Evolution of Geomatics Curriculum: Adding new knowledge without lengthening studies

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MAIN MESSAGE

- Science is based on accumulation of knowledge
  - More and more knowledge in every discipline.
  - Pace of knowledge production is accelerating.
- Academic programs are intended to educate, train, and develop competencies.
  - It is not only about knowledge transmission.
- How can we keep our curriculum complete and adapted for new challenges and social concerns?
INTRODUCTION

• Demands for new curriculum contents are increasing.
  • Faster and faster
  • Technology-driven / Society-driven

• Geomatics education programs are highly concerned by these demands.
  • Land is the base of society, economy, ..., happiness.
  • But we can not just keep adding new courses and, by doing so, lengthening the duration of our programs.

• How can we do more within the same time frame?

PRODUCTION OF KNOWLEDGE

• M. Gibbons and al. (1994), The new production of knowledge: the dynamics of science and research in contemporary societies, Sage Editor
  • “A new form of knowledge production started emerging from the mid 20th century which is context-driven, problem-focused and interdisciplinary.”
  • “It involves multidisciplinary teams brought together for short periods of time to work on specific problems in the real world.”

Source: http://en.wikipedia.org/wiki/Mode_2
PRODUCTION OF KNOWLEDGE

- **Mode 1** = Knowledge production is within a single discipline.
- **Mode 2** = Solving practical problems requires the integration of different skills and knowledge – it is transdisciplinary.
  - **Multidisciplinarity** is characterised by the autonomy of the various disciplines and does not lead to changes in the existing disciplinary and theoretical structures.
  - **Interdisciplinarity** is characterised by the explicit formulation of a uniform, discipline transcending terminology or a common methodology. The form scientific co-operation takes consists in working on different themes, but within a common framework that is shared by the disciplines involved.
  - **Transdisciplinarity** arises only if research is based upon a common theoretical understanding and must be accompanied by a mutual inter-penetration of disciplinary epistemologies. (Gibbons et al, 1994).

Source: http://labspace.open.ac.uk/mod/oucontent/view.php?id=449234&section=1.2

IN THE LAST 25 YEARS

- **Introduction of Geomatics as an Academic Curriculum**
- **New courses**
  - Geo-computing
  - GIS, Remote Sensing, GPS, ...
  - Land Use Planning, Urbanism, Environment
  - Professional Ethics, Communication
- **Still pending demands:**
  - Aquatic botany (watercourse boundaries and delimitation)
  - Project Management, Advanced Land Analysis
  - Sustainable Development, Case studies, ...
EDUCATION PROGRAM

- Education programs can not just integrate new contents, resulting in a lengthening of studies.
  - Time frame is not a variable.
- Geomatics Sciences program
  - 8 semesters (over 4 years)
- Program adjustments almost every year
  - Marginal adjustments
  - Periodic revision (every 7 years)
- Program committee: Professors, Students, Professionals

STRATEGY ???

- Analogy between academic program and urban management
  - End of the Urban Sprawl = Densification
  - Creation of new space within a defined area
    - Air-space and underground developments
- Can we densify education and knowledge transmission?
  - New teaching and pedagogic approaches
  - Is there a critical limit (or level) beyond which there is no learning gain?
RENEWAL OF PEDAGOGICAL APPROACHES

• Problem-oriented methods
  • Practical exercises, term papers, ...
• Case studies
• Written and Oral presentation / Different roles and responsibilities (team-work)
• Self-evaluation and Peer-evaluation
• Team teaching
• Mixing of students
• Competency and quality development

PROFILES

• Managerial
  • Business skills, project management, assessment
• International
  • Foreign problems, new ways of learning
• Sustainable Development
  • Introduction of SD concerns in a specific discipline
• We must accept the fact that our graduates have different profiles!
  • Same basic knowledge, with different training and competencies.
CONCLUSION

• The evolution of geomatics’ curriculum is a constant concern at Laval University.
  • This task is not the sole responsibility of the program’s director.
  • It is a collective challenge, shared by the program’s direction, the professors and teaching assistants, the students and the geomatics’ professional community.
• This task represents a wonderful challenge of thinking about the future, but also about the renewal of pedagogical methods and the ways we teach geomatics!