FUTURE DIRECTIONS IN EDUCATION FOR SURVEYORS

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INFLUENCES: EXTERNAL

- Change:
  - Very rapid technological change
  - Rapid theoretical advancement and technique change
  - Slow organizational change → silos
  - Very slow legal change → e.g., (co-ordinated) cadastre
  - Demographics → disposable income
INFLUENCES: EXTERNAL

- Shrinking survey crew size leaves no room for unskilled employees
- Skill levels required for survey crews are increasing
- Greatly reduced opportunities for on-the-job learning
- Limited development of experience component for professional education of new surveyors
- Two conflicting models of surveying and engineering: ABET and NCEES
Integration of geospatial information across disciplines, applications, professions, etc.

Integration of thinking about geospatial information outside the geospatial information professions

Risks of being excluded from critical developments, as with GIS in the past

Spatial information cycle
The Spatial Information Cycle

1. Measurement
2. The Real World
3. Management
4. Understanding and Wisdom
5. Experience, Insight, External Factors
6. Knowledge
7. Structure, Selection, Transformation
8. Information
9. Pattern Recognition, Computer Vision, Decision Making
10. Patterns
11. Prediction, Judgment
INFLUENCES: EXTERNAL

- ‘Volunteer’ geospatial information
- Google Earth, Google Maps
- Need to differentiate between amateur and professional data products and services
- Compare medical, legal, accounting professions
- Quality issues, certification and consequences
“As information technology’s power and ubiquity have grown, its strategic importance has diminished. The way you approach IT investment and management will need to change dramatically.”  
— Nicholas Carr

When everybody is a ‘surveyor,’ nobody is a surveyor

Need to focus on retaining the professional difference, which means a real focus on professionalism
INFLUENCES: INTERNAL

- Surveying at State colleges and universities
- Education as a cost, rather than an investment
- “Do more with less”
- ‘One-size-fits-all’ education: standardization
- Difficulty in obtaining faculty
- Education very slow to change
END PRODUCTS

4-year Graduate and Professional

Graduate:
- Theory and technology
- Professional status
- Broader education
END PRODUCTS

- 4-year Graduate and Professional
  - Professional
    - Management, financial and business skills
    - People skills and a broad focus
    - Professional experience and expertise
    - Ability to deal with rapid change and integration
    - Oh, and technical and theoretical skills
GETTING THERE: ON-LINE

- If on-line was straightforward or solved, we’d all be there by now
- 100+ year history, just changes in technology that match similar changes in the rest of society
- On-line is better for factual delivery, poor for interaction
- Experts learn patterns, rather than methods, and on-line is limited in the discussion and interaction required for creation of a professional
Key:
Primary Interaction Person
S = Self
G = Group
Inst = Instructor
Peers

Primary Mode of Interaction

Equivalent component in traditional courses
Many educational methods were developed to overcome specific resource problems:

- Lectures were devised to overcome shortages of books and expert instructors
- Libraries were devised to concentrate scarce information resources
- Mass lectures were developed to deal with large numbers of students
Over time, these developments became “the way we’ve always done it” and so unalterable, even as the resource problems disappeared.

Change has been slow in education, much slower than changes in technology, communications and theoretical understanding of learning.

The introduction of production-line methods into human education has tended to reduce the students to objects and the educators to assembly-line robots.
Unfortunately, the economic model built on primary production and manufacturing is rapidly becoming outmoded, although those economic ‘models’ are woefully out of date.

We are in an information, service or experience economy, but we still create the workers for this economy using methods from the industrial economy.

As the first information profession, geomatics/surveying should lead the way in the Information Age.
Pre-industrial era education was very different to today

Instruction tended to be in small groups with a lot of interaction, discussion and doing

What can we take from that earlier era and apply to the new situation?

Direct transfer won’t work, as other external factors have changed
BACK TO BASICS

- Collaborative and co-operative learning
- Discover-based learning
- Project-based learning
- Montessori methods
- Oxbridge tutorial model
- The non-role of competition
OTHER TRENDS

- Pressure to expand programs with more content vs focus on more complete and appropriate theories

- As technology and theory expands, we seem to need more in programs (bigger is better!)

- As a science matures, the amount of factual material decreases, and the focus moves to thinking smarter

- Possibilities of more specialization within a more general program (fine-grained, customized model)
OTHER TRENDS

- Thinking focused on critical thinking (negative), but very poorly, while creative and constructive thinking ignored.
- Problems understanding and integrating design thinking.
- Global economies need global thinking and global understanding of global problems.
- Poor thinking leads to poor understanding of problems and implementation of poor solutions, and so more (and often worse) problems, in addition to the original problem.
The preceding discussion should indicate some of the currents pulling in different directions.

- Which current will pick up any given boat?

- Should we leave the future of our profession at the whim of various popular trends?

- An alternative approach is to create the future ourselves, which makes predicting it a lot easier!
My recommendations:

- Integrate across the various geospatial disciplines
- Re-think the theoretical basis of what we do
- Focus on non-technical skills that round out professionals
- Realize the different mindsets attached to 2-year and 4-year degrees and their programs
My recommendations:

- Think outside the state, region and nation: hybrids thrive
- In an information economy, the human software for handling information is essential and critical
- Realize the central role of passing on learning and culture to a civilization’s survival (or a profession’s)
- Recognize that universities are a convenient tool, not an institution
THANK YOU