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## How Learning Works

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### If you want to learn, here are the basics!

As more research is done we are discovering more about what helps and what hinders learning. You come to University with very little information on how your brain actually learns, and you consequently default to learning the way you have always learned, regularly doing things that may interfere with your learning and missing out on things that help. Here are seven principles from cognitive research<sup>1</sup>.

**Principle P1:** Most information taken in through the senses either never enters our consciousness or is quickly filtered out and lost, with only a relatively small percentage being retained in long-term memory. The ability to retain new information increases if the information is explicitly linked to your previous knowledge. Also, you often come to your classes with misconceptions about what is being taught. If you do not correct these, you will continue to act as if the misconceptions are true.

**Principle P2:** How you organize knowledge influences how you learn and apply what you know. A big difference between experts and novices is that experts have organized their knowledge into patterns and novices have not. Organize your knowledge with patterns and connections of key ideas and probabilities to be able to adapt an effective strategy for problems of that type, instead of stumbling through randomly selected strategies as most novices do.

**Principle P3:** Your motivation determines, directs, and helps you maintain what you do to learn. Motivation to learn increases if you believe the course is about things you care about and skills you will need, and if you think you have a good chance to be successful.

**Principle P4:** To develop mastery, you must acquire individual skills, knowledge, and attitudes as well as practise using them, integrating them, and know when to apply them to real world situations. Practise Makes Better! It takes time to get good at anything.

**Principle P5:** Goal-directed practice coupled with targeted feedback enhances your learning. You by initially attempt small tasks that require the strategies and skills, get feedback on your attempts, try again with better results, and gradually move to increasingly complex problems as you learn problem-solving strategies and improve your skills. Your improvement is accelerated if you fully understand the learning objectives/outcomes and the feedback is clearly related to the targeted skills.

**Principle P6:** University courses challenge you to question and revise your conceptual understanding and beliefs based on the best available evidence. The environment in which you learn affects your ability to meet these challenges. In a supportive climate (you feel accepted and safe, even when your ideas are being challenged) you are more likely to achieve the course learning objectives than when the climate is chilly (you feel you are anonymous and your ideas are irrelevant or unacceptable), or hostile (you feel marginalized because of your ethnicity, gender, or beliefs, or you perceive the instructor as an adversary rather than encouraging your learning). With support, you gain self-confidence, autonomy, and a sense of personal and professional identity. Seek support from your instructors, classmates, tutors, and the Learning Centre.

**Principle P7:** To become a self-directed learner, you must learn to assess the demands of the task, evaluate your own knowledge and skills, plan your approach, monitor your progress, and adjust your strategies as needed. Metacognition (self-reflection about one's thinking and learning) has been shown to promote cognitive skill development in a wide variety of circumstances.

<sup>1</sup>Adapted from: Ambrose, S.A., Bridges, M.W., DiPietro, M., Lovett, M.C., & Norman, M.K. (2010). *How learning works*. San Francisco: Jossey-Bass.