

The Role of the Surveying Profession in Education

The role of formal education in any profession is generally well understood. You go to college, get a degree, take the professional examinations, and that's your education over and done. There is, in reality, a bit more to it than that.—**By N.W.J. Hazelton**



WHAT IS A PROFESSION?

There have been many definitions of the term “profession,” but if we look at the key characteristics of a profession and a professional, we find some commonalities. Perhaps the critical point is that a professional is an expert in his or her field, which is characterized by systematized theoretical knowledge of the field, together with demonstrated proficiency. This knowledge is based on an extensive education, usually formal, which today tends to mean a university degree. It was this point about “expert knowledge” which led a judge to decide some years ago that a bachelors degree was required for someone to be considered a professional.

Another critical point is that a profession involves indeterminacy of knowledge. This means that while there is a systematic theoretical basis of knowledge for the profession, the details of each case are such that this knowledge forms a guide, rather than a solution. The professionals’ experience guides them in applying their knowledge to the particular case. This means that there are few “cookbook” solutions to problems with which the profession deals.

We recognize this in how we educate professionals. Some of the coursework is straight theory, e.g., the mathematics of space, change, and errors. This material is usually taught in the classical style. Some of the coursework is more “cookbook” in style, e.g., how to measure and reduce a traverse. This material is often

taught as a methodology to be followed. But the parts of the curriculum dealing with indeterminate knowledge are taught very differently.

With regard to the spatial data and information cycle, the “measure” and “transform” operations generally fit in well with the straight theory and cookbook’ approaches. But the pattern recognition parts of the cycle do not. Pattern recognition requires that certain patterns are learned, so that they can be recognized among a great deal of other information. The most obvious place such pattern learning occurs is in boundary re-establishment.

When a boundary is to be re-established, a range of measurement data is collected. Some of the data are from old surveys, some from the current survey. The data are of varying qualities and reliability, which can only be judged from experience in working with both the old and new data. There is other information, such as evidence from landowners. Then there are the legal requirements: which piece of law, statute or common, applies in this particular situation? In most cases, a quick look would suggest several different legal regimes, some of which are contradictory. Making a decision about the best solution is a matter of recognizing specific patterns that apply to different legal and measurement situations, then testing how well they work. This cannot be taught as either theory or cookbook approaches. The professional has

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to learn the patterns and how to recognize them.

Of course, there is a significant amount of “cookbook work” in a boundary re-establishment. Traverses must be measured, vectors determined, and areas computed. But the key to the solution of the problem is pattern recognition; all the rest is, to some extent, peripheral.

Similar pattern recognition processes exist in other professions. In medicine, for instance, diagnosis is all about pattern recognition. The primary job of a lawyer is to change people’s viewpoints, which requires being able to recognize patterns and apply different viewpoints and aspects of the law to them.

GAINING EXPERIENCE

All professions require extensive experience which builds on the theoretical knowledge base. Doctors have a period of residency and lawyers work under articles, during which time they work with practicing professionals to translate their theoretical knowledge and experience into working expert knowledge. It is a time for learning patterns in a very practical way.

Because the patterns must be learned before they can be recognized, it is important that the theoretical knowledge precedes the formal training or experience period. It is also important that the trainee professional has a chance to reflect on the patterns experienced and discuss how these fit into the professional’s expert knowledge base.

Translating theoretical knowledge into working expert knowledge can be done alone, but it is very inefficient. This is why most professions assign a new professional to a mentor, guide, or master for this period of professional learning. The mentor or guide also has significant responsibilities, as they have to help the new professionals understand, interpret, and organize what they are learning.

The professional experience education is beyond the scope of formal university education—in its current form. While many college faculty in surveying

programs could certainly mentor young graduates, universities do not have the surveying business coming in to support all their graduates for several years while they gain this experience, nor do the current faculty have the time to run such a full-time surveying business.

If the profession wants the universities to take over this role, providing them with ready-made licensed professionals with significant experience, it would have to encourage the universities to develop large-scale surveying businesses, and accept that the universities will have to compete with existing surveying firms for business. It would necessarily have to ensure that university-based businesses were preferentially favored with work, in order to undertake this role successfully. Clearly then, the profession itself needs to address the question of the professional experience education of young surveying professionals. To pass this responsibility to anyone else passes control of the future of the profession into those hands.

PROFESSIONAL EXPERIENCE EDUCATION

Many of the licensing boards require certain types of experience. This varies, but includes time in charge of jobs, as well as different types of work. The differences in requirements make it difficult to create a “curriculum of experience” which a young professional should undertake. There are however some common themes.

