

DRO

Deakin University's Research Repository

This is the published version

Davies, H. A., Csete, J. and Poon, L. K. 1999, Employers' expectations of the performance of construction graduates, International journal of engineering education, vol. 15, no. 3, pp. 191-198.

Available from Deakin Research Online

<http://hdl.handle.net/10536/DRO/DU:30048654>

Reproduced with the kind permission of the copyright owner

Copyright: 1999, International journal of engineering education

Employer's Expectations of the Performance of Construction Graduates*

H. A. DAVIES, J. CSETE and L. K. POON

The Hong Kong Polytechnic University, Kowloon, Hong Kong. E-mail: bshilary@polyu.edu.hk

This study describes the development and testing of a paired 'customer satisfaction' survey used to determine the development of general skills by graduates from professionally accredited construction degree programmes. Graduates from professional courses are often described by employers as lacking in useful and instant fee-earning skills. This survey reveals the extent of differences in expectations and achievement of skills by graduates and their employers. Graduates are apparently not as ill-prepared for the workplace as anecdotal comments from employers would suggest. This survey is part of a programme of quality assurance measures and provides useful information for curriculum design and revision.

INTRODUCTION

AN IMPORTANT OBJECTIVE of many degree programmes is to prepare students for the workplace. Students of professional studies programmes have what can be regarded as an additional benefit or hurdle—they expect to join a particular profession and have a clearly identified career path—in return, employers often expect students of such courses to be instantly able to fee-earn. Academics involved with such courses have to balance such demands of employers with broader educational aims that will prepare graduates for not just the immediate work-entry years but a life-long career with suitable skills that will allow them to be adaptable to changing work practices and market skills needs. This paper discusses the ways in which a department offering four professional degree programmes in construction addressed this balancing act when revising curricula and developing assessment surveys to measure the skills achievements of its graduates.

The Department of Building and Real Estate of the Hong Kong Polytechnic University offers four undergraduate honours degree programmes in Building Surveying, Construction Management & Economics, Building Technology & Management and Real Estate. The courses are accredited by the professional bodies of the Royal Institution of Chartered Surveyors, (UK), the Hong Kong Institute of Surveyors and the Chartered Institute of Building (UK). As part of the review of their curricula, the department wished to address the following concerns:

1. Do the abilities of the graduates match employer's expectations?
2. What other essential skills do graduates and

employers feel are required from vocational degree education?

3. Do graduates feel they were well-equipped for the workplace by their education?

But what are the differences between expectations of employers and academics preparing students for the workplace in terms of a knowledge base which is useful? One difference is in the type of knowledge that is required. Mole [1] has suggested that professional knowledge can be divided into three broad domains:

- Generic areas of knowledge (propositional knowledge as defined in curricula);
- Generic skills (process knowledge);
- Generic professional competencies.

The norms of higher education tend to favour scientific or propositional knowledge rather than professional competencies. The knowledge base is likely to be couched in technical/scientific terms rather than practical terms. Typically, technical knowledge is capable of written codification and could be regarded as a kind of propositional knowledge, commonly expressed in curricula [2]. Practical knowledge (as often required by employers) is learned only through experience with practice [3]. Thus learning takes place through using. Learning situations can occur from a range of situations—reading publications, practical experience and people (mentors at work or tutors at university).

Universities seek to broaden and academise the knowledge base and this may develop tensions between university and profession oriented perspectives on knowledge. Universities have a recognised independent role in the creation and validation of knowledge. Professions increasingly need university validation to confirm the status, worth and complexity of their knowledge base [2]. The provision of professional education has moved away from pupillage or qualifying

* Accepted 15 January 1999.

examinations set by institutions to a system where recognised academic examinations, set by universities, exempt graduates from professional examinations. There is thus typically a two-tier route to professional qualification—a degree followed by a period of practical experience from work-based learning and some further test of professional competence is usually required. Technical and practical knowledge are thus divorced in a large number of professional routes to qualification.

This separation between theory and practice is becoming increasingly recognised as a potential problem [1]. Academic institutions are criticised for not providing the right graduates for the industry [4]. Practitioners claim that graduates have little practical knowledge whilst academic institutions will defend their right to set educational objectives.

