

NAVIGATING THE FUTURE OF SURVEYING EDUCATION - OUTCOMES AND CONCLUSIONS OF THE FIG COMMISSION 2 WORKSHOP 2009 IN VIENNA

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Key words: Professional Surveying Education, Student Recruitment, Continuous Professional Development, Marketing of Professional Education

SUMMARY

In February 2009, Commission 2 (Professional Education) of the International Federation of Surveyors (FIG) and the Austrian Society for Surveying and Geoinformation (OVG) organized a conference under the title "Navigating the Future of Surveying Education". This paper summarizes the key messages and conclusions derived from five key speeches and from presentations of the technical sessions.

In addition to presentations by experts, participants discussed issues of importance to academic surveying education in two workshops: in the first workshop the reasons for the – in general – decreasing number of students were analyzed and suitable strategies for the recruitment of students as well as the marketing of the profession were evaluated. The second one examined the situation of students in the professional field of surveying and attempted to outline visions for an optimized education. The outcomes of the two workshops are presented in the second part of this paper.

ZUSAMMENFASSUNG

Im Februar 2009 organisierten die Kommission 2 (Fachliche Ausbildung) der Internationalen Vereinigung der Vermessungsingenieure (FIG) und die Österreichische Gesellschaft für Vermessung und Geoinformation (OVG) eine Konferenz unter dem Motto "Gestaltung der Vermessungsausbildung in der Zukunft". Dieser Artikel dokumentiert die Kernaussagen der fünf Keynote-Präsentationen und der Vorträge aller technischen Sitzungen.

Zusätzlich zu den Präsentationen der Experten diskutierten die Teilnehmerinnen und Teilnehmer in zwei Workshops Themen von höchster Relevanz für die Ausbildung von Vermessungsingenieuren: im ersten Workshop wurden die – generell – abnehmenden Studierendenzahlen analysiert und geeignete Strategien für die Rekrutierung von Studierenden und der Vermarktung des Berufs erarbeitet. Der zweite Workshop untersuchte die derzeitige Situation von Studierenden im Vermessungsumfeld und versuchte Visionen für eine optimale Ausbildung aufzuzeigen. Die Ergebnisse der beiden Workshops werden im zweiten Teil der Arbeit präsentiert.

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1. INTRODUCTION

FIG-Commission 2, in particular Working Group 2.3, and the Austrian Society for Surveying and Geoinformation (OVG) organized a workshop under the title "Navigating the Future of Surveying Education" from 26th to 28th of February, 2009. The venue of this conference was the main building of the Austrian Federal Office of Metrology and Surveying (BEV) in Vienna. The key topics of this conference were linked to the terms of reference of Commission 2:

- Marketing of Professional Education
- Availability of Continuous Professional Development (CPD)
- Educational Networks
- Quality Assurance in Surveying Education & Training
- New Methods for Knowledge Transfer
- Scope of Competences in Professional Education

The workshop program included the opening session, two keynote sessions with five keynote speeches, eight technical sessions with 28 presentations, two workshop sessions and the closing session. 74 participants from 20 countries attended the conference.

Keynote speeches were given by the President of FIG, Professor Stig ENEMARK, by the Director of Higher Education of ESRI, Michael GOULD, by the Incoming Chair of FIG Commission 2, Steve FRANK, by the Rector of the University of Technology Graz, Professor Hans SUENKEL, and by the Austrian Representative of the Bologna Follow Up Group, Gottfried BACHER. Key messages and conclusions derived from the five keynote speakers and technical session presentations are summarized in *Chapter 2*.

Additionally during the conference two short-term workshops discussed issues of great importance to most of the countries. In the first "Students Where Are You?" the reasons for the decreasing number of students were analyzed and suitable strategies for the recruitment of students and the marketing of professional surveying education were evaluated. The second one, arranged by students and young surveyors, on the topic "Students Today – Students Tomorrow" examined the situation of students in our professional fields and tried to outline visions for an optimized professional education. Results and main outcomes of the workshops are summarized by the chairpersons of these workshops in *Chapter 3*.

