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ABSTRACT

This paper reports on the design and results of a paired sample survey of 226 graduates and 110 of their employers in one professional area at a university. This study was designed to explore the usefulness of a method of data collection for paired surveys and the potential benefits of surveying both graduates and employers. Survey development and dissemination methods are described. A quantitative analysis was made of a list of 22 general skills. Qualitative analysis of graduate and employer comments compared graduate and employer expectations of any graduate employee in terms of important skills and their assessments of skills of a particular graduate (Achievement of the same skills). Although few statistically significant differences were found between ratings of employers and graduates, results indicate that each group can answer different questions that contribute to curriculum improvement, and more qualitative methods may reveal differences in similar questions. Recommendations for survey development and use include: (1) supplementing questions on general skill levels with open-ended questions; (2) differentiating between the importance of and achievement of skills; (3) graphically presenting qualitative results for decision makers; and (4) using alternate question types and qualitative data collection methods to control for respondents' tendencies to provide predominantly positive responses. (Contains 2 figures, 4 tables, and 16 references.) (SLD)

Servant of Two Masters?

Comparing Results from Matched Employer and Graduate Surveys

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ABSTRACT

This paper reports on the design and results of a paired sample survey of graduates and their employers in one professional area at a university, to explore the utility of a method of data collection for paired surveys, and potential benefits of surveying both graduates and employers. Survey development and dissemination methods are described. Results present quantitative analysis of a list of 22 general skills as well as qualitative analysis of written comments to compare employers' and graduates': a) expectations of any graduate employee (important skills), and b) assessment of skills of a particular graduate (achievement of the same skills). Discussion includes a description of how survey results were used for curriculum revision and recommendations for future improvements. Although few statistically significant differences were found between ratings of employers and graduates, the authors recommend surveying both populations. Each group can answer different questions that contribute to curriculum improvement, and more qualitative methods may reveal differences in similar questions. Recommendations include: a) supplementing questions on predetermined general skill areas with open-ended questions; b) differentiating between the importance and achievement of skills; c) graphically presenting quantitative results for decision makers; and d) using alternate question types and qualitative data collection methods to control for respondents' tendency to provide predominantly positive responses.

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Background

Continuing trends of accountability, quality assurance, and the incorporation of a customer focus in higher education will increase the necessity for educational institutions of all types to collect data from their "end users." The data collected from students after graduation or their employers can be a valuable tool in the evaluation of outcomes and planning of curricula. Programs can be revised to accommodate changes indicated by these reviews. Although surveys can require a great deal of money and staff time, they still represent the most cost and time efficient method of collecting data from a large number of people. They therefore are a common, and sometimes the only, method used to collect information for purposes of assessment and revision.

This paper reports on the design and results of a paired sample survey of graduates and their employers in one professional area at a university, to explore: 1) the utility of a method of data collection for paired surveys; and 2) potential benefits of surveying both graduates and employers. The surveys were conducted in 1996 by the Department of Building and Real Estate (BRE) in the Hong Kong Polytechnic University. Hong Kong Polytechnic University is the largest of the seven universities in Hong Kong with over 1,000 full-time faculty and over 20,000 students (13,000 full-time equivalent). The Department of Building and Real Estate has 38 full-time faculty and admits more than 270 new students every year. The department's four undergraduate degree programs are accredited by professional organizations in the United Kingdom. The courses are very vocational in focus, with graduates going on to complete 2 years of professional practice before assessment and certification of their competence by these professional organizations.

There has always been a need for building surveying and construction degree programs to closely follow any changes in the skills required by the property and real estate market and to reflect these in courses offered. A lack of responsiveness in such courses has led, in the UK, to an identified lack or mismatch of skills offered by Surveying degree programs in the areas of linguistic and management skills and financial analysis (College of Estate Management, 1992).[1] The Department of Building and Real Estate has regularly sought informal advice from employers, and consults with an advisory panel whose members are recognized leaders in the local industry. BRE decided to collect more systematic feedback from employers and graduates as part of a larger curriculum revision effort.[2] This data was to be collected through self-administered surveys.

A review of the literature on employer and graduate surveys revealed that most of the work was unpublished, and that there was considerable variability in the focus and quality of such surveys. Some surveys had attempted to identify the skills, knowledge base and educational goals considered desirable by employers (Moohan [1993] and Otter [1992] are examples), while other surveys had elected to track students after graduation to gain feedback on their perceptions of college and its value in accomplishing transfer and employment goals (Frank, 1991; Pettit, 1991; Kiger, 1994;

[1] The surveying profession in the UK comprises 7 divisions; the main three covering "Quantity Surveying", " General Practice" or "Real Estate", and "Building Surveying." The professional expertise of "Surveying" is not to be confused with the data collection method of "surveying" reported in this paper.