Attaining a good vocational degree is no longer however, a guarantee of employment, and students must develop the skills necessary for work before leaving university [5]. Universities therefore need to ensure that graduates have a range of skills of potential use to all employers. This latter need is supported by recent statistics from the UK. Increasing numbers of graduates from all degree courses are entering the market place—160,000 in 1995, of which 5,300 obtained surveying degrees. Of these however, only approximately 3,000 entered the profession and registered for the second stage test for professional qualification (the Assessment of Professional Competence).

What are the typical attributes that employers of graduates seek? A number of surveys have elected to track students after graduation to gain feedback on their perceptions of college and its value in accomplishing transfer and employment goals [6, 7]. Other surveys have identified a range of useful attributes for graduates entering the workforce. For example the work by the Centre for Research into Quality, Birmingham, UK [8] which interviewed 258 strategic managers, line managers and recent graduate employees. This identified that employers want 'intelligent, flexible employees who are quick to learn, can deal with uncertainty and rapid change and are able to work on a range of tasks simultaneously'. Graduates are more likely than non-graduates to meet these criteria. Employers are looking for rounded people with a depth of understanding, and an ability to take responsibility and develop their own role in the organisation—to be educated rather than trained. Higher education should continue to provide critical, reflective students. Employers need people who can work in teams, exhibit good interpersonal skills, communicate well and who have an understanding of work culture [8].

Are there any differences between what employers expect and desire of **any** graduate (such as the surveys quoted above) and employers of vocationally trained graduates entering a profession? A number of surveys aimed specifically at the surveying/construction professions have sought to identify a range of generic knowledge areas and/or

some professional knowledge requirements. For example, a College of Estate Management survey in 1992 [9] identified some generic skills that were considered deficient in the areas of management skills and financial analysis. A further survey attempted to identify the skills, knowledge base and educational goals considered desirable by employers [10]. Davis [5] identified that most employers target candidates with similar qualifications and those with transferable skills are the most sought after—skills such as:

- strong interpersonal skills;
- team players who can also lead a team;
- IT and language ability;
- good commercial awareness;
- problem-solving skills.

An unpublished survey developed by a working group of the Royal Institution of Chartered Surveyors (RICS), targeting the knowledge base and generic skills and competencies for Building Surveyors, produced the following list of generic skills:

- gathering, interpreting and giving information;
- management of self and others;
- oral, written and graphical communication;
- teamwork and leadership;
- creativity;
- use of equipment and IT;
- analysis and problem solving.

So how well are professional degree programmes fitting graduates for the workplace? The surveys quoted above asked either graduates or employers to comment on skills achievements of graduates. The tendency for respondents to generalise about the performance of all graduates is therefore high. Anecdotal reports from employers suggest that graduates' technical skills are deficient and that standards are falling. The survey developed for the Building and Real Estate Department, and reported in this paper, attempted to remove this element of generalisation by adopting a new element—both graduates and their immediate supervisors were asked to comment on the development of a range of generic skills. This gave the opportunity for more focused and specific response about an individual's performance at work. This aspect of the survey is rarely done but vastly improves precision. Csete and Davies [11] in a review of international literature on the subject identified that few surveys adopted the approach of matching a specific graduate with their immediate supervisor. The comments received from employers were therefore informed and specific to their employee and not generalised judgements about the performance of any graduate from the institution or even more general impressions of all new employees. The comments from graduates on their perceptions of their achieved skills levels gained from the university programme could be matched with the more objective judgements of those skills by their employer.

The following sections explain the development of the survey, its administration, analysis and discussion of the results.

QUESTIONNAIRE DEVELOPMENT

Some of the professional surveys from the United Kingdom [9, 10] proved useful sources for the typical attributes that employers might expect of graduates from the degree programmes offered by the Hong Kong Polytechnic University since these programmes are accredited by the United Kingdom professional bodies. To accommodate local needs, additional questions relevant to language skills were asked. Employer and graduate surveys were developed that assessed how well students were prepared for the workplace in the view of the graduates themselves and their employers. This was undertaken in a two-stage process involving job analysis and skills analysis.

Staff, working in course teams, were asked to develop a job analysis for graduates entering the current job market and to consider the implications of technology and process changes and work context for graduates in the year 2001. The subsequent stage—skills analysis—identified the key competencies needed to perform the duties and tasks identified through the job analysis.

