

**Evolution of Geomatics Curriculum :**  
*Adding new knowledge  
without lengthening studies*



**Francis ROY**

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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](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 interpenetration of disciplinary epistemologies. (Gibbons et al, 1994).

Source:

<http://labspace.open.ac.uk/mod/oucontent/view.phpid=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!**