



The University of  
Nottingham

# Making Surveying Education **Relevant**



**Garfield YOUNG**, Martin SMITH, and Roger MURPHY

The University of Nottingham, UK



FIG Working Week 2011, Marrakech

Copyright The University of Nottingham

Closely connected or  
appropriate to the matter in  
hand. (Oxford Dictionary online)

having significant and  
demonstrable bearing on  
the matter at hand. (Merriam-  
Webster)



*Paring the square peg to fit the round hole*





## The matter at hand

- The Surveying/Geomatics Profession & Industry(ies)
  - A changed and changing Surveying/Geomatics Industry
  - Major influence from technological advancements
  - Perceived threats to traditional surveying
  - Widening scope of work for the modern surveyor
  - International variations in the scope of the surveyor
  - Desire for global convergence in some activities
- Professional Surveying/Geomatics Education
  - Higher education institution programmes
  - Post university professional certification requirements
  - New content, some old content discontinued
  - New specialisations & new partnerships



# Key Questions



The University of  
Nottingham

- Is Surveying/Geomatics Education appropriate for / applicable to / pertinent to ...
  1. ...contemporary industry demands?
  2. ...professional expectations?
  3. ...societal demands?
  4. ...student demands?
  5. ...contemporary higher education strategies?



# Contemporary Industry Demands



The University of  
**Nottingham**

- Large geospatial firms require a limited number of managers capable of managing technical teams and with good project management skills.
- Large geospatial firms require a large number of individuals with technical expertise mostly in specialised areas such as GIS, Remote Sensing and GPS.
- Smaller geomatics firms mostly need technical personnel with general geomatics skills.
- Both require graduates with the theoretical and practical skills along with business skills.
- Involvement in non-traditional areas where spatial data is seeing increased application e.g. Mobile technology, commuter navigation, facilities management, etc.





Largely unchanged in most countries with strong cadastral orientation in many.

- HEIs to develop knowledge and skills competences in fundamental technical and generic areas.
- Professional Accrediting Bodies such as RICS and ICES act as quality assurance bodies.
- Graduates to prove professional readiness through some system of certification.
- CPD to maintain relevance through consistent knowledge and skills upgrade.





- Indispensable surveyors still needed for:
  - Cadastral work (subdivisions, boundary disputes...)
  - Civil engineering works
  - Growing GI application to many areas
- Confidence, integrity, honesty, professionalism, high standards, competitive, international applicability...
- The role of the surveyor linked to national and international developments.
- General limited public knowledge of the expansive role of the surveyor



# Student Demands



The University of  
Nottingham

- Student-focussed education
  - Participatory education
  - Feed-back
  - Options (specialisations, electives, modes of delivery, curriculum structure etc.)
- Relevance to work
- Maintain momentum (educational culture)
- Use of technology (NML)
- Education with global outlook but local relevance







- The first generation of children to grow up surrounded by digital media, with most of their activities dealing with peer-to-peer communication and knowledge management mediated by technologies (Pedro, 2006).
- These students are considered to be particularly adept with computers, creative with technology, highly skilled at multitasking, find interactivity engaging, and have a preference for experiential, hands-on learning.



# Contemporary Higher Education Strategies



The University of  
**Nottingham**

- Focus on learning not teaching
- Development in the scholarship of teaching and learning
- Flexibility – curriculum & pedagogy
- Inclusive pedagogies
- Inter-disciplinarity



# Pedagogy is important!



The University of  
Nottingham

- The degree to which universities prepare students for the profession is a product:
  - The knowledge content of the course
  - The degree to which students are able/made to apply theoretical concepts to practical work.
  - **Appropriateness of pedagogical approaches**
    - Link between pedagogical approaches and learning is not frequently acknowledged.
  - Etc.
- Certain approaches are better at promoting certain types of learning than do others.
- An example of a contemporary pedagogy set for geomatics is offered...