The course teams generated a list of desired skills, competencies and values through a process of brainstorming that was refined over several weeks by voting and discussion. These were subsequently used to develop first drafts of the questionnaires for customer (i.e. employer and graduate) satisfaction and used for curriculum revision. The questionnaires were revised to accommodate suggestions from an advisory group of employers and two rounds of pilot testing. Employers value communication skills highly. Degree programmes are taught and examined in English—regarded in Hong Kong as an essential international business language. The local Chinese dialect is Cantonese and graduates would be expected to be able to use this in the office and on construction sites when dealing with local workers. An increasing number of construction firms and professional consultancy practices are working in mainland China where the language is Putonghua. Communication skills in three languages are therefore considered desirable and warranted additional questions in the survey.

The final 22 closed response items selected for the survey form were used for both groups—graduates and employers. The questions asked students and employers about how important they felt it was for graduates to have gained a series of skills and abilities, ranging from practical skills such as technical expertise and communication skills to value opinion areas such as the importance of ethical standards or an ability to exercise professional judgement. The graduates were then asked if they felt they possessed each

attribute and additionally if they felt they had developed this competency during their studies at university. The employers were asked to rate the importance of the listed skills for **any** graduate and then to comment specifically on the ability of the graduate who had named them as their immediate supervisor who was familiar with their work.

QUESTIONNAIRE SURVEY ADMINISTRATION

The total number of graduates from the previous two years were identified from student records. These graduates were chosen because they would be new enough to the workplace to be able to comment on their current personal achievement of skills, where they felt they had deficiencies, and how well these skills had been provided by their education. A survey form was posted to them together with a covering letter requesting them to complete the form and to advise the department of the name and fax number of their immediate supervisor. For those who did not immediately reply, two follow-up letters and a second questionnaire form were posted. The response rate was a high—51%—compared to the usual response rates from graduates usually reported in the literature. A total of 226 returns from 442 questionnaires, of which 187 were from graduates working in a relevant profession, were received. The employers were then faxed the corresponding questionnaire and a similar follow-up procedure was adopted. The response rate from the eligible employers was 61%. The largest number of graduates were employed by a range of professional consultancy firms—30% quantity surveying, 21% general practice and 7% building surveying. Government departments employed 3% of graduates whilst a further 6% were employed in the fields of maintenance management and property development respectively. The Building and Technology graduates were largely employed by construction firms as project managers (21%). The size of firms and number of employees was not part of the survey as the focus was on the comments of the nominated supervisor on an individual graduate.

Quantitative analysis of the closed -questions and qualitative analysis of the open-ended questions was performed. The analysis helped to inform curriculum revision and identify the differences in expected skills and skills achievement by recent professional degree graduates and their employers.

QUESTIONNAIRE ANALYSIS AND RESULTS

The significant questions that this research wished to explore are:

1. Do the abilities of the graduates match employer's expectations?

2. What other essential skills do graduates and employers feel are required from vocational degree education?
3. Do graduates feel they were well-equipped for the workplace by their education?

Each item will be examined in the following analysis.

Q.1 Do the abilities of graduates match employer's expectations?

This question was explored through two processes. Paired samples t-tests (two tailed) were run on the 22 items. Written comments of the two groups were also qualitatively analysed and compared.

The results of the paired samples t-tests are reported in Table 1. At a significance level of $p < 0.05$, there were no significant differences between employers' and graduates' opinions of the levels of achievement of 16 skills. Of the remaining six skills, employers rated graduate achievement higher in 'listening skills', cooperative team-working', and 'creativity'; whilst graduates felt they were better equipped than employers did

in the areas of 'extensive practical knowledge,' 'defining and solving problems' and 'working autonomously'. These results are gratifying, given that ongoing discussions with employers and the advisory panel had led to the expectation that employers would rate graduates significantly lower in most skill areas than graduates would rank themselves. Graduates are not so ill-prepared for the workplace as anecdotal evidence would suggest.

