How do students learn best?

The research estimates suggest to us that, on average, students spend about 35 hours a week watching movies or television, playing video or online games, and connecting to peers on social media. Because they are immersed in digital entertainment and networking and because they seem to juggle many different tasks at one time, it might seem that the best way to reach these students is to infuse their learning experiences with visually stimulating digital technology and mirror the multi-tasking they use in their daily life. You don't have to look far to find teaching suggestions based on the belief that today's students learn visually, read and gather information through multitasking, or have particular learning styles we should accommodate. But a growing body of research suggests that these ideas about how students learn are myths.

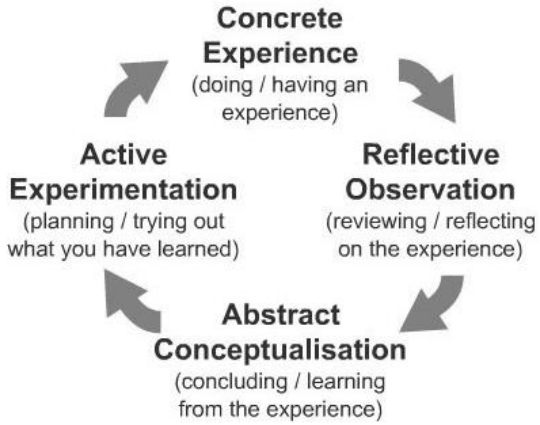
How does research help us reconsider these common myths about how students learn?

- **Today's students do *not* rely on or need visual stimuli any more than we do to learn**. All students (with the exception of students who are visually impaired) process information visually and benefit from visual representations of concepts and events.
- **"Multi-tasking" is *not* conducive to learning—it isn't even possible.** What we often characterize as multi-tasking is more accurately described as "task switching," or moving attention frequently and rapidly from one task to another. Research shows that task switching, for example rapidly skimming and moving between websites or printed texts, leads to poor retention of information and does not result in deep learning.
- **It is *not* helpful to accommodate each learner's specific style or preferences for learning.** Changing our teaching approach to try and fit students' perceived "learning styles" is not helpful and, in fact, may prevent us from guiding them through the effortful, active, and unhurried work that leads to deep learning. In addition, research suggests that we should be skeptical about the very notion that students have learning styles (Riener & Willingham, 2010).

Moving beyond the myths: what the research says about learning

- **Learning should start with concrete experiences**. Psychologist David Kolb articulates a research-based framework for conceptualizing the process by which learning takes place. His "learning cycle" helps us see that concrete, sensory experiences are the initial raw material for cognitive change. After learners have a concrete experience, they develop reflections about that experience based on observation of what's taken place. It is only then that abstract conceptualization begins, the process by which learners start to pull principles from the experience and her reflections and observations. Then learners make new attempts to test out their new ideas. Kolb's learning cycle helps redirects our teaching focus away from planning how we will *tell* students about big abstract ideas or *demonstrate* how to use abstract algorithms or frameworks to a more effective teaching focus on *designing concrete learning experiences for students*. Kolb's cycle also helps us see

that learning takes time and is cyclical: the opposite of the ideas that learners can



multi-task or skip through the deep processing of a sensory experience.

- **Learning is fueled through cycles of practice.** It might seem quite evident that practice is a key to learning, but biologist James Zull helps us recognize that for practice to change how the brain works, it needs to be designed using key elements. First, practice needs to stimulate emotion to some extent because emotion is a neurochemical trigger for memory. Second, practice needs to surface the errors and misconceptions that are blocking progress toward new ways of thinking. For practice to be effective, learners need feedback on what is and isn't working in their approach. Finally, learners need time to reflect on their practice attempts. Zull's ideas help us grasp that learning must be active and effortful: this practice can't be accomplished by simply taking in visual stimuli or multitasking. If you think Zull's ideas sound similar to the learning cycle described above, you're right! His brain-based approach is another way to think about learning, but one which focuses on the value of emotion and error in learning, elements that we don't always purposefully design for but which we should.

- **Learning is a social enterprise.** To learn means letting go of or modifying previous ways of thinking and adapting or adopting new ideas and behaviors. When learners debate and discuss with peers as they tackle realistic problems and encounter errors in their thinking, they are more likely to integrate new perspectives and ideas. Current research on the brain suggests that learners are more likely to take productive cognitive risks and have heightened affect when they work with peers, both necessary ingredients for learning to take place. What research suggests about the power of peer learning calls into question the popular (but mistaken) idea that each student should take their own individual approach to learning or that we teachers should focus on individual learning styles. Instead we see that by requiring students to discuss and explain their thinking with others, learners can see problems from multiple perspectives and begin to clarify own thinking.

Using the research to plan optimal learning experiences for students

Make Learning Social
Have students work in small groups (5-7 students per group) to tackle meaningful, challenging disciplinary problems. The work students do in groups will only lead to deep learning if it is directed toward your teaching goals for the course. When groups of students are asked simply to repeat information or share ideas casually, they have no real reason to talk and the work they do together is meaningless. The key to making learning social is presenting students with a problem that can't be solved individually. This means that all group members need to contribute to the discussion in order to solve the problem.

Make Learning Emotional and Messy
Give students problems to tackle that are genuinely interesting within your discipline (and that genuinely interest them!). Have them wrestle with situations and puzzles that call into question their novice ideas in ways that don't feel threatening or confrontational: in other words, find the sweet spot between baffling and just a little surprising. This is easier when you present them with realistic, ambiguous problems from your discipline. There's a reason that experts argue about these problems: they are not easily solved and they matter. They will matter to your students also!

Make Learning Concrete
It's very tempting to start with the abstract, but as Kolb shows us, students learn when they encounter concepts and principles within a concrete context. This means that it's best to begin by asking students to tackle messy problems—*before* you lecture or show students how to solve them. They will learn from your lecture or demonstrations only if their prior knowledge and confusions have been surfaced through practice attempts first.

Resources

Kolb, D. (2015) *Experiential learning: Experience as the source of learning and development.* Upper Saddle River, NJ: Pearson.

Riener, C., & Willingham, D. (2010). The myth of learning styles. *Change: The Magazine of Higher Learning 42*(5), 32-35.

Zull, J. E. (2002). *The art of changing the brain: Enriching the practice of teaching by exploring the biology of learning*. Sterling, VA: Stylus Publishing.

If you'd like support in designing effective learning experiences for your students, please feel free to **request a consultation**.