2. CORE MESSAGES OF KEYNOTE SPEECHES AND PRESENTATIONS

Crucial conclusions, important recommendations and core messages of speakers given during the symposium were summarized by the authors and outlined in thematic clusters within the following chapters. It was tried to highlight at least one key message of all the presentations documented in the proceedings of the conference.

2.1 Problems and Challenges

The major issue in surveying education is low student numbers, which has caused the closure of several surveying courses and an insufficient supply of graduates to fill vacancies. This is enhanced by a demographic time bomb in the profession which means that a large number of surveyors will retire in the next ten years. This is also a particular problem with academia, where an aging teaching profession is a very visible barrier to attracting young people into University surveying education (*Mahoney, Hannah, Kavanagh, Plimmer, 2009*).

Surveying student recruitment is a challenge for universities and colleges in the U.S. (*Frank, 2009*), but also in other regions of the world, like Austria (*Navratil, 2009*), UK (*Bramald, H.Mills, J.Mills, Edwards, 2009*), and Nigeria (*Fajemirokun, Nwilo, Olusegun, 2009*). Professional involvement in student recruitment is necessary and is now available in many forms. We have to bring more young people into the surveying profession (*Frank, 2009*).

Additional challenges to be faced for the future are the big swing in surveying education and in the surveying profession that could be entitled "From Measurement to Management" (*Enemark, 2009*) and the global drivers: technology development, micro-economic reform, globalization, sustainable development, changing demographics, and changing times (*Enemark, 2009; Fairlie, 2009*).

2.2 Improving the Education

The future of surveying education has to be committed to excellence in intelligence, performance, learning ability, flexibility, mobility, language competence, social competence, and tolerance. This can be achieved by the 3 credo: competence, competition and cooperation (*Suenkel, 2009*).

Facing the challenges requires an innovative and adaptable approach to both curriculum design and course delivery within the framework of an overall quality culture. The success will eventually depend on an efficient interaction between education, research, and professional practice (*Enemark, 2009*). It is necessary to have flexible curricula as underlying knowledge quickly becomes obsolete (*Enemark cited in Fairlie, 2009*) and the market needs are changing much faster than study programs (*Mesner, Lise, Drobne, 2009*).

Contemporary education will be achieved by cultivating competitive profiles, the enhancement of study conditions, the increase of efficiency, and strengthening of internationalization (*Gartner & Weber, 2009*).

2.2.1 Adequate Education

New teaching methods are required to keep students interested in the studies and to increase students' satisfaction levels. But it is also necessary to use student and industrial feedback to seek continued improvement (*Watson, Workman, Hanney, 2009*) and it is necessary to teach the teachers (*Bramald, H.Mills, J.Mills, Edwards, 2009*).

The last few years have shown a paradigm shift in academic education towards student-centered learning, with credits and learning outcomes becoming visible (*Bacher, 2009*). New teaching and learning methods have been developed that enable improved knowledge transfer. E-Learning and the virtual learning environment have increased dramatically the available number of educational tools and training challenges, like discussion boards, wikis, blogs, etc. (*Groenendijk, 2009*).

Education should focus on 'worked based learning' (*Watson, Workman, Hanney, 2009*). Specifically, students and graduates should be encouraged to develop a practical background and to mix educational experience with practical experience (*Heinz, Klonowski, Mueller, 2009*). Study programs must be designed with a proper balance between theory and practice (*Oprea & Ienciu, 2009*). Students benefit from practical work experience (e.g. offices of cadastre and land registration or surveying companies) as information is packaged, with the result of decreased study times (*Ienciu & Oprea, 2009*).

Enemark (2009) recommended focusing academic education on skills for problem solving and on skills for learning to learn, as this competence can only be established through the process of academic training at the universities. Professional and technical skills also can be acquired and updated later in ones carrier.

Continuing professional development is part of an adequate higher education (*Bozik & Gospavic, 2009; Mesner, Lisec, Drobne, 2009*) and is as important as following a proper curriculum at university (*Heinz, Klonowski, Mueller, 2009*). One conclusion of *Edwards, Bird, Mills (2009)*: It is worth running CPD courses at universities.

