

CRITICAL-THINKING-BASED TEACHING

KEY PRINCIPLES OF CRITICAL-THINKING-BASED TEACHING/LEARNING

Principle #1: Critical-thinking-based teaching/learning is a cooperative endeavor involving one or more teachers and one or more students.

Principle #2: Critical-thinking-based teaching/learning continually and cooperatively seeks to improve the products of the endeavor.

Group Learning Activity: In your group, study this Six Sigma description taken from Wikipedia and decide if any or all of it can be applied to what you do as a teaching professional. What will definitely not fit? What will definitely fit? What might fit? Find 2 principles that you think might fit.

Six Sigma is a business management strategy, originally developed by Motorola, USA in 1986, that is widely used in many sectors of industry.

Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes. It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization ("Black Belts", "Green Belts", etc.) who are experts in these methods. Each Six Sigma project carried out within an organization follows a defined sequence of steps and has quantified financial targets (cost reduction and/or profit increase).

The term *Six Sigma* originated from terminology associated with manufacturing, specifically terms associated with statistical modeling of manufacturing. The maturity of a manufacturing process can be described by a *sigma* rating indicating its yield, or the percentage of defect-free products it creates. A six sigma process is one in which 99.99966% of the products manufactured are statistically expected to be free of defects (3.4 defects per million). Motorola set a goal of "six sigma" for all of its manufacturing operations, and this goal became a byword for the management and engineering practices used to achieve it.

Describe the product of your work. What are you seeking to produce with all the work you do?

What would the quintessential product of your teaching look like?

Principle #3: Students must take charge of their own learning.

Principle #4: In-charge students buy into the principle of constructing knowledge and work hard to achieve it.

Principle #5: Well-constructed knowledge is one of the most important goals of critical-thinking-based teaching and learning.

Principle #6: Teachers must promote, foster and encourage knowledge construction.

Principle #7: Students construct knowledge from encounters with data.

Principle #8: Students must strive to make every encounter with critical data a knowledge-construction encounter.

Principle #9: To do a good job of constructing knowledge, students must keep their minds fully engaged during encounters with critical data.

Principle #10: Teachers must provide well-thought-out activities that foster the engagement of their students' minds.

Principle #11: Teachers must constantly assess the learning taking place among their students.

Principle #12: Learning is greatly enhanced when students have access to multiple learning encounters with data, the same data.

Principle #13: Teachers must provide multiple encounters with critical data.

Principle #14: Teachers must find time to foster knowledge construction among their students.

Principle #15: Teachers will provide a SCALE-UP classroom for their students if at all possible.

RESOURCES

Online sources for flipped classrooms

<http://www.youtube.com/watch?v=y5M4QoDbch4>

http://www.mlive.com/news/grand-rapids/index.ssf/2011/10/how_high_school_teacher_flips.html

<http://www.fi.ncsu.edu/project/fizz/pd/lecture>

<http://www.ncsu.edu/features/2011/09/leaving-lectures-behind/>

Khan Academy

<http://www.khanacademy.org/>
http://en.wikipedia.org/wiki/Khan_Academy

Studio for videotaping your lectures

Faculty Media Studio

In the Global Gateway

2nd floor of the Centennial Complex, West Wing

Talk to Stephen Robertson or Jeremy Grove, Ext. 15830

Critical Thinking Text

Critical Thinking: Tools for Taking Charge of Your Learning and Your Life by Richard Paul and Linda Elder (Second Edition or later), Pearson Prentice Hall

The SCALE-UP Classroom

Nationwide, more than 100 universities are adapting SCALE-UP, to varying degrees. The University of Minnesota recently completed a building with classrooms designed for SCALE-UP learning. At the Massachusetts Institute of Technology, more than 90 percent of physics instruction occurs in SCALE-UP classrooms.