A particularly useful way of interpreting the data was to graphically present the results comparing the relative importance and achievement of each of the skills areas. Figure 1 is a general description of how to interpret the results—'Quadrants of effectiveness in teaching important skills for graduates'. The graphs could be divided into a greater number of quadrants. In Fig. 1 an arbitrary midpoint of 2.5 on the 4-point response scale has been selected for creating the quadrants. These axes could be adjusted and the results interpreted accordingly. Figure 2 visually represents the employers' estimates of importance and achievement of essential skills for graduates in the present study. Only one area (communication

Table 1. Comparison of employers' and graduates' views on achieved skills (paired) ($p < 0.05$)

	Skill	Achievement higher according to employers	Achievement higher according to graduates	No significant difference
1.	Extensive practical knowledge		✓	
2.	Computer literate			✓
3.	Able to update professional knowledge			✓
4a.	Possess effective: reading skills			✓
4b.	listening skills	✓		
4c.	oral communication skills			✓
4d.	written skills			✓
5a.	Able to communicate in: English			✓
5b.	Cantonese			✓
5c.	Putonghua			✓
6.	Gather and interpret information			✓
7.	Define and solve problems		✓	
8.	Adaptable and flexible to cope with changing work environment			✓
9.	Work autonomously		✓	
10.	Work co-operatively as a team member	✓		
11.	Lead others effectively			✓
12.	Work effectively with multi-national teams and projects			✓
13.	Be creative	✓		
14.	Value and promote truth, accuracy, honesty, accountability and ethical standards			✓
15.	Accept responsibility			✓
16.	Exercise professional judgement			✓
17.	Recognise and respond to environmental concerns			✓

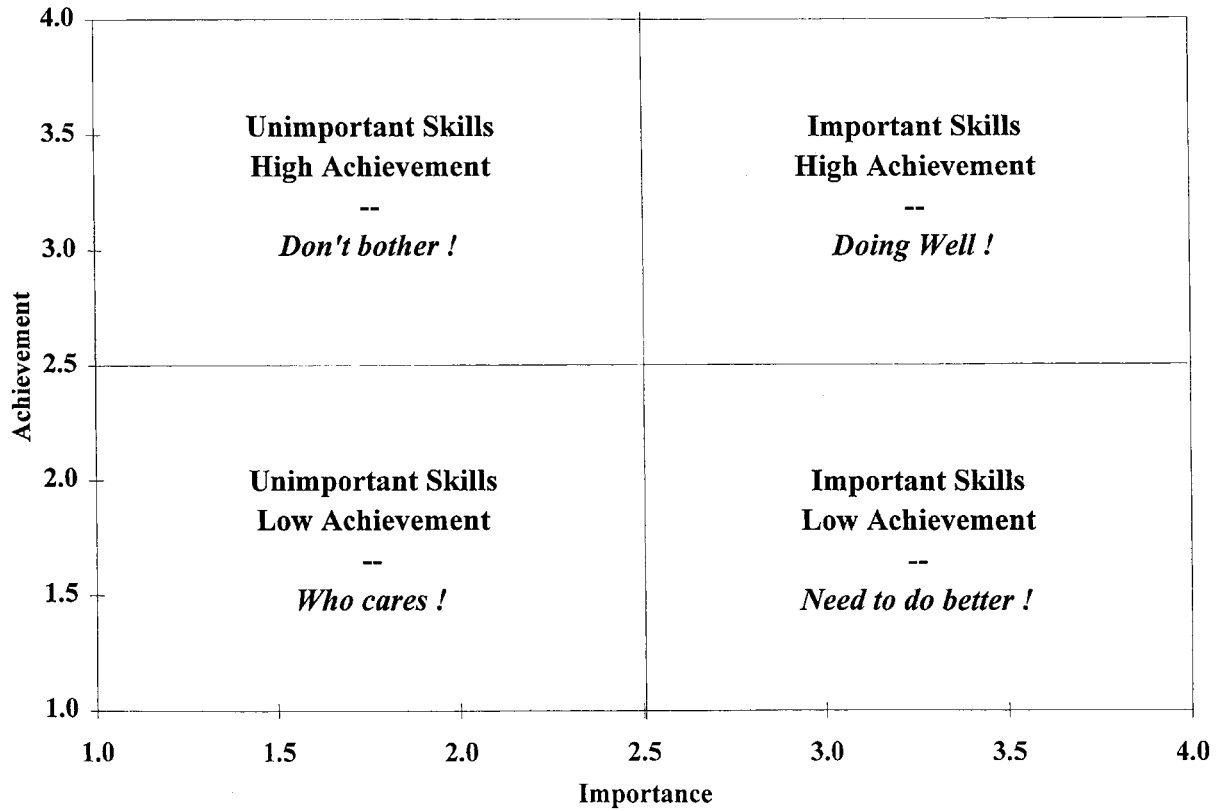


Fig. 1. Quadrants of effectiveness in teaching important skills for graduates.