Variety of experience is critical. In order to learn to recognize the full range of patterns, various patterns have to be experienced. Discussion alone is not enough. A checklist of experiences should be developed to avoid a situation where four years of experience become one year of experience replicated four times.

Reflection and discussion is central to learning patterns. There needs to be an experienced mentor assigned to each young professional, and that mentor must take responsibility for the learning that is taking place. This responsibility would ultimately be to the profession, rather than to the licensing board.

The quality and thoroughness of a candidate’s professional experience education cannot be verified through conventional tests. Such tests are very much fact-based and better suited to the theoretical knowledge base. To test professional experience, practical tests must be undertaken, which would demonstrate whether a candidate can successfully complete certain professional tasks in a professional setting. Portfolios of actual jobs are a good foundation for such tests, as are real projects. Arguing a case for the solution of an ambiguous problem allows candidates to show that they have the right skills and approach, as well as that they are able to recognize patterns and apply the appropriate methods.

The role of the profession here is to create the curriculum of professional experience, support the mentors, and provide the conditions for this approach to work across the profession as a whole. If the profession wants the best future for the profession, it will be able to work out ways to move young professionals between firms, so as to provide them with the best possible experience, without disadvantaging either the employer or the firm providing the experience. Creating a new professional is a major investment—by the individual, by the state (all surveying programs in the U.S. are at state colleges, and so directly subsidized), and by the profession. Everyone stands to benefit from this investment, including (and importantly) the profession.

IMPLEMENTATION

For many professions, the period of professional experience after graduation is laid out, and everyone understands what should happen during this period. As part of the process of building a true profession, each profession needs to take charge of the development of new professionals in its field. While the theoretical and cookbook components are rightfully delegated to professionals in the academic sector, the means of translating this theoretical basis into professional expert knowledge should be the responsibility of the profession as a whole.





Professional experience, from p. 15

The profession as a whole, in conjunction with the academic sector, should be developing a professional experience curriculum. The academic sector has to be involved to ensure a strong connection and a smooth transition between the academic curriculum and the professional experience curriculum. The role and responsibility of mentors needs to be defined, and mentors may need to be trained. The profession

should provide formal ways of bringing several trainees and mentors together to reflect upon their experience, beyond informal bull sessions before chapter meetings.

The process of professional experience development should be separate from regu-

lar continuing professional development (CPD), which tends to be more theoretical in nature. Continuing education should be used to extend the professionals' knowledge base, rather than their experience.

In the early days of professions, professional organizations controlled most aspects of the education and professional development of their members. Today, the professions are under increasing pressure to conform to non-professional models of organization and behavior, and this tends to destroy the very nature of professions. By taking charge of more aspects of its operations, professions re-assert their roles as professions. Once they lose this control, professions become little more than trade organizations.

Surveyors' tools

The GeoExpress Best Practices Guide for manipulating images

Released by LizardTech at the Autodesk University Conference in Las Vegas, the GeoExpress™ Best Practices Guide is a printable key designed to help navigate the many workflows available using LizardTech GeoExpress software for achieving optimal information from high-resolution geospatial data such as aerial and satellite imagery and LiDAR. Many of the decisions that are made and the options that are selected in compressing, manipulating and publishing imagery have impacts for downstream users. The complete GeoExpress Best Practices Guide is available as a free download at <http://www.lizardtech.com/products/geo/datasheets.php>. For information on how to obtain hard copies, contact LizardTech at 206 652-5211. —Justyna Bednarski



GRX1: A versatile GNSS System

Sokkia Corporation's new GRX1 GNSS system includes the new SHC250 data collector, as well as a new controller and post-processing software. This new GNSS system provides unmatched versatility and usability in RTK, network RTK and static applications which require millimeter or centimeter positioning accuracy. The GRX1 GNSS receiver has an integrated antenna, digital UHF radio, GSM module, Bluetooth® module and detachable battery in a compact, rugged, magnesium-alloy body. The SHC250 data collector incorporates the latest Windows Mobile® 6.5 OS, built-in Bluetooth modem and the new Spectrum Survey **Contact 800.4.SOKKIA for more information.** — LeRoy Sorenson

ProMark 500 V4.0 GNSS receiver

Released by Ashtech® (formerly Magellan Professional) in January, the ProMark™ 500 V4.0 GNSS receiver is a fourth generation upgrade to ProMark 500 enabling more cost-effective, high-performance RTK surveying. Current users of ProMark 500 can benefit from the many new features of ProMark 500 V4.0 via a simple system upgrade.— Claire Geffroy, cgeffroy@ashtech.com.