[2] The university is phasing in a credit-based system which will begin with first-year students in the fall of 1998. As in the present system, students can only begin university if they have been accepted into a particular three-year course of study in a department. However, with the modularized credit-based system (drawn from American examples) each year cohort will no longer progress through the course on the same schedule and students will be able to select electives and take subjects from outside their major department. This change to the credit-based system provided an opportunity to examine existing courses and implement substantial curricular changes.

Brennan et. al., 1993). Reported studies rarely collected data from both graduates and employers. In the few examples found, only one study used matched graduate and employer surveys (Banta, 1993).

It quickly became apparent that linked graduate and employer surveys are underrepresented in the literature. As expectations increase that institutions will collect information from employers and/or graduates, there certainly is scope for further research and methodological development. Therefore, in the present study it was decided to collect data from both graduates and employers, not only for the customary uses of assessing outcomes and informing curriculum revision, but also to advance survey research in this context. As surveys of this type are conducted more often, it will be important to arrive at cost effective means of collecting the most valid data possible. This study explores whether there are benefits in consulting both stakeholder groups, and begins to answer questions such as:

Do employers and graduates agree on the most important skills for the workplace?
Do the abilities of the graduates match employers' expectations?
Do graduates feel they were well-equipped for the workplace by their education?
Do employers agree with the graduates' assessment?

Study Design and Methods

Questionnaire development and dissemination

The questionnaire surveys for employers and graduates went through several stages of development. In the spring of 1996 a series of department-wide faculty and special small group meetings resulted in a decision to survey the opinions of both recent graduates and their employers, and the general areas of inquiry of the surveys. Surveys were then developed by a task force comprised of subject matter experts within the department, and external educational consultants. First drafts of the surveys were based on information from the literature search and input from department faculty. The surveys were then repeatedly revised to accommodate suggestions from consultations with employers (through an advisory panel), and resolve potential problems identified in two cycles of piloting on target respondents.

In the final version, the questionnaires collected information in four areas: 1) general information on the respondent, 2) assessment of importance of skills for all graduates, 3) assessment of a particular graduate's performance of these same skills, and 4) open-ended questions requesting written comments (see Table I for a detailed description of each section). The final survey package consisted of three and four page surveys for employers and graduates respectively, a one page explanatory cover letter, and either a stamped addressed envelope for return mailing (graduates) or return fax instructions (employers).

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Insert Table I about here

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Except for minor changes to maintain clarity, the order, wording and scales for the twenty-two closed response items used in the second and third sections of the surveys were kept the same to facilitate comparing responses from the two groups. The twenty-

two items included general skill areas that both department staff and employer representatives had agreed covered the basic skills that graduates of any program in the department should be assessed for. The list was generated through brainstorming sessions and refined over time through voting and discussion processes. It resembles the skill areas used in numerous other surveys found in our own literature review as well as the recurrent themes sought by employers across a wide range of fields in the studies reviewed by VanHorn (1995). In addition, several of the open-ended questions were kept as similar as possible so that comparisons could later be made between employers' and graduates' written responses.

Methods for survey administration (as well as development) were drawn from Bourque & Fielder (1995) and Dillman (1978). To maximize response rate, three waves of data collection were carried out and a tracking system was implemented to follow-up with non-respondents. Survey dissemination methods were slightly different for graduates and employers to take their likely preferences into account. Graduates were first mailed the survey with an explanatory cover letter and stamped addressed return envelope. Both the cover letter and survey clearly requested they complete and return the questionnaire by a specified due date (two weeks from date of mailing). This was followed by a letter either thanking them for their response or noting that their survey had not yet been returned and asking them to do so. After another two weeks a "second edition" of the questionnaire was mailed with a different cover letter and stamped addressed envelope to the graduates who had not yet responded. Employers were faxed the cover letter and survey and requested to return fax their responses within a week. Each employer also received a thank you or reminder fax after the week had passed, and non-respondents received a revised cover letter and new copy of the survey after another week had passed.