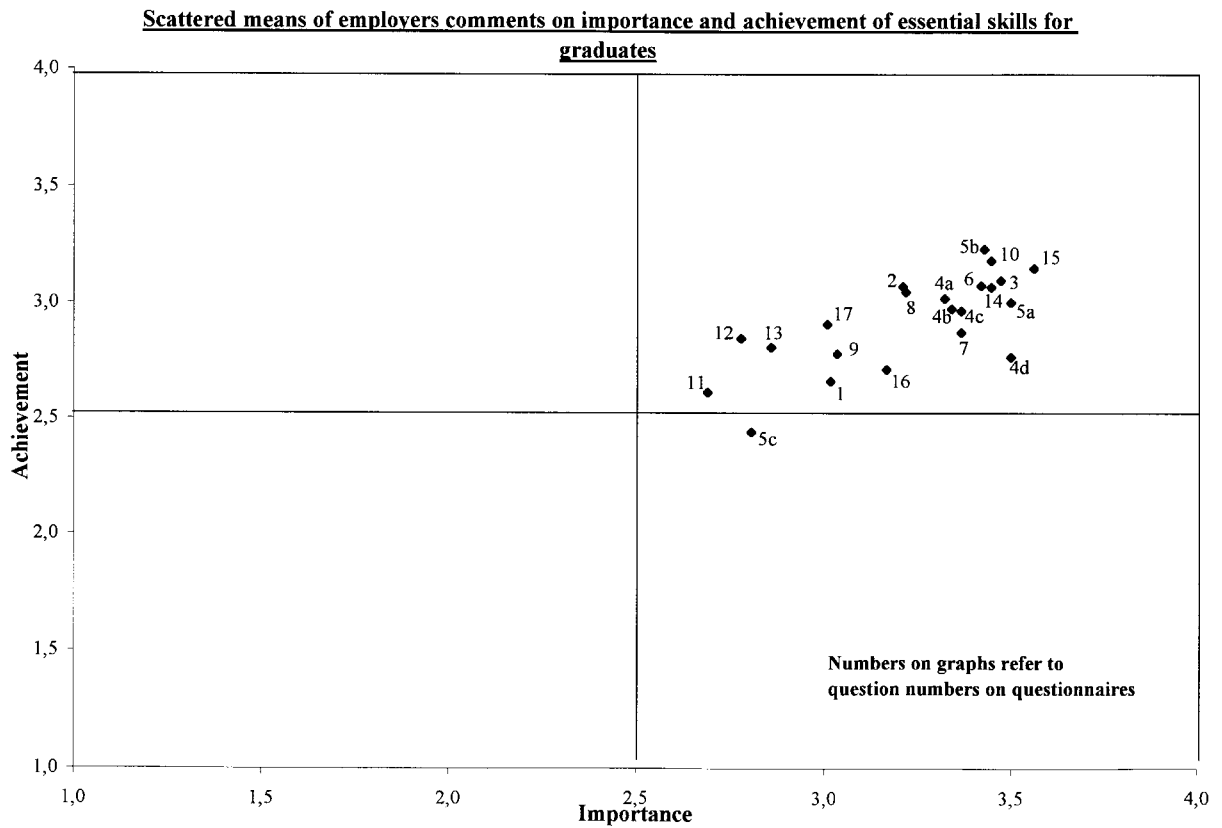


Fig. 2. Scattered means of employers comments on importance and achievement of essential skills for graduates (Questionnaire Part 1 and 2).

Scattered means of graduates views on the importance and achievement of essential skills