# General guidelines for pedagogical development

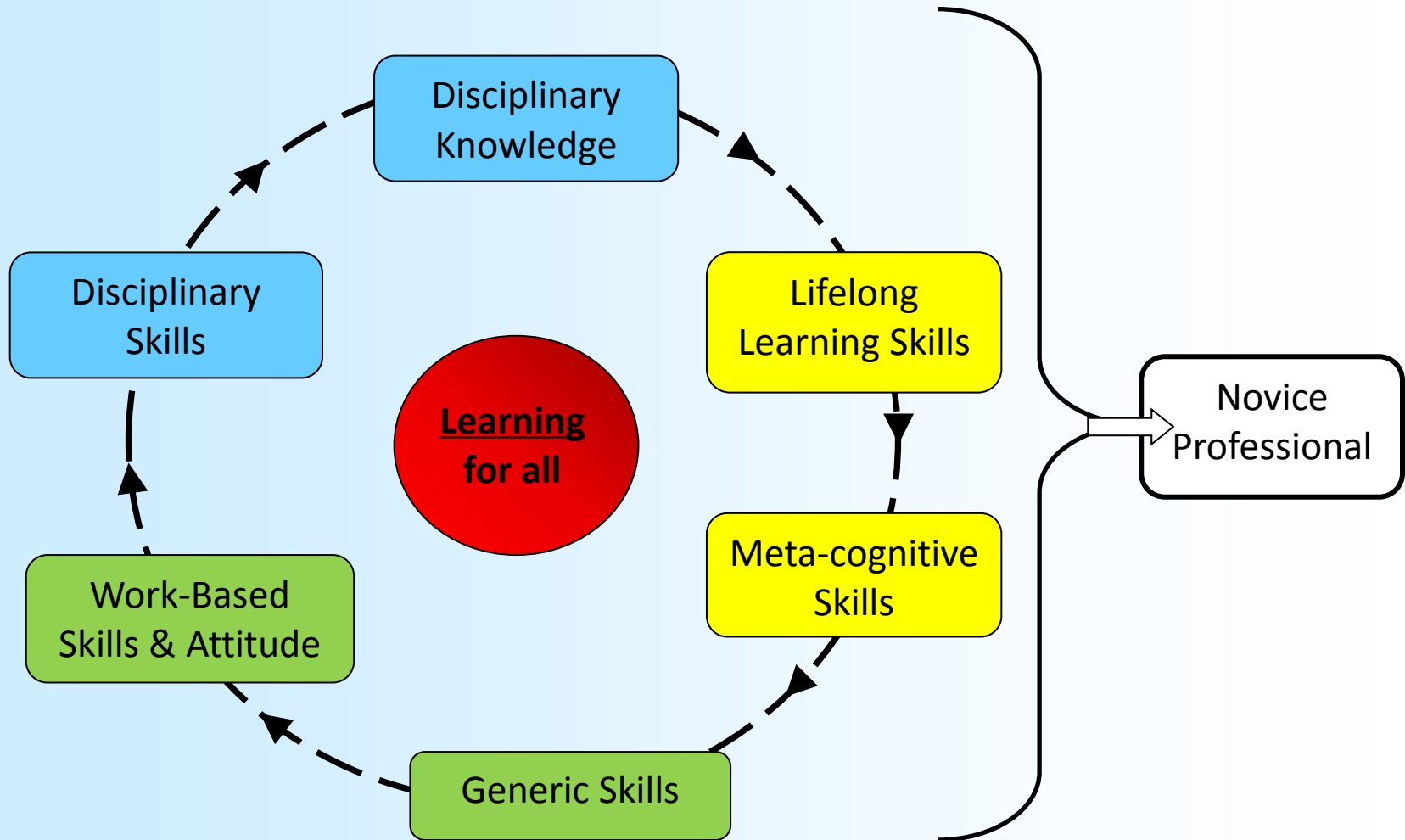


The University of  
Nottingham

- E.g. for a holistic appreciation of a particular surveying method, students should be able to engage with the theoretical concepts, the skills required for applying theory to practice, and the affective aspects of negotiating the problem in a relevant context.
- In other words, concepts are not taught as abstract ideas that are joined with related concepts and activities after graduation. Rather, the learning of theoretical concepts occurs in a setting where related activities are linked.
- This kind of learning arrangement is described by Kolb (1995) as experiential learning. In this context students are able to make meanings of the teaching and learning experiences.



# Modeling Contemporary Surveying Education



# Surveying Pedagogy

## Disciplinary Knowledge & Skills



The University of  
**Nottingham**

Concepts	Definition	Concept application examples
Disciplinary Knowledge	Specialised knowledge that is contained within a defined disciplinary field.	Corpus of geomatics knowledge delivered in lectures. Put systems in place for feedback to measure learning. E.g. support large group lectures with smaller discussions on the lecture materials [tutorials & seminars]. Evaluate sequencing of material and make adjustments where necessary.
Disciplinary Skills	Knowledge application in practical settings - fieldwork, lab work, computations, design, reporting, evaluating etc.	Organized field and lab practicals around the lectures to reinforce the theoretical concepts. The production of reports that justify choices and identify how challenges were overcome are also an important skill developed through project work. Exposure to authentic surveying activities (actual or virtual)

# Surveying Pedagogy

## Generic Skills



Concepts	Definition	Concept application examples
Generic Skills	Skills that are not unique to surveying/geomatics but are relevant to any professional practice.	<p>Group work – interdependency skills: cooperation, teamwork, partnership...</p> <p>Peer evaluation used to reinforce the importance of each member actively participating in all aspects of team run projects.</p> <p>The presentation of findings helps both oral and written communication skills.</p> <p>Working with stated deadlines with penalties for shortfalls is one way of reinforcing the principles of appropriate project planning and time management.</p>
Work-based skills & attitudes	Work-based skills are those kinesthetic and cognitive capabilities that are useful for work. Work-based attitudes are features of the affective domain that promote a healthy approach to work and co-workers.	<p>Simulating a team of professionals within the learning setting as would normally exist in real work settings e.g. surveyor with politician, civil engineer, architect, urban planner, economist, etc. [inter-disciplinary learning]</p> <p>Make work-based attitudes part of assessment process and something addressed in the pedagogies.</p> <p>Involve practicing professionals in the pedagogy to facilitate the passing on of values and disciplinary habits.</p>