Good examples of educational practices were given by several speakers. *Tunalioglu & Öcalan (2009)* presented the situation in surveying education in Turkey; *Grecea (2009)* and *Oprea & Ienciu (2009)* introduced the geodetic education of two Romanian universities. *Jancso, Engler, Szepes (2009)* discussed their experiences in introducing a credit system in Hungary. *Petrakovska (2009)* outlined the current situation of academic surveying education in the Ukraine and *Prüller, Scholz, Strauss, Achleitner (2009)* summarized their experiences about teaching GIS in Central Asia.

Experiences with new methods of teaching and learning were presented by *Groenendijk (2009, Experience Based Learning in GeoInformation Sciences)*, by *Bartoněk, Bureš, Dráb, Menšík (2009, Usage of a multidisciplinary GIS platform for Design of building structures and for education)*, by *Cepek & Pytel (2009, Web based tool for teaching and examining student's knowledge of SQL)*, by *Heine, Santana Quintero, Van Genechten (2009, Supported learning and training tools for terrestrial laser scanning applications)* and by *Strobl & Car (2009 – Continuing professional education via distance learning)*.

2.2.2 Creating Quality Culture

Excellent surveying education is based on excellent teachers, on excellent students, on appropriate curricula, and on proper infrastructure (e.g. lectures halls, laboratories, instruments, and library). This can be achieved by creating a quality culture at all institutions providing higher academic education. Quality assurance refers to the means by which an institution satisfies itself that the standards and quality of its educational provision can be maintained and enhanced (*Enemark, 2009*).

Quality management tools have to be used for surveying education (*Dimén & Luduşan, 2009*). This means the evaluation of courses, the integration of incentive systems, the implementation of mentoring concepts, the increase of teaching competence, the use of new teaching and learning methods, and the assignment of international reviewers/examiners (*Gartner & Weber, 2009*).

Navratil (2009) pointed out that the low number of students in surveying education has an impact on the quality: low student numbers results in a lack of young academics coming through the ranks and consequently with a decreased number of potential academic teachers. Additionally the critical mass of academic staff cannot be reached as a low number of students is very often linked to low budgets, and therefore to a decreased number of teachers.

Assessment procedures for students must include project work, where students have to prove their learning abilities and their practical application skills (*Luduşan & Dimén, 2009*).

A profession can only flourish if members are highly competent. This can be achieved by mandatory continuous training and applying sanctions in case of non-attendance (*Mazuyer, 2009*).

2.2.3 Globalization – Harmonization - Mobility

Universities are the breeding grounds for an adequate academic surveying education. Nevertheless the traditional focus on on-campus activities will change into a more open role of serving the profession and the society (*Enemark, 2009*). Cooperation between education professionals globally is required to guarantee proper academic surveying programs in every region and at every time.

Good examples of international cooperation between educational institutions and/or professional bodies exist: In the European Union the ministers of higher education adopted

the Bologna Communiqué to achieve the creation of a European higher education area, a space providing unlimited mobility for students, staff, teachers and early stage researchers, with full recognition, quality assured offers and comparable, transparent study cycles (*Bacher, 2009*). Another success story is the implementation of the FIG Young Surveyors Network with the objective to increase the number of active young surveyors within FIG and to create connection between generations and cultures (*Fairlie, 2009*).

But international partnership is not only an indispensable educational issue. International cooperation and knowledge transfer is also essential between professional companies for the implementation of international projects (*Ragosnig-Angst, 2009*). Liberalization of services and international recognition of professional competences are a topical issue of the international agenda (*Mesner, Lisec, Drobne, 2009*).

2.3 Marketing of the Profession – Recruitment of Students

The main topic of Working Group 3 of FIG Commission 2 is educational management and marketing. Therefore topics on advertising the study of surveying and marketing the profession were highlighted during the conference. In particular three questions were discussed during the keynote session and the technical sessions:

- What is the core competence of surveyors?
- Which measures are necessary to improve the perception of surveyors?
- How to bring more students to the surveying studies?

2.3.1 Professional Competence of Surveyors

The competencies of the surveying profession should include a mix of general competence (e.g. understanding and solving technical and/or business related problems, languages, communication skills, ability for interdisciplinary work) and of knowledge (professional specific) competence (land measurement, spatial data management and land management) (*Lisec, Drobne, Petrovič, Stopar, 2009*).