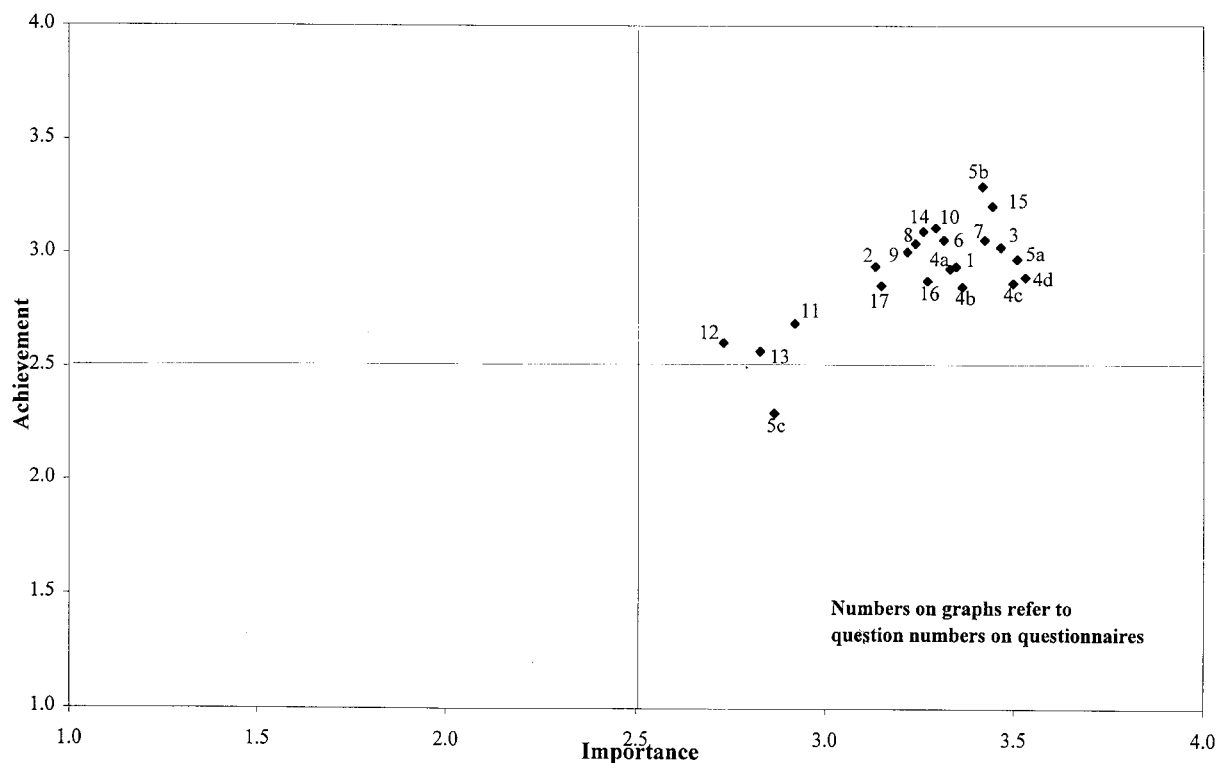


Fig. 3. Scattered means of graduates views on the importance and achievement of essential skills (Questionnaire Part 2 and 3a).

in Putonghua) is below the 2.5 mid-point on the 1 to 4 scale. The university at the time of the survey did not provide language classes in this subject, so this result is not surprising. Figure 3 is a summary of graduates' views on the importance and achievement of essential skills. Again, the scatter of results is generally satisfactory with only the achievement of proficiency in Putonghua falling below the mid-point rating.

Q.2 What other essential skills do graduates and employers feel are required from vocational degree education?

Employers and graduates were asked an open-ended question about any other essential skills that they felt were essential for a vocational degree. The comments were listed and reviewed for common

themes. They were then coded and analysed after a method by Fink [11]. Both graduates and employers identified the same three categories as being the most important. These three categories which account for more than half the comments on each list are detailed in Table 2. A need for more general intellectual and analytical skills was cited most often as an additional essential skill. Other requests were for stronger technical skills and for more practical or 'hands-on' training.

As the target population had a maximum of 24 months experience on the job, it was no surprise that they and their employers wished for more practical 'hands-on' training and specific technical knowledge. Students are given opportunities to develop problem solving skills in their university degree programmes. However, it would

Table 2. Employers' and graduates' written comments on other essential skills

	Graduates (<i>n</i> = 187)	Employers (<i>n</i> = 110)
Most frequent comment category	Graduates need general intellectual and analytical skills (e.g. problem solving) (34 comments)	Same as for graduates (with added emphasis that these skills would allow them to work more independently). (25 comments)
Second most frequent comment category	Graduates need stronger skills in particular technical areas (e.g. law, building contracts) (15 comments)	Same as for graduates. (14 comments)
Third most frequent comment category	Graduates need more practical or 'hands-on' training. (6 comments)	Same as for graduates. (6 comments)

Scattered means of graduates views of their achievement of skills and the effectiveness of teaching by PolyU to achieve these skills

