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Solutions in Science, Technology, Engineering & Mathematics Education

STEM MINDEDNESS: CONTINUOUS LEARNING

Continuous learning is an active and ongoing process in which self-directed learners at all levels of the school pursue goals they identify through a reflective learning cycle.

Active and Ongoing

"Continuous learning is an ongoing, unbroken flow of learning that is carried out by the individual, every day, indefinitely," says Robert Talbert, mathematics professor at Grand Valley State University. As an example, he cites the work of engineers, increasing in complexity at an exponential pace. Talbert stresses that to keep pace with change, individuals must add continuously to their own skill sets.

In a STEM community, all stakeholders take responsibility for continuous learning relevant to improving student readiness for college, career and citizenship. Administrators and teachers stay abreast of research, best-practices and technological tools. Students set, monitor and implement learning goals with support from the school, parents and strategic alliances. These partners engage in ongoing opportunities to increase their understanding of student learning needs and the relationship between education and a safe and economically viable community.

Self-directedness

As self-directedness is an attribute of continuous learners, it also is part of the STEM culture. In *Cognitive Coaching, A Foundation for Renaissance Schools*, Art Costa and Bob Garmston posit that self-directed people know what they know, as well as what they don't know, and use this understanding to set challenging goals. They are able to accurately assess their progress towards meeting those goals and persevere in the face of barriers. STEM schools bear out this position. Individually and collectively, STEM communities are motivated to seek constant improvement with purpose and self-awareness.

Reflective Learning Cycle

In STEM schools, self-directed learners make meaning of experiences and use a reflective, cyclical process to determine next steps. The essential elements of a reflective cycle include:

- identifying goals
- planning
- implementing
- gathering evidence
- self-assessing
- adapting

The reflection process will not occur automatically. It has to be taught, modeled and practiced. In *The School as a Home for the Mind: Creating Mindful Curriculum, Instruction and Dialogue*, Bena Kallick and Art Costa write, "Every school's goal should be to habituate reflection throughout the organization—

individually and collectively, with teachers, students and the school community." Some tools for facilitating reflection are collaborative dialogue, portfolios, journals and self-assessment protocols. A STEM school's engagement in a recursive pattern for improvement is motivated by the need to prepare staff and students for teaching, leading and learning in a rapidly changing world.

The Principle

For maximum impact, STEM schools apply the principle of continuous learning community-wide. Through this process, school practices are refined, knowledge is deepened and skills are sharpened as educators continuously adapt their practices to meet the needs of the 21st century learner. Further, continuous learning becomes the norm for students as they embark upon college and careers and lead their lives as productive citizens. The ultimate benefit is reaped by the community at large having a better trained, more thoughtful workforce and citizenry.

Bibliography:

Talbert, Robert, mathematics professor http://chronicle.com/blognetwork/castingoutnines/2012/06/13/continuous-learning-instead-of-lifelong-learning/

Costa, Arthur and Garmston, Robert. *Cognitive Coaching: A Foundation for Renaissance Schools*. Norwood, MA: Christopher-Gordon Publishers, 2002. Print.

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Guiding Questions

Use the reflection questions below to guide discussions. We recommend documenting evidence to support each question. Doing so will assist you in setting action plans, goals, and progress monitoring.

Active and Ongoing

- In what ways do teachers and administrators stay abreast of current research, best practices, and technological tools to improve student readiness for college, career, and citizenship?
- How are you supporting students to set, monitor and implement learning goals?
- What are some ongoing opportunities provided for stakeholders to understand student learning needs?
- What are some ongoing opportunities provided for stakeholders to understand the relationship between education and a safe and economically viable community?

Self-directedness

- In what ways are the characteristics of self-directedness developed and nurtured within the learning community?

Reflective Learning Cycle

- What tools are you using to promote the use of a reflective learning cycle among stakeholders?
- How are you preparing students and staff for the rapidly changing world?

The Principle

How is your school applying the principle of continuous learning community wide?