This opinion was shared by other speakers. The students should be educated not only from the professional point of view but also from a social point of view and should have a vision that enables them to undertake administrative positions in the future (*Tunalioglu & Öcalan, 2009*). The traditional subject based approach has to be modified by giving increased attention to entrepreneurial and managerial skills and to the process of problem-solving on a scientific basis (*Enemark, 2009*).

Employability is the word that describes the needs of modern education: hand-in-hand training of general and professional skills as well as lifelong learning. Study programs in surveying have to be flexible to meet the fast developing technology and they have to be tailored to the changing needs of society (*Mesner, Lisec, Drobne, 2009*). Or in other words: The results of an employability-orientated education are the 'Global Surveyor' and the 'Interoperable' or 'Plug & Play Surveyor' (*Fairlie, 2009*).

Additionally, interdisciplinary cooperation is necessary to enable an interdisciplinary knowledge transfer and parallel new fields of work (*Heinz, Klonowski, Mueller, 2009*).

2.3.2 Improving the Perception of Surveyors – Marketing

Currently the definition of the surveying profession is very complex with national and regional variations resulting in a near-invisible profile of the ‘Surveyor’ and in poor local and international perceptions.

In Nigeria, for example, the belief of the general public is that there are little or no career prospects for graduates of the surveying program. In addition financial yield for qualified professionals in surveying is low in comparison to other profession (*Fajemirokun, Nwilo, Olusegun, 2009*).

Mahoney, Hannah, Kavanagh, Plimmer (2009) recommended to review the definition of ‘surveyor’ and to outline a set of core competences of the surveying profession: Spatial measurement, geospatial information, valuation, land administration, planning and development, and project management and professional studies.

On a global level, coordinated strategies to improve the perception of surveyors as well as marketing of the profession are necessary. Focused and coordinated marketing as well as sharing of marketing resources is essential (*Mahoney, Hannah, Kavanagh, Plimmer, 2009*). Additionally young surveyors have to be integrated to national and international institutions, associations and professional bodies: Mentoring and networking across generations, disciplines and cultures is key to continuing and expanding this group to encompass an international network of young surveyors (*Fairlie, 2009*).

2.3.3 Recruitment of Students

In the past student recruitment was left to universities. Professionals have only recently recognized the need to become more involved (*Frank, 2009*).

The key client group within higher education is no longer 18-25 years old, it is in fact moving towards a more mature and experienced people set, wishing to enhance their existing qualifications to meet changing circumstances and future needs (*Watson, Workman, Hanney, 2009*).

As many potential students believe that studying the surveying profession is not only difficult, but potentially boring (*Fajemirokun, Nwilo, Olusegun, 2009*) efforts must be made to change this perception and to recruit students. The objective of such recruitment is to attract not only mass of students, but also quality students (*Mahoney, Hannah, Kavanagh, Plimmer (2009)*).

Strategies and activities for marketing the surveying study programs and to encourage students to enroll in surveying courses were outlined during the conference:

- Capture interest of young students (*Gould, 2009*)
- Provide information on careers with income and benefits (*Gould, 2009*)

- Continue to actively recruit, retain and support the progression of students (*Watson, Workman, Hanney, 2009*)
- Organize road shows throughout the country (*Jancso, Engler, Szepes, 2009*)
- Undertake promotion activities like University Visit Days, Higher Education conventions, Science Taster Courses (*Bramald, H.Mills, J.Mills, Edwards, 2009*).

As a good example of how younger people might be attracted to the surveying profession *Gould (2009)* suggested the approach used by the US Military: These unfamiliar with this approach might like to go to <http://www.navy.com/careers/accelerateyourlife/lifeaccelerator>. The Life Accelerator™ asks you questions about the types of activities you like, the things you'd like to learn, and the jobs you might enjoy. Answers help identify the kinds of jobs and work environments that best match peoples skill and interest profile.

3. OUTCOMES OF WORKSHOPS

Two breakout workshops were an integral part of the conference. Participants were split into four groups – a random process seeking for each group to have a mix of backgrounds, ages, cultures and nationalities.