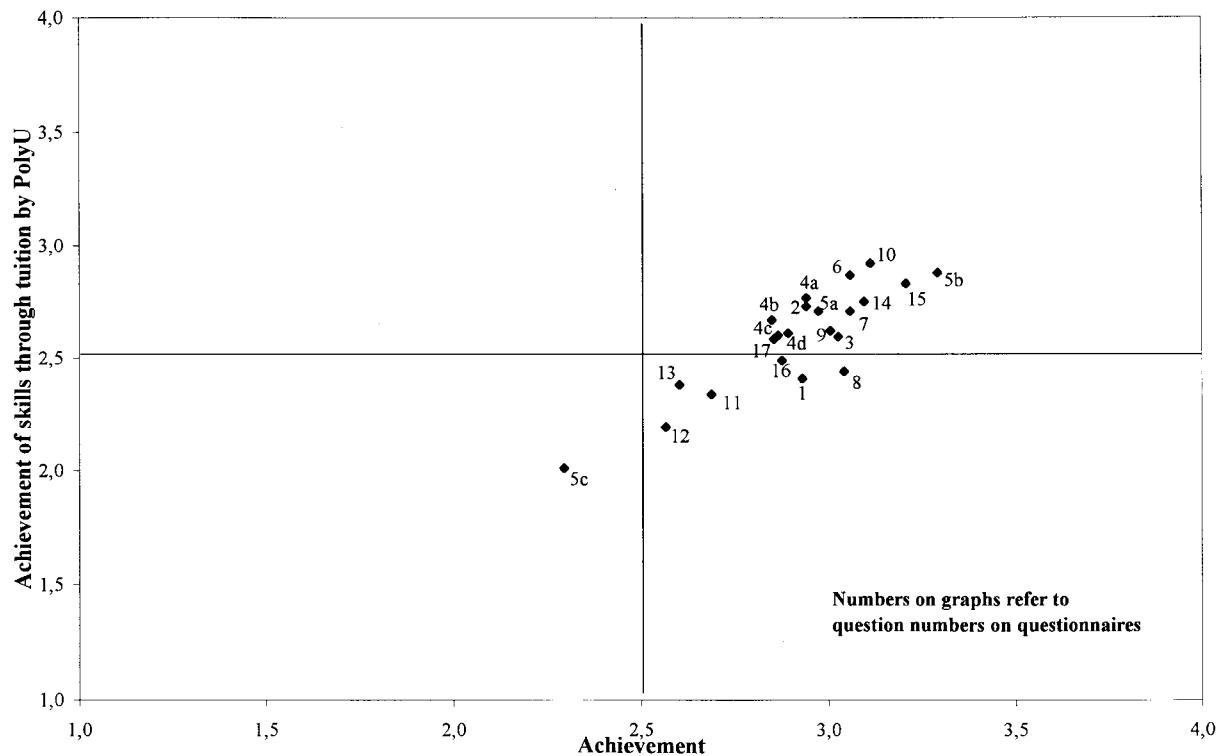


Fig. 4. Scattered means of graduates views of their achievement of skills and the effectiveness of teaching by PolyU to achieve these skills (Questionnaire Part 3a and Part 3b).

seem necessary to increase student exposure to learning situations that would encourage further development.

Q.3 Do graduates feel they were well-equipped for the workplace by their education?

This final question is answered by the results from Fig. 4 which represents graduates' estimation of their achievement of essential skills and the effectiveness of university teaching to achieve those skills. Besides Putonghua, a number of other skills fall below the mid-point scale level. These include an ability to work effectively in multi-national teams and projects (Q.12), an ability to lead others effectively (Q.11), creativity (Q.13) adaptability & flexibility (Q.8) and an ability to exercise professional judgement (Q.16). All these abilities are likely to be developed over a period of time through practical experience and recent graduates therefore do not feel they have gained sufficient experience. It could be argued that these skills are perhaps more suited to 'on-the-job' experiential learning. Academic programmes can attempt to introduce learning situations where these skills can be practised, but until students perceive the need to develop these attributes, they may not take advantage of the opportunities for self-development offered by the university.

Of more concern is graduates' underestimation of their practical knowledge in at least one area (Q.1). This could reflect their modesty and

uncertainties about their own knowledge and skills in a new job environment. Staff, however, feel it is important to ensure that graduates have the ability to apply principles and know where to find information rather than memorise current technical details that may have only a short period of use. Proficiency in general skills will take them further in their career.