A tracking system was essential for thanking respondents and following up with non-respondents. Each graduate and employer was assigned an identification code, the purpose of which was clearly explained in the cover letter. To preserve confidentiality, the identification code was cut off of returned questionnaires after the code had been noted in a separately kept log on who had responded. Also as a gesture of thanks and to improve response rate, respondents were invited to return their name and address on a separate form if they wished to receive a copy of the survey results. A larger number than expected requested this information (44 of the 110 employers and 97 of the 226 graduates).

Employer names were generated from graduates. Graduates who were working in the field were asked to supply a name and contact number of a supervisor familiar with their work. In contrast to other surveys using this method reported in the literature (Banta, 1993), a large percentage of graduates complied (180 of 187 graduates working in the field, or more than 96% of qualified respondents). Specifically named employers were then directly contacted. Employer survey forms included a space in which the name of a particular graduate (who had identified the supervisor as familiar with his/her work) was written. This mechanism assured that only someone familiar with the graduate as an employee completed the matched employer survey. To preserve confidentiality, the graduate's name was also removed after responses had been coded. Data tables for both employers and graduates contained matching information, but only based on the identification codes.

Questionnaire analysis

The entire population of graduates from 1994 and 1995 were surveyed. These years were chosen for the theoretical reason that they would be new enough to the work environment to be able to both recollect what they had learned in school and comment on other skills new graduates most needed, and for the practical reason that the database would contain the most accurate addresses for these more recent graduates. A total of 442 questionnaires were sent out to graduates. 226 were returned for a 51% response

rate. Of the returned questionnaires, 187 indicated they were employed in the field. Surveys were sent out to all 180 employers named by graduates. 110 employers returned surveys for a 61% response rate.

Analysis of the surveys included quantitative and qualitative methods. Closed ended questions were coded into numerical responses and entered into the statistical program SPSS from which descriptive and explanatory statistics could be run. 114 paired employer and graduate surveys comprised the data set for quantitative analysis.[3] Open-ended questions were analyzed qualitatively using a system of coding and categorizing all written responses, and testing for coder and category reliability as described in Fink (1995), Lincoln & Guba (1985), and Tesch (1990).

Results

The surveys provided a large amount of data that was analyzed in different ways and put to a variety of uses for the purposes of outcomes assessment and curriculum revision. As the purpose of this paper is to describe a method of matching graduate and employer surveys and explore the utility of the results, only a few sections of the data will be focused upon. More specifically, we will center on the 22 closed response items of the paired sample to compare employers' and graduates': a) expectations of any graduate employee (important skills), and b) assessment of skills of a particular graduate (achievement of the same skills). We will also briefly report on one open-ended question collecting written comments from both employers and graduates on essential skills not included in the list of 22.

Do employers' and graduates' views differ on what skills are important in the workplace?

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 analyzed and compared.

The results of the paired samples t-tests are reported in Table II. At a significance level of $p < .05$, there were no significant differences between employers' and graduates' opinions of the importance of 16 skills.[4] Of the remaining six skills, "extensive practical knowledge," "oral communication skills," and "leading others effectively" were rated as significantly more important by graduates; and "computer literacy," "working co-operatively as a team member," and "promoting truth and ethical standards" were rated as significantly more important by employers.

Given anecdotal evidence gathered across years of conversations with both employers and graduates, the researchers and department faculty had expected many more significant differences. Even what new knowledge was generated from the six statistically significant results was questioned. As the target population had a maximum of 24 months experience on the job, it was no surprise that they wished for more extensive practical knowledge. For the same reason, graduates may feel it is more important to know how to lead others, in contrast to their employers' perception that this was not important at such an early career stage. Two other significant results brought up a question as to the validity of the items themselves. To what extent could "possessing oral communication skills," significantly more important to graduates, be considered a part of "working cooperatively as a team member," a skill significantly more important to employers? However, the fact that these differences cannot be accounted for by chance should not be forgotten. The paired design of this study

[3] There are slightly more pairs than employers because in a few instances more than one graduate identified the same supervisor.

[4] If a level of $p < .01$ had been chosen, two skills (1 & 11) would have been significant.

controls for many potentially confounding variables. Why these differences exist should be explored, especially to discover implications for curriculum revision.

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Insert Table II about here

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Both forms of the survey asked respondents to write in any other skills that were essential for graduates. This question immediately followed the 22 item skills list. All comments were compiled into two separate lists of employers' and graduates' comments.[5] These lists were reviewed for themes. Shorthand codes were then created for these themes, the lists were repeatedly reviewed and attempts were made to attach codes to each of the comments. After several cycles of adjusting themes/categories and recoding the individual comments, a limited number of discrete categories emerged which accounted for most of the comments on each list. The three categories which account for more than half the comments on each list are detailed in Table III. It was interesting to note that for this, as for all other open-ended questions in both surveys, the number of comments fitting into a single category dropped off sharply after the three most common categories. More important to this particular study, employers and graduates identified the same three categories of additional essential skills, and in the same order of frequency. More than half of the comments from both groups were either general statements about the importance of, or requests for specific a) intellectual skills; b) technical skills; or c) practical training.

