciplined. They plan study sessions and then execute those plans. The use good learning strategies—distributed practice, interleaving, and self-testing, for example. Their beliefs become a self-fulfilling prophecy. They do what they need to realize their self-expectations.

Given the power of self-efficacy, the second key message is encouraging: **teachers can intervene to raise student self-efficacy.** Ten studies in this sample demonstrated that "self-efficacy was higher when particular teaching strategies were employed." (p. 1924) Seven studies showed that self-efficacy improved over a period of time probably as a result of completing a course or a particular learning activity. That's the good news. The not so helpful news is that the courses and related activities that garnered the improvement in the studies tend to be very specific, discipline- and course-related. They're not easily replicated and if they aren't replicated according to the study design, then the results aren't guaranteed.

It is always a challenge to extrapolate general conclusions from individual studies. The researchers observe, "As scholars, we need to become skillful at extracting pedagogical principles from publications or presentations reporting on work conducted in a range of disciplinary settings. . .for adaptation and testing in our own particular teaching situations." (p. 1931). What's at issue here is how research that advances knowledge gets translated into evidence-based principles that can be applied to practice.

However, there is help for teachers in self-efficacy theory which explores how learners decide if can or can't do or learn something? Those beliefs derive from four main sources and each in an area over which teachers have some control. First, **performance accomplishments** or the actual experiences of success or failure are part of what develops self-efficacy beliefs. If a learner tries something and

completes it successfully, that's evidence that they can. Frequently that motivates a second attempt and success then further builds the belief. However, not all failure experiences decrease self-efficacy—it's repeated failure experiences that do. For teachers then, it's understanding the importance of those first experiences and selecting ones where the chance of success is good. It's also understanding that failure can be a learning experience or it can erode self-efficacy beliefs.

Unfortunately, many students arrive in our courses with firmly established beliefs, and for many of them, it's about what they can't do. "I can't write." "I'm very bad a math." They desperately need experiences that challenge those beliefs and teachers who recognize that changing them is a process. The student who has never before gotten a decent grade on a math test often attributes a decent grade to luck, prayer or clean living.

Beyond experiences that challenge beliefs, self-efficacy is also developed by **vicarious experiences**, that is, by seeing the success or failure of another person, especially if the person is someone like the observer. So, if women in engineering programs see other women doing the problems, performing in lab and succeeding in courses that's persuasive and motivating. And the opposite happens as well. If students, see other students failing or don't see any other students like themselves succeeding, then those vicarious experiences accomplish the wrong result.

Teachers also need to be aware that self-efficacy beliefs are influenced by **social persuasion**. It makes a huge difference if a faltering student has a teacher who believes in them and continues to believe, even in the face of failure. The statement of belief is made acknowledging that the student has far to go, much to learn, is not close to the goal, but the student still has the potential to reach the goal. Teachers can powerfully influence the development of self-efficacy and just as powerfully compromise those beliefs.

And finally, beliefs about ability are influenced by the **physiological reactions** that come to be associated with the learning task. How does the learner feel about what he or she is trying to learning? If the experience provokes anxiety, fear and stress, those emotions get woven into beliefs about self-efficacy. This is why teachers should pay special attention to those aspects of instruction that many students do find anxiety provoking—being called to answer a question, various aspects of testing situations, and critical feedback on performance, for example.

It's difficult to underestimate the power of beliefs about ability to influence learning. A belief in the ability to do something enables a learner to confront a task with confidence, to organize what needs to be done, to know or figure out how it should be done and then to set about doing it. If students don't believe in their abilities, success is a much less likely outcome. Teachers can intervene—they can be part of the set up for success or they can be part of the reason students don't succeed.

Reference: Bartimote-Augglick, K., Bridgeman, A., Walker, R., Sharma, M. and Smith, L. (2016). The study, evaluation and improvement of university student self-efficacy. *Studies in Higher Education, 14* (11), 1918-1942.

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Regular, Ongoing, In-class Review

Most teachers already spend time reviewing content. What different here is that these activities **get students doing the reviewing** and they **do so with activities that model evidence-based exam preparation strategies.**

- Use test questions—students pay attention to them.
    - Have one displayed at the beginning of the session. "Here's a test question I've asked about the material covered when we were last together." Encourage students to test themselves. Let them talk to each other. Have them look in their notes to see if they have material there that helps them answer the question. Unanswered questions keep students engaged and attentive longer than those that are answered directly, especially if several possible answers are proposed.
    - Have student create one at the end of the session. As the session winds down, ask students to take a look at their notes. "This material is fair game for the exam. What might a test question on this material ask? How about jotting down some ideas?" Then ask several students share their ideas. Identify those you think could be good exam questions. Then use one of their suggested questions on the test. That pretty much guarantees they'll take this activity seriously. It's also a great way to get students reviewing their notes and it gives you feedback as to what they think is important.

- Regularly (as in at least once a session) ask questions about material covered previously
    - Resolutely refuse to answer the question. That's exactly students want you to do.
    - Give them a hint. "We talked about this when we were talking about X?" "Check your notes for October 20. You might find the answer there."
    - Be patient. It takes time to retrieve what you've just learned and barely understand.
    - Still no response? Tell them, that's the question you'll start with tomorrow and if they don't have an answer then, they'll next see that question on the exam.

- Have students do short reviews of previous material—at the beginning of the session, when they might need a break in the middle, or as a way to end.
    - "Let's all look at our notes from March 3. You've got two minutes to underline the three things in your notes that you're going to need to review for the exam." Ask several what they've underlined and why. This activity makes students who don't have notes for the day nervous and uncomfortable which is how they should feel.
    - "Take three minutes to review your notes from November 1. Do you have anything in your notes that doesn't make sense to you now?" Encourage other students to respond to what's not making sense now. "Help Shandra out. What do you the rest of you have in your notes about this?" Conclude by giving them another minute to write more in their notes if they need to.

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Relevant Resources

Andaya, G., Hrabak, V., Reyes, S., Diaz, R. and McDonald, K. (2017). Examining the effectiveness of a postexam review activity to promote self-regulation in introductory biology students. *Journal of College Science Teaching, 46* (4), 84-92.

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