# Surveying Pedagogy

## Life-long learning



Concepts	Definition	Concept application examples
Meta-Cognitive Skills	Those skills that foster reflecting on what one does and why it is being done. It is a reflexive way of being that allows a person to associate value with practice.	Students are required to openly explore the role of the surveyor in a wide spectrum of traditional and non-traditional areas. They are encouraged to consider innovative ways that the skill of the surveyor can be utilized and to explicitly state how these can be of benefit to the surveyors themselves and to others. As part of reporting on projects, students are required to comment on the relevance of the work done.
Lifelong Learning Skills	An approach to learning that assumes that learning is an ongoing process not limited to time inside the formal university setting or the post-university certification activities.	The use of discovery learning activities encouraging students to find alternative and innovative solutions to surveying problems. Shifting the learning responsibility to the learner who must actively seek out the information and tools needed to come to solutions. The academic staff, in this context is seen as one of the resources that students can access but not as the primary source of knowledge as in a traditional didactic instructional setting.



# What research has told us...



The University of  
Nottingham

- Still much emphasis on traditional approaches to curriculum and pedagogies.
- Content given much more attention than delivery approaches/effectiveness.
- Fragmented educational strategies undermine quest for general guidelines.
- Innovations done mostly on small scale with little consideration for wider application.
- Still some resistance to developing relevant pedagogical approaches.
- In some contexts student-demand is bearing fruit in regards to flexibility in specialisation offerings and pedagogy.



## Relevance of Surveying Education is hinged on 4 primary factors:

1. A clear understanding of the contemporary profession (locally and globally)
2. A clear understanding of and commitment to a scholarship of teaching and learning & its application to Surveying/Geomatics.
3. An orientation towards learning for all in the communities of surveying education and practice. All key stakeholders must be involved.
4. Sensitivity to changes in methods and techniques (surveying and education) and an orientation to change.

*As a surveying community we can only respond to  
contemporary demands effectively  
if our education is anchored in good values & principles  
but geared to the times*



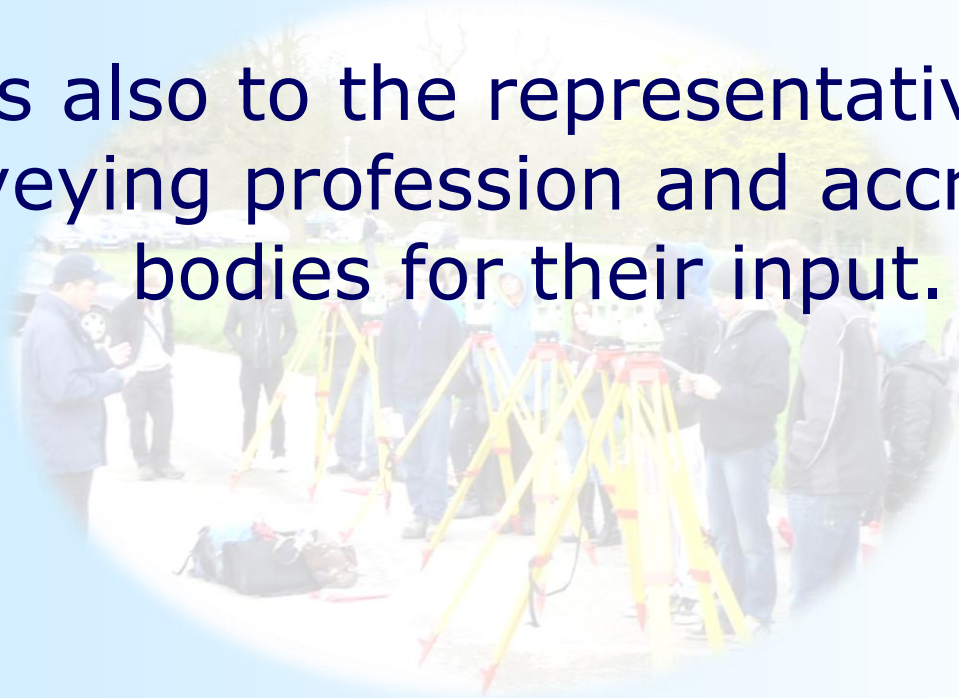
# Acknowledgements



The University of  
Nottingham

The authors thank the academic & administrative staff and students in the fifteen universities from around the world who participated in our study.

Thanks also to the representatives of the surveying profession and accrediting bodies for their input.



# Thank You



The University of  
**Nottingham**

## Contact Details

Garfield Young

School of Education

University of Nottingham

Nottingham, NG8 1BB, UK

Email: [ttxgy1@nottingham.ac.uk](mailto:ttxgy1@nottingham.ac.uk)

or [osboyo@yahoo.com](mailto:osboyo@yahoo.com)

