

Session Report from the ITS in Europe Glasgow Congress

SW2 Next Generation ITS Professionals

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Is there an ITS profession for us to promote as a career choice?

How do we define an ITS professional? What is the university background that you need? This is an important consideration when discussing ITS recruitment and training. Romania has ITS courses including an MSc in ITS, but they come under the umbrella of electrical engineering. This may be too restrictive in terms of the people it attracts. You can extend this line of thinking from traffic and logistics into other domains. It is unlikely that electrical engineers will be able to fulfil all the requirements of the ITS sector, no matter how much post-qualification education and training they have received. Expertise in areas such as sustainable development and human factors is also important in ITS, and unlikely to be found in engineering faculties.

The first question to ask is what exactly do we want when we say we seek a “really good ITS professional”? A very good understanding of one subject area is important. But you also need breadth. Language and communications ability can actually disguise a lack of specific expertise, and

this needs to be explored. One model is to look for a recruit with a specialist degree and an ITS MSc which at least in theory proves that the person has both depth and breadth of knowledge.

ITS is too broad a term to use for most recruitment situations. If we take Mobility as a Service (MaaS) as an example, creating a fit-for-purpose MaaS product will need staff who understand societal factors such as models of ownership, use and consumption, the role of individuals in society, the implications of individual personal goals for mobility, and so on – the loose umbrella term would be “human factors”.

Generally any transport implementation needs to start with the needs and problems of ordinary citizens on the move, and the answer will never again be to just lay some asphalt. Intelligence is a required part of all transport provision in our contemporary world. IT alone cannot be the answer either. Effective collaboration across discipline borders, where the outcome is greater than the sum of the individual inputs, is key today. Good problem solving ability gained in any discipline is also an asset to any team.

We need both technical and other experts but we also need very good communications to make our intelligent mobility services work for citizens. Different disciplines use different language – not just terminology and jargon, but literally different language constructs which arise from the very different education, training and research models created by practitioners in segregation over many years. An engineering graduate and a sociologist working together on a project are likely to have serious communications problems. It is essential to have people who can work across this and that skill is uncommon.

It can be very inspiring when people from different backgrounds work productively together – but this can only happen when communications issues are dealt with effectively.

What is a “good ITS education”?

One line of argument was that universities are the best place for education and training. Industry can support PhDs by posing questions, providing data, and so on. Everybody vaguely agrees that cooperation between industry and universities is important, but what exactly do we mean by this? Input into PhDs is one concrete example. It would also be good to see new engagements in areas of human behaviours especially relating to CAVs, rather than the more usual cooperation between technical universities and the ITS industry. Health care is another area where new collaborative relationships could be fruitful.

Bucharest Technical University is considering a multidisciplinary MSc course. It will be easier for a single institution to organise this. Sharing the course between universities would be difficult to do in reality even though the benefits look good in theory.

But on the other hand, apprenticeships are important in Austria where they are used effectively to grow the available workforce. Austria also has special high schools for technical vocations, with a very hands on style of teaching and training. This goes some way to avoid losing talented potential technical staff because they for whatever reason do not wish to follow the university route into work.

Connected and autonomous vehicles are swiftly forming a new discipline of their own and this will need changes to vocational and university training syllabuses. This is happening now and gives us an excellent opportunity to get the framework right in order to produce the CAV experts we will need in the future to get the best out of this new mobility offer. Young people need guidance now on what

training and education to seek out in order to do this new work. We need to identify the new topics or new combinations of topics for these new jobs. Human behaviour science should become more important generally in education, and possibly even be taught at school level.

In Bordeaux the Swedish PhD students had a special activity stream with talks by Ericsson, the Gothenburg transport authority, and so on. The students were required to report back and a very good seminar was organised with them reporting on the different areas that they had learned about at Bordeaux. This is a good way of ensuring breadth of knowledge. Social sciences do need to be taken more into account than has been the case in the past.

In a connected world – Mobility as a Service is one example – ITS becomes more and more integrated into the world outside engineering and science.

How can we sell ITS as a field of work?

When attracting young people to choose any field of transport technology as a career, we need to start to build an interest in the early teenage years and then continue as young people progress to college and university level. AustriaTech supports such activities, for instance by helping with congress attendance for students and organising networking events at undergraduate level, and they also attend schools to encourage interest among young children. They also hold competitions for young people to create projects for sponsorship.

Many young people have a “default” strong interest in data and you can build on this in order to encourage them into ITS. They grasp concepts of data driven / enabled mobility without any detailed explanations being necessary. We should empower the young generation by explaining that as engaged data and transport users they are well placed to drive deployment and strategy professionally.

In Austria and Germany it is chiefly males who are attracted to engineering and electronics – very few females apply. Diversity is needed for better, more balanced outcomes. This shows up that we need to tailor our message so we do not just attract more of the same new recruits. The gender balance in current ITS workplaces is broadly that human factors, data analysis, and sociology input comes from females, while road design experts are male. We might surmise from this that as the industry moves to a more outcome based focus, it may automatically become more female oriented.

We also need to remember that for IT specialists, e.g. banking as an employment field has the attraction of higher incomes – we need to explain what the attraction is of ITS and transport, since it cannot be the highest possible pay. One good message which can be used in order to attract a wider selection of people is that of being able to affect societal outcomes (rather than controlling the technical means by which this is achieved). “Stories” of real transport technology projects and their outcomes are more interesting and attractive to young people than we may think.

