

LEVERAGING TECHNOLOGY FOR CRITICAL THINKING

BY DR RIK BAIR AND
DR BETH TEAGARDEN BAIR

Current Critical Thinking Dilemma

After reviewing the 2013-2016 College Learning Assessment Plus (CLA+) standardised test results from dozens of public colleges and universities, *The Wall Street Journal* reported that many students did not improve their critical thinking skills over their four years of secondary education. One would surmise that the top academic universities delivered the best results; however, their students on average produced little or no growth in critical thinking. For employers looking for a workforce that can quickly solve problems, this is a disappointing statistic that does not bode well for the future. As parents of these students witness the rising costs of tuition and student loans, they struggle to justify sending children into the higher education realm.

The CLA+ test was administered to undergraduate students, who take very few, if any, fully online courses at most universities. If we assume that most of these students are being taught in a face-to-face environment, then we can also relate the results of this article to learners in the K-12 realm. Critical thinking and reasoning skills should be a part of every course at every level to encourage learners to either seek out information on their own or at the very least, ask the right questions. With the growing list of technology tools, avenues to allow learners to pursue knowledge are readily available to make face-to-face environments become a blended or flipped classroom design.

Learner Forensics

Have you been an instructor in a classroom that has just finished discussing the directions for an assignment and turned the learners loose only to now find a line of students at your desk asking for help? It makes you wonder why you even bothered to give directions! The instructional goal is not to enable learners, but to train them to evaluate the process, contemplate possible resources, consider alternatives,

and ask probing personal questions to problem solve. Otherwise these learners fall into the trap of developing poor learning habits.

Although using technology does not mean the learners will automatically become critical thinkers, it provides a familiar environment for today's learners. Students are already using technology daily with social media and entertainment at a higher rate than they are for learning. This premise indicates that students may not know how to learn effectively when using technology in an educational environment. The key is to combine the use of digital technology and the student's mindset to apply critical thinking skills.

Instructional Forensics

To leverage the power of technology, the instructional design needs a framework that provides avenues of information-seeking methods. This design incorporates technology with a learning purpose to develop disciplined thinkers who attack problems. For instance, the instructor divides the students into groups of three and gives them a real-life situational problem, such as facing an incoming category five hurricane with no other help available. They will not be able to relocate, so they must plan how they will survive in their home. The instructor frames this assignment with the technology tools he/she wants the students to use as part of the research and development, and then the final presentation of their plan. A planned practice session may be necessary for students using the chosen technology tools for the first time, and the instructor should keep it simple to cover the basics.

To begin the project, instruct the students to use a Mindmap software to brainstorm the various challenges they need to consider, like loss of power, loss of water or food, storm surge, and wind damage. This organizer will initiate the beginning steps for students to ask the right questions, such as "If I lose power, what will I eat?" Learners must

immediately address the three prongs of critical thinking: creativity, reflection, and adaptability (MACAT, 2016). As the learners brainstorm and complete a Mindmap, they will find creative and workable solutions while working through relevant and flawed ideas. The Mindmap is important for students to include in their final presentation, and it provides the framework for considering alternatives. By grading their initial thought process, the instructor motivates them to put effort into the brainstorming aspects.

Next the instructor frames the research process and provides directions for the students to gather and organise their data. The students can make educated guesses about how they will handle some of the problems they will face, but the instructor's design includes using the Internet to research prior hurricane-damaged areas to investigate the conditions that people faced and how they survived different aspects. As the students place themselves in another's shoes, they address the critical thinking stages of evaluating what was effective and what could have been improved, as well as articulating opinions, solving problems, and developing solutions (MACAT, 2016). For this part of the project, the instructor can include a game of rewarding bonus points for the most creative solutions for each problem. Perhaps the instructor could incorporate a budget, where the students must face the choice of buying, wiring and fueling a generator versus obtaining supplies like candles. They should also consider what happens when they run out of fuel.

Now that the students have acquired and assessed this content, they can use a technology tool to organize and spread the knowledge to others. In this crucial final stage of critical thinking, the learners take a stand for their decisions, based on their research and problem solving. By creating a tool that could in turn teach others, the critical thinking students reach the highest level of Bloom's revised taxonomy: create

(Anderson et al., 2001). As they teach others, the learners obtain an even stronger grasp of the content and skill development. WebQuest tools such as Zunal.com are easy to use and a great choice for compiling and organising content into a learning environment. WebQuests are structured, student-centered technology tools, so they allow for the learners to go at their own pace to analyse and synthesise the content.

As a final project, the students can pretend they are members of a World Disaster Response Team, who are going to reach out to people on an island that are about to suffer from a direct hurricane hit. The students can present their content as a WebQuest that will instruct the audience to consider their options for each potential aspect of the hurricane they will be facing. The instructor can challenge the students to engage their audience by adding media, such as video clips or images of storm surge and 320km per hour wind damage.

In this example, the Instructional Designer has integrated key aspects in a range of critical thinking and processing skills with various technology tools. Using a rubric, he/she can grade the learners on communication, collaboration, creativity, problem solving, and innovation. Because the students are already versed in social media tools, they can easily communicate and work outside of the normal classroom parameters. If instructors can employ such pedagogical methods in lesson planning, they can better prepare this generation for the workforce and reinforce the journey to disciplined thinking as well as the envisioned results.

References

- Anderson, LW, Krathwohl, DR, Airasian, PW, Cruikshank, KA, Mayer, RE, Pintrich, PR, Raths, J, and Wittrock, MC 2001, *A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.
- Belkin, D (2017, June 06). Exclusive test data: Many colleges fail to improve critical-thinking skills. *The Wall Street Journal Eastern Edition*. Retrieved from https://miami-primo.hosted.exlibrisgroup.com:443/uml:Everything:TN_gale_ofa494485264
- Gurung, B. and Rutledge, D 2014, 'Digital Learners and the Overlapping of their Personal and Educational Digital Engagement', *Computers & Education*, Vol. 77, pp. 91–100.
- MACAT (2016, March 16) What is critical thinking? A definition for real-life. Retrieved from <https://blog.macat.com/what-is-critical-thinking/>
- Porter, WW, Graham, CR, Spring, KA and Welch, KR, 2014, 'Blended Learning in Higher Education: Institutional Adoption and Implementation', *Computers & Education*, Vol. 75, pp. 185–195.

Dr Richard Bair is the Director of the Distance Learning Institute for the University of Miami in Coral Gables, Florida. Contact via Rikbair@miami.edu

Dr Beth Teagarden Bair is the National Service Coordinator at Frostburg State University in Frostburg, Maryland. Contact via bbair0@frostburg.edu