

Innovations in Interdisciplinary Learning: Informal and Extracurricular Opportunities

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Background

The importance of using interdisciplinary approaches has grown over the past decade. Interdisciplinary thinking is rapidly becoming an integral feature of research, as a result of the need to solve complex societal problems and the desire to explore problems and questions that are not confined to a single discipline¹. Interdisciplinary research and learning is associated with creativity, progress and innovation², and is considered as an essential key to knowledge economy.

There are a variety of opportunities for students to further their interdisciplinary knowledge and skills and build a community of young interdisciplinary scientists, and to learn about and share issues regarding interdisciplinary research and learning. Besides formal curricular training, students and their supervisors should be encouraged to share experiences, issues, problems and solutions/good practices regarding interdisciplinary collaboration³.

Université Laval (ULaval), the first Francophone university in North America situated in Quebec City, is a comprehensive university of about 48,000 students, including approximately 10,000 graduate students. It offers 263 graduate programs including 160 master and PhD programs. Among these, about 60 comprise an important interdisciplinary component. Furthermore, the Faculty of Graduate and Postdoctoral Studies offers *ad hoc* interdisciplinary master and doctorate programs. At ULaval, Institutes and some Research Centers are responsible in developing initiatives of added value, outside the regular curricula, to form young researchers and practitioners with high interdisciplinary skills. Below, are four examples of ongoing extracurricular training activities developed at ULaval.

Integrated Training in Biophotonics—an added value to an interdisciplinary program

ULaval offers master and doctorate degrees in Biophotonics, where highly qualified students are trained in chemistry, biology, neurosciences, and optics-photonics and pursue research activities under the co-supervision (compulsory) of directors from different disciplines, and continuous assessment of a multidisciplinary advisory committee who together bring a diverse perspective to research problems. The program-associated faculty members, through a federal training grant⁴, have designed a series of extracurricular activities to better support the interdisciplinary learning of their students. A summer school entitled *Frontiers in Neurophotonics* is an extracurricular activity, designed for graduate students registered in the interdisciplinary master or doctorate programs in Biophotonics, but is also opened to students and postdoctoral fellows from other

1 National Academy of Sciences (2004) Facilitating Interdisciplinary Research. ISBN: 0-309-54727-X, 332 pages

2 Buanes, A. & Jentoft, S. (2009) Building bridges : Institutional perspectives on interdisciplinarity. *Futures*, 41 : 446-454.

3 Lyall, C. & Meagher, L.R. (2012) A Masterclass in interdisciplinarity : Research into practice in training the next generation of interdisciplinary researchers. *Futures*, 44 : 608-617

4 http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/CREATE-FONCER_eng.asp

disciplinary fields such as chemistry, physics, cell and molecular biology and neurosciences, from ULaval or universities in Canada and abroad. The summer school gives them the opportunity to meet with international experts from different disciplines to discuss the latest advances in optical imaging of living cells during the morning seminars. “Hands on” training on different techniques as well as informal discussions and networking activities are offered in the afternoons and evenings. Students enrolled in the Biophotonics program can broaden their perspective through internships in industrial settings, in Canada and abroad. Among other initiatives launched to support interdisciplinary learning is the Annual Symposium in Neurophotonics entirely organized by the students and offered in rotation with the University of Bordeaux (France). Students exposed to the enriched program are better prepared for their future career and some success stories are reported.

Training program in Functional Foods and Technology—an added value to disciplinary training

The Institute of Nutrition and Functional Foods (INAF) offers in collaboration with the University of Manitoba, a training program that comprises a summer school as well. In this particular case, students and fellows come from disciplinary fields such as chemistry, chemical engineering, nutrition, microbiology and medicine, but are invited to discuss and work together on a practical problem - How to develop a functional food from milk, for instance. During this problem-solving oriented activity, they can learn on Canadian rules and regulations related to food production, interact with specialists of large-scale industrial production, and be initiated on the principles of marketing ethics. Students have the opportunity to further their experience through internships in government or private laboratories that are regular partners of the program. While keeping their disciplinary identity, the trainees learn to work within an interdisciplinary team to solve a practical problem.

Sustainable Development—interdisciplinary conversation with the civil society

Sustainable development is a key element of ULaval’s development plan, in its training and research mandate, and in its good management practices. ULaval hosts the Institute on Environment, Development and Society (IEDS). The IEDS is highly interdisciplinary, its members coming from many disciplines: geography, law, economics, social sciences, biology, forestry, engineering, and education, among others. It offers a series of activities including a Fall University on Sustainability. Besides regular conferences, the Fall University holds a town hall meeting where students, experts and people from the community discuss issues of concerns in sustainable development, giving the students the opportunity to develop their interdisciplinary skills but also to learn and to translate their knowledge about a real world problem in the civil society.

International Studies—interdisciplinary conversation with the world

The *Institut Québécois des Hautes Études Internationales* (IQHEI) offers master (mainly course-based with internships) and doctorate programs in international studies, combining law, politics and economics. IQHEI has integrated social networking and social medias in its summer schools in order to build and strengthen the interdisciplinary community, and to promote knowledge translation to the civil society. Extracurricular design-based learning that is student initiated and student directed supports innovation, motivation, learning and achievement⁵. SPECQUE

5 Gerber, E., Olson, J.M. & Komarek, R.D.L. (2012) Extracurricular Design-Based Learning : Preparing Students for Careers in Innovation. *International Journal of Engineering Education*, 28 (2) : 317-324.

(Simulation du Parlement Européen Canada-Québec-Europe) is an international French-speaking model of the European Parliament (EP). Founded in 1998 by students from the IQHEI, it has become a reference model on both sides of the Atlantic. It gives its participants from all over Canada and Europe an insight into the functioning of the EP. The debates allow for a direct exchange of knowledge in international and interdisciplinary perspectives, and contribute to open-mindedness. Students from the IQHEI have also launched (in 2006) the journal *Regard Critique* that publishes articles submitted by graduate students from all over the French-speaking world. It promotes opinions' diversity, neutrality and integrity in an interdisciplinary perspective, and raises awareness among the general public about international issues.

Conclusion

Extracurricular activities designed to support formal interdisciplinary training enrich and broaden the horizon of knowledge, ensure a framework of practicing and cultivating some skills and often, in a more casual environment⁶.

⁶ Chisiu, C.M. (2013) Extracurricular activities, an alternative for interdisciplinary learning. *Postmodern openings*, 4 (4), 67-79.