Representation and appearance are very important. We need to make careful choices in our imagery. The impact of for instance magazine illustrations is subtle but it does matter. How we present the message is very important. A photo of an all male, all white, all middle-aged project team sends quite a specific message about who is best placed to do the same sort of work as they do.

Maybe the term ITS is a hindrance in itself and talking about smart cities, connected mobility and so on would be more attractive and more understandable to a wider audience?

At Chalmers Technical University in Sweden, alumnae come back to tell of their experiences which can be very motivating and interesting for the current students who are making choices about education and jobs.

The ITS sector evolves and new products and services appear, such as connected and autonomous vehicles, but the same organisations are working in the new areas as worked in the old ITS areas, with the addition of some new players large and small. However, a “traditional” informed overview of the transport system is still a relevant skill, but now with an added understanding of how the new will interact with the established modes such as cycling and walking. We already have the core skills we need because they stay the same: cyber security experts, sociologists, human factors experts – we are better equipped than maybe we think.

What about national road administrations? They need to modify and redesign the backgrounds of their staff, which traditionally have been quite homogenous. Existing long serving staff do not necessarily understand how citizens of a different age or social background to themselves live and travel.

To achieve innovation, you need the technology to work but also the public demand for the innovation and the political support. People working with policy have the generic skills to make this happen but need a new mindset. The process can be slow and clunky and needs fine tuning.

Evaluation is very important. If we apply our innovation quickly and then move on without proper evaluation, we are storing up trouble. New systems and new products need proper impact evaluation. National Road Administrations can be poor at doing this, due to political imperatives which overrule professional analysis.

And once the person has got an ITS job ...

For some organisations retention is more important than recruitment. This provides an internal motivation for training, mentoring, qualifications, and gaining experience. Trained mentors are provided. Mentoring is respected as good for the organisation, not just for the individual being mentored.

On the other hand, people leaving an organisations after a few years’ service is not actually evidence of a failure on the part of the employer. It increases the network of good contacts available to the organisation as a whole.

Young professionals do need to continue their training and learning after they have entered employment. Partly this can be regarded as their own responsibility, but good practice dictates that it is also reasonable for them to expect their employer to assist with this. Structured professional development is important to young professionals. There is no reason why a combination of MSc and short / part time courses should be provided, and take up encouraged, by employers once the young person is in employment. But this can take a lot of convincing employers – the financial argument can be difficult to make in a for-profit workplace environment.

Mentoring is important to give advice to YPs regarding further learning as well as other development matters. Established professionals should consider passing on advice as part of good professional conduct. Again, this does have a cost in time if not in money. But so does not doing it – it can be an investment not a cost when the “mentee” performs better and stays with the employer for longer. It would be useful to have some case studies to evidence this.

To the argument that training staff is expensive, we can answer that if no training is provided, either staff leave for an employer who does provide training or they stay on as untrained staff. It is hard to describe either scenario as profitable for the employing organisation.

It is also good to get young professionals themselves to take on mentoring and representation as part of their roles. A mentor or role model relationship works better when the parties are not too far apart in age. The relationship becomes more inspiring because it offers a more tangible goal.

Young professionals should not automatically be excluded from leadership roles. They may well be suited to thought leadership roles even while their ability to lead people as senior managers is still too undeveloped. Technology is evolving so fast now that everything in ITS is new most of the time. People with 50 years experience may be obsolete in their knowledge and therefore not suitable as thought leaders even though they are excellent managers and team leaders. On the other hand, not all problems are new and some old ones are still waiting for solutions. So, rather than begin by deciding if leadership is required from a young or an older perspective, start from the problems and needs when identifying the person. An older professional is not necessarily outdated. You can also have effective reverse mentoring where the young professional mentors the older one – what matters is who has knowledge and skills to transfer, not their relative ages.

What should professional bodies contribute?

What is the role of professional institutions in attracting ITS professionals? If we look at the present Congress where this session forms a part, it is demonstrably not designed for younger people. Its professional, commercial and social components are almost unchanged for over twenty years. Industry events and professional bodies need to move with the times. But they also play a useful role in creating networks of engagement and ideas – formal or informal interest groups which identify common issues and throw up common solutions.

Professional institutions have different funding models. The individual membership of a professional institution creates a personal relationship between the member and the institution. Corporate membership such as those of ITS (UK) put the onus on the Member and its staff to get the value out of it once the fee has been paid. This should justify participation including by younger professionals, since to not participate is to waste your subscription.

Closing remarks

How do we attract people to work in ITS? We must demonstrate that we offer organised training and development, but also tell positive and engaging stories to young people:

- Automated vehicles are a good “hook” at the moment
- An ITS professional can make a positive impact on people’s lives in a short time
- ITS is intrinsically interesting as a meeting point of human need and technology
- It is a truly international endeavour
- There can be no liveable cities without ITS
- And more!

Discussing how to attract younger people to choose ITS as their career is immediately difficult since it is hard to define the ITS profession. The Session discussion reflected this but was still useful since it was conducted by people with a deep understanding of the issues and areas of work who shared their insights openly. We covered a range from how to create interest at kindergarten level to the contribution retired professionals can make, the difficulty or maybe impossibility of defining the future, how to design the stories we want to tell which are about mobility not just about ITS, how to

recognise and value the sometimes unexpected contribution of young professionals, how best to act when the field of transport engineering is changing so profoundly and quickly, and much more.

Our sector is more interesting and engaging than many other engineering sectors since it is less component based than other engineering disciplines and has to give more importance to human factors, different approaches, and the integration of other disciplines and domains.

What we need are new mindsets, not new skills.