CONCLUSIONS

This study describes the development and testing of a paired graduate and employer 'customer satisfaction' survey used to determine the development of general skills by graduates from professionally accredited construction degree programmes. The combination of items on general skill areas and open-ended questions can serve as a flexible design for surveys of this type.

Graduates from professional courses are often described by employers as lacking in useful immediately fee-earning skills. This survey reveals that graduates and employers from the population surveyed, largely agree on the importance of a set of general skills required by graduates. Comments from employers and graduates on the need for additional skills recommend the development of three main categories—a need for general intellectual and analytical skills (e.g. problem-solving),

particular specialist technical skills, and more practical 'hands-on' training. Statistical analysis of responses indicates that there are few differences between graduates and employers assessment of levels of achievement of skills by named graduates. Graduates are apparently not as ill-prepared for

the workplace as anecdotal evidence from employers would suggest. The survey provides feedback for those areas of skills development which the programmes need to revise or emphasise and thus acts as a mechanism for curriculum design and revision.

REFERENCES

1. T. Mole, '*Mind the Gap: An Education and Training Framework for Chartered Building Surveyors*', The Royal Institution of Chartered Surveyors, London, (March 1997).
2. M. Eraut, *Developing Professional Knowledge and Competence*, The Farmer Press, London (1994).
3. A. Ashworth and A. J. Bridge, Capability learning and the construction professions, in *Proc. CIB: Working Commission W65 'Organisation and Management, Construction'*, Glasgow, (September 1996).
4. M. Li, Q. Gao and B. Chen The extension from practice teaching links to training the engineering practice ability, *Proc. Fourth Int. Conf. Modern Industrial Training*, Xian, (1994) pp.274-279.
5. L. Davis, High fliers must hit the ground running, *Chartered Surveyor Monthly*, RICS, London, (September 1996) p.42.
6. J. Frank, A comparative analysis of 1990 graduates, *Research Report No. 73*, Columbia, MD: Howard Community College, (1991).
7. J. L. Brennan, E. S. Lyon, P. A. McGeevor and K. Murray, *Students, Courses and Jobs: the relationship between higher education and the labour market*, Higher Education Policy Series 21, London: Jessica Kingsley Publishers, (1993).
8. L. Harvey, S. Moon, V. Geall with R. Bower, *Graduates' Work: organisational change and student's attributes*, Centre for Research into Quality, University of Central England in Birmingham, UK, (April 1997).
9. College of Estate Management, *The Skills Mismatch*, College of Estate Management Research Paper, Reading, UK, (1992).
10. J. Moohan, *Procedures and Guidelines for Course Accreditation, Supplementary Advisory Notes: Postgraduate Programmes*, Royal Institution of Chartered Surveyors, London, UK, (1993).
11. J. Csete and H. Davies, Servant of two masters? Comparing results from matched employer and graduate surveys. Paper presented at American Educational Research Association Annual Meeting, Chicago, Illinois, March 27 1997 (ERIC Document Reproduction Service No. ED413334) (1997).
12. A. Fink, *The Survey Handbook*, Thousand Oaks, CA, USA: Sage, (1995).

Hilary Davies received her Ph.D. from the Geography Department of University College London. She qualified as a Building Surveyor whilst working for Local Government in the United Kingdom and was elected a Fellow of the Royal Institution of Chartered Surveyors. She taught at the University of Greenwich as Principal Lecturer in Construction Technology and led the Masters Portfolio for three years. She is currently an Associate Professor with Hong Kong Polytechnic University, Department of Building and Real Estate leading the Building Surveying programme. She is chair of the Departmental Learning and Teaching Development Committee, working to ensure high quality teaching and learning in the department. Her research interests also include facilities management and building defects.

Josephine Csete received her Ph.D. in Educational Systems Development from Michigan State University. She is a member of the Educational Development Unit at Hong Kong Polytechnic University—a department charged with 'improving the quality of teaching and learning' on a campus of over 1,000 full-time teaching staff and 20,000 undergraduate and graduate students. Her interests include curriculum design, curriculum development, and mixed methods approaches in educational research.

Joanna Poon graduated in 1996 from the Hong Kong Polytechnic University with a B.Sc.(Hons) in Real Estate. Upon graduation she joined the Department of Building and Real Estate of the same university and worked as a Research Assistant. She was awarded the S. L. Pao Education Foundation Scholarship to study overseas and she obtained an M.Sc. in Real Estate from the University of Reading. Her research interests are real estate development, urban economics and housing economics.