3.1 Workshop “Students Where Are You”

Globally the attractiveness of the profession seems to vary. Some surveying courses are closing whilst others report a good demand for places from high quality students.

Five questions were addressed by each of the four groups selected at random to address this subject:

- Is the surveying profession itself too unattractive for today’s young people?
- Is the low number of surveying students the result of insufficient and inadequate education?
- Is the low number of surveying students just the result of a lack of active marketing if surveying education and/or the surveying profession?
- How to enhance the technical and academic interest in surveying education? Has technical education and training to start at kindergarten/ elementary school?
- How to encourage lifelong learning, project management and quality management?

The feedback from the four groups provided a diverse range of views, reflecting the twenty countries attending the workshop. It reflected the extent to which surveying is seen by some as a state regulated profession and by others as a more diverse profession operating within the context of a wider market economy. One consistent message was that Younger Surveyors are looking for technology to support their career, through:

- Passive and interactive networks
- Pod Casts

- Webinars
- Social networks, for example “You tube” and “Twitter”

In order to provide sense of the discussion key points given to the questions outlined above are contained in the following section:

3.1.1 Is the surveying profession itself too unattractive for today’s young people?

Key points and outcomes of discussion:

- Many expressed the view that there seem to be a negative image surrounding the surveying profession – sometimes it is seen as an outdoor activity with low salary, though for others working indoor on GIS is seen as positive (Contrary views are generally found in former transition countries where the profession is well respected with comparatively good salaries)
- Surveying is not as attractive to high flying students as medicine or law though there are global variations
- Generally there is a lack of awareness as to what studying surveying involves and this may put some students off even initial enquiries
- Some find the interdisciplinary nature of the profession attractive, particularly when combined together with the scientific aspects of the work

There is a need for clear promotional material that is suitable for ‘blogs’ and social networking sites that are frequently used by young people.

3.1.2 Is the low number of surveying students the result of insufficient and inadequate education?

Key points and outcomes of discussion:

- In general this was not seen as a problem, though there are clear examples of where this is a concern
- Where this was an issue the subjects of mathematics and physics together with field work was seen as an inhibitor. Mathematics and physics are seen as too complicated or difficult to study
- One point that was frequently mentioned was the need to make the teaching of Mathematics and Physics more exciting at secondary level
- The poor or indifferent image of the profession means that students are unclear about the type of work they would be involved in once they were qualified
- There needs to be improved linkages to schools to ensure that teachers are aware of the opportunities through a career in surveying

A comment made in one discussion group summarized the answer to this question “Our public profile is poor: surveyors are people standing on the highway looking through strange instruments. This image needs to change”

3.1.3 Is the low number of surveying students just the result of a lack of active marketing of surveying education and/or the surveying profession?

Key points and outcomes of discussion:

- There were wide variations in response to this question which appeared to be linked to the perception of surveying
- In some areas course funding is tied directly to student numbers and this creates the need for aggressive marketing
- Direct marketing was generally seen as the most successful approach to attract new students
- One example that was reported as being very successful was in France where Ordre Géomètre-Expert have one dedicated communication person visiting schools, and have produced a ‘comic/cartoon’ video to promote the profession
- There was considerable variation in views over the need for a 3 or 5 year degree program. Some felt that the 3 year program simply resulted in a technical qualification.

There was agreement that the name of a degree program was important and needed to be attractive: The need to promote what being a surveyor actually involves was seen as critically important. A widely held view was that FIG should take a lead role to develop templates to explain the profession and surveying activities for schools that could be adapted locally.

3.1.4 How to enhance the technical and academic interest in surveying education? Has technical education and training to start at kindergarten/ elementary school?

Key points and outcomes of discussion:

- In many countries primary education embraces surveying as a topic: in some explicitly, in others not so explicitly
- Kindergarten was seen as too early to start promoting the profession
- Engagement with teachers was seen as essential, as are visits to schools to explain what surveying involves including for example; GPS, spatial modeling, satellite imagery
- The material The Life Accelerator™ used to promote the US Navy was given as a good example of how to engage with young people

There was general agreement of the need to promote diversity and active involvement in global problems by those in the surveying profession.

3.1.5 How to encourage life long learning, project management and quality management?

Key points and outcomes of discussion:

- In some countries there is mandatory Continuous Professional Development (CPD) where either a chamber of engineers or a professional body is involved
- In some countries compulsory Professional Indemnity Insurance (PII) requires skills to be up to date or the insurance would be invalidated

- Chambers or professional bodies should monitor CPD / Life Long Learning (LLL) records and regulations should enable members to be expunged if they fail to comply with mandatory CDP or LLL requirements
- Making mandatory competence in Project Management and Quality Management should ensure that these skills are acquired

3.2 Workshop “Students Today – Students Tomorrow”

This workshop addressed student life around the world, with a focus on regional variations to studies, on job prospects and on the role of the institution. Groups discussed two key areas: the status and future vision of students and of surveying studies, and the current status, practices and vision for networking and other ‘soft-skills’ within universities and the profession.

3.2.1 Workshop results

Table 1 gives a contrasting overview of surveying student life in different countries. Note that views represented were limited by the nationalities of attendees.

	EU (without UK)	UK	US	Australia
Pre-university awareness of surveying	Low	Low	Low	Low
University attendance	Straight after high school.	>20% mature aged	>20% mature aged	>20% mature aged
Scholarships	Few surveying-specific scholarships.	Few scholarships	Some scholarships; surveying specific are based on competitions.	Several significant scholarships, some surveying specific.
Fees	Low <i>Pay per semester</i>	Medium <i>Pay per year</i>	High. <i>Pay per subject</i>	Medium; some govt support <i>Pay per subject</i>
Structure	Bologna.	Bologna	See <i>Other</i> .	4 year undergraduate, 1-2 year masters
Work during study	Limited and discouraged	Limited to uni. breaks	Unknown.	Common and encouraged

	EU (without UK)	UK	US	Australia
International exchange	ERASMUS	ERASMUS	Unknown	International exchange is passively encouraged, some scholarships available.

Table 1: Summary of regional variations

Key to the discussions was the acknowledgement that the regional situation had a significant impact on surveying awareness and student focus.

The following sections note highlights of the workshop by tracing a student’s journey through their education and degree.

3.2.2 Getting to University

Key messages:

- Students in attendance had all chosen a surveying career through personal contact with a surveyor or university representatives
- General public has a lack of surveying awareness (Global problem)
- No surveyors in attendance had children who chose a surveying career; perhaps significantly many chose architecture or construction/property management degrees out of a perception that these professionals ‘managed’ the surveying workflow!

Developing innovative approaches to interest more students in a career in surveying is high on the agenda of many universities internationally. This workshop determined that the approach to mitigate against low student numbers is dependent on the trends of student entry into university and age at which they ‘choose’ their degree and future career direction.

The European and developing country trend is that students attend university straight from high school. The US, UK and Australia differ slightly in that a small number of students (estimates of 10-20%) are “mature-aged”, and have chosen to study to gain a professional qualification for the work they already do or as a complete career change. These two types of students have a different outlook on the ‘university lifestyle’ – younger students place greater emphasis on the choice of university and location than on the actual degree, lifestyle and having fun is seen as important. Older students are more career conscious, as too are some of the seemingly few scholarship holders.

3.2.3 At University

Key messages:

- The structure of surveying studies vary regionally
- EU Bologna structure has an overall positive response
- Greater mention of surveying in secondary education math and geography courses required
- Good workplace accessibility to university-run professional development courses in Australia and the UK should be replicated elsewhere

The Bologna roll-out in the European Union (EU) has been overwhelmingly accepted (and indeed, its base structure replicated, in the case of Australia's University of Melbourne). Several concerns were voiced however with regards to the benefits of a bachelor-only degree (few jobs at that time available to bachelor-only degree holders in Europe), the extra year of study required by students in the UK, and the need to complete ALL bachelor level subjects before a student may begin subjects at the master's level.

Australia was the only country with representatives reporting that students could simultaneously study multiple degrees (eg. a double degree B Engineering/B Arts or Law or Science etc.). The US and UK offer only a joint degree in surveying and civil engineering.

