Understanding Subject Knowledge

Subject (also sometimes referred to as conceptual) Knowledge is the systematic understanding of the fundamental principles and the interrelation between different pieces of information regarding a topic. On the other hand, Procedural Knowledge is “the knowledge of the steps required to attain various goals.” In other terms, subject knowledge is “what” you know, whereas procedural knowledge is “how” you apply that knowledge to accomplish a task. For example, understanding Darwin’s theory of evolution is an example of conceptual knowledge, whereas the knowledge of genome sequencing techniques in tracing the evolution of species is an example of a procedural knowledge.

Why does it matter?

One of the main goals of education is to foster a learning experience by providing students with knowledge in a field of interest, and outlining strategies to further pursue and apply that knowledge, in order to thrive academically and professionally.

Demonstrating an in-depth knowledge of your field and field-related practices is one of the goals and outcomes of graduate programs, as outlined by the Quebec Association of Graduate Deans. As a graduate student, you are taught the concepts and procedures behind conducting a study, which is the first step in developing your understanding of the approach to problem-solving in research. Your conceptual understanding of a subject influences your choice of problem solving strategies. Studies have shown that experts who have a solid understanding of a topic, use conceptual information to identify and implement effective problem solving strategies. In contrast, “novices”, who have gaps in conceptual knowledge, fail to reach the same level of solutions.

Beyond school, Lifelong Learning has become essential for professional success in an ever-changing world of discoveries and emerging technologies. Lifelong Learning refers to the diversity in education that is adapted to the individual and the context (e.g., school, home, workplace) throughout life. In addition to leading a more fulfilling life, continuous learning allows you to adapt to the fast-growing knowledge-based economy and to secure better career opportunities and advancement. In fact, most employers offer professional development opportunities so that employees can expand their knowledge and skills in areas influencing the growth of the organization.

Cultivating Subject Knowledge

While higher education courses provide students with the essential concepts in a given field, it is crucial to continuously build on this foundation by learning about new discoveries and research methods through periodic reviews of the literature.

Additionally, experiential learning (i.e., learning through doing) during studies has been shown to contribute greatly to the knowledge and practice in a subject area. For instance, writing and submitting research articles will teach you how to review the literature and how to navigate the publishing process. McGill offers many experiential learning opportunities through different courses, internship opportunities, clubs and extracurricular activities, independent projects (e.g., Sustainability Projects, with available funding!), and exchange programs to study abroad (check out the McGill Experiential Learning Network website for more information).

Additionally, professional development opportunities such as content-specific workshops (e.g., Bioinformatics), research seminars, and keynote lectures offer a complementary strategy to shape your knowledge in topics and practices within and beyond your field.
### Quick Guide to Expanding Your Subject Knowledge

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<th>Action</th>
<th>Description</th>
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<tr>
<td>Identify current concepts, theories and approaches and follow the latest developments in your field</td>
<td>Identify current concepts, theories and approaches and follow the latest developments in your field. Through consistent learning, you can stay informed about the latest research and methodologies in your field. This is crucial for staying innovative and competitive.</td>
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<td>Take initiatives to learn more, inside and outside the scope of your field</td>
<td>Taking initiatives to learn more, both inside and outside the scope of your field, can significantly expand your knowledge base. It can include attending conferences, workshops, and courses that offer new perspectives and insights.</td>
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<td>Critically reflect on both the object and purpose of knowledge</td>
<td>Critical reflection is essential for deepening your understanding. It involves questioning the assumptions and implications of what you are learning and how it fits into the broader context of your field.</td>
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<td>Keep an open mind and engage with a wide range of ideas and perspectives, especially ones that challenge your own</td>
<td>Cultivating an open mind is crucial. Engaging with diverse viewpoints can broaden your understanding and enhance your problem-solving skills. This includes challenging your own assumptions and being receptive to feedback.</td>
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<td>Identify tools to organize and represent information as a strategy to effectively learn and apply new concepts (e.g., Concept Maps)</td>
<td>Developing strategies to organize and represent information effectively is key. Concept Maps, for example, can help visualize relationships and connections between different ideas, making it easier to apply new knowledge.</td>
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<td>Adopt Active Learning strategies; For suggestions, consult the resources and strategies provided by OSD</td>
<td>Active Learning strategies involve engaging actively with the material, such as through discussions, problem-solving, and hands-on activities. Consulting resources like those provided by OSD can offer guidance on effective learning methods.</td>
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### Taking Action

**Professional Development & Training**

- McGill myResearch Graduate Seminar Series: A series of workshops providing information on specific study subject, research strategies and tools.
- Check myInvolvement for upcoming workshops and programs by searching for events tagged with this category: Subject knowledge.
- Consult your department webpage for upcoming seminars and professional development opportunities.

**Gaining Experience**

- Participate in or organize a Journal Club.
- Participate in one of the McGill EL initiatives or programs.
Resources

Websites & Apps

- McGill Library Guides: a list of databases by subject.
- McGill Experiential Learning Network: McGill EL resources, reflection tools, programs and initiatives.
- Mindmeister app: a mind-mapping and planning app that provides a visualization of concepts and relationship between ideas.

Books & Articles


References

3. Targeted Competencies in Graduate Programs. ADESAQ. (2015).