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Insert Table III about here

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In summary, the quantitative analysis of the 22 item skills list and qualitative analysis of written comments on additional essential skills suggested there was little practical difference between employers' and graduates' views on the importance of various skills in the workplace. As has occurred in many other surveys of this type, there was a tendency to rate all the skills as important. The means for all 22 items for both groups was above 2.5 on a four point scale.[6] There are several plausible explanations for this tendency of respondents to rate all the skills as important. One possibility is that, as experts in the field had designed the list to cover what they felt were the important skills, it would be no surprise if employers and graduates agreed with them. Another explanation is that the response scale was not as clear and appropriate as possible. Whatever the reason, respondents' use of a limited range of the scale may make statistical significance less common, and certainly restricts the understandings that can be derived to help make practical decisions. For example, the differences between means of the 22 items was often as little as a few hundredths of a point. A faculty decision to concentrate their improvement efforts on any portion of the skills ranked as most important would therefore be arbitrary.

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[5] Note that qualitative analysis of written comments included all respondents, not just the 114 pairs.

[6] In fact, most of the means were much higher. The "mean of the means" was 3.27 for graduates and 3.24 for employers (for those who don't completely discount this "average of averages").

Do employers and graduates differ in their assessment of achieved skills?

This question was explored via paired samples t-tests (two tailed) on 22 closed response items asking respondents to assess the achievement of a particular graduate in each of the items previously rated for importance. The results of the paired samples t-tests are reported in Table IV. At a significance level of $p < .05$, there were no significant differences between employers' and graduates' opinions of achievement of 16 skills.[7] Of the remaining six skills, graduates reported significantly higher achievement in possessing "extensive practical knowledge," being able to "define and solve problems," and "work autonomously;" and employers reported graduates achieved more in the skill areas of "listening," "working co-operatively as a team member," and "being creative."

Once again, researchers and department faculty had expected many more significant differences in these items. As many faculty had heard complaints about the quality of graduates from the advisory panel as well as employers they interacted with, the expectation was that employers would rate graduates significantly lower in most of the skill areas.[8] It came as a pleasant surprise that although the graduates had rated themselves higher in three areas, there were also three areas which the employers rated graduates higher than they had rated themselves!

It was interesting to note that only two of the items with a significant difference in importance rating also received a significant difference in achievement rating. Graduates rated possessing "extensive practical knowledge" higher in importance and achievement, and employers did the same for "working cooperatively as a team member." This was useful information as during the survey development stage many of those involved wondered whether employers would rate graduate achievement lower for more important skills, and conversely, whether graduates might tend to rate as more important the skills they felt they were still achieving the least in.

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Insert Table IV about here

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Quantitative analysis of the 22 closed response items indicates much less difference between employers' and graduates' perception of achievement of various skills than had been expected. Possible confounding variables include a tendency for employers to provide higher scores when a specific graduate is named (Banta, 1993), or conversely, modesty on the part of this particular group of graduates (an often repeated stereotype of Asians). A slightly larger portion of the scale was used in answering the achievement questions, but the means for 21 of the 22 items for both groups was still above 2.5 on the four point scale.[9] Once again, use of a limited range of the response scale is troubling. Plausible explanations of this tendency to rate graduates "above average" for all skills include: a) graduates are really doing a good job and achieving

[7] If a level of $p < .01$ had been chosen, three skills (1, 4 & 9) would have been significant.

[8] This concern generated a great deal of discussion during survey development. Many faculty members were concerned that disseminating a survey asking questions related to achievement would lay the department open to criticism and attack.

[9] The one skill eliciting an achievement mean of just under 2.5, "ability to communicate in Putonghua" (the national language of Mainland China) was not even part of the curriculum for students! (Over 90% of graduates are native speakers of Cantonese and have received no formal language training in Putonghua, though many Cantonese speakers have shown the ability to pick up Putonghua when required for business purposes.)

that well; b) employers feel graduate achievement is high given relatively low expectations of performance as new employees; or c) employers do not wish to appear overly critical. However, the "real" explanation