Austrian attendees reported an overlap of the surveying degree with informatics disciplines. Many countries (eg. Australia) also emphasize the Information Technology (IT) element of surveying; Canada offers ties with biomedical imaging. In contrast to the European Union (EU) countries, many core subjects (such as Mathematics) are taught externally by non-surveying faculties in the US and Australia.

With regards to an international experience, many universities support student exchange; however such initiatives are limited by language, cost and credit transfer agreements.

3.2.4 Networking and Beyond University

Key messages:

- Professional organizations generally struggle to attract active student participation
- Most students find work through their network
- Use of technology for networking considered underused.
- Softskills important, but are considered the domain of professional bodies over university studies.

Significant contrast was noted in comments on student networking: active involvement in professional bodies was rare, and yet such networks were a primary source of employment contacts for young professionals. Networking at an internationally, or even inter-state/region level was rare at the student level, and yet extremely common for university staff (albeit

informally, and subject to the whims of university financing). The constant turnover of students is perhaps relevant to both points.

Technology was highlighted as a key enabler for international networking and mentoring. One participant told how Jamaican students learnt practical 3D laser scanning methods through an Australian university via video teleconferencing.

Mentoring was considered by all participants as extremely important and under-utilized – greater facilitation and enabling is needed. Mentors need to be trained just as much as mentees. Concerns were raised that a focus on softskills may affect the integrity of the degree if included at the expense of core surveying essentials. Networking and mentoring, particularly as enabled through professional bodies, are key factors to produce a well-rounded surveying graduate.

4. SUMMARY AND RECOMMENDATIONS

The conference addressed a range of issues, though essentially these revolved around the topic of what the profession of surveying really is today and how it is recognized in today's society: important topics the answers to which will help to determine how the profession can be steered towards the future. The conference also focused on the perception of surveying as a career for young people: anecdotal evidence suggests that it's different from the past, but what is it that attracts them into the profession, what are their expectations? Unless this is understood how will we be able to meet their expectations? Underlying this whole area are the dynamic changes in new technologies, greater opportunities in career development, the requirement to deliver broader skill sets and a new role of multi-talented surveying professionals who will potentially becoming professional facilitators as part of an ever eclectic skill set.

With the diversity of views expressed drawing coherent conclusions from this conference would be inappropriate. What was clear is that there is a clear need that those considering entering the surveying profession have a realistic expectation of what is involved and what they will do when they are qualified. It was also clear that the use of social networks and other electronic communication channels have to be used to explain what the profession does. As a profession there is a requirement of a coherent marketing and communications strategy in place to propagate the attractiveness of the profession and to ensure that members have access to all available resources to keep their skills and knowledge up to date.

Students passively participate in professional bodies, and utilize these for the purposes of employment and scholarships, however little active involvement is seen. Confusion as to the role, number and benefits of professional membership may contribute to this. Students and young surveyors should particularly be involved in surveying awareness and marketing initiatives, and may help address any 'image' problems surveying may have across regions.

Younger members of the profession also expect the use of electronic communication including pod casts and webinars to be the norm.

Educational structure was a key topic, with the Bologna process seen as increasing transparency, student funding and student mobility. More work is required to translate this mobility from studies into the workplace.

Emphasis on new methods of knowledge transfer is required to help bridge the gap between developed and developing countries and enable students no matter the difficulties of distance or cost. Technology is a key enabler to this, and should be better utilized across representative and educational bodies.

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Workshop presentations and papers also available on:
www.fig.net/commission2/vienna_2009_proc

BIOGRAPHICAL NOTES

Kate FAIRLIE is a recent graduate of the University of New South Wales (UNSW) and admits to being a Gen Y'er. She has a Bachelor of Engineering (Surveying and Spatial Information Systems) and is one year into a PhD with the University of Technology (UTS, Sydney), researching property rights in greenhouse gas emissions reduction schemes. Most recently, Kate has worked as a GeoInformation Analyst with Shell UK Exploration and Production, and is currently an Environmental Officer with the NSW Department of Climate Change, Environment and Water and casual lecturer at UTS. Kate has been involved in a number of young surveyor and young engineer activities, including a role as Engineering Ambassador for UNSW – promoting engineering as a career to high school students in Australia. She is Regional Coordinator for the Young Surveyors Network and a Young Ambassador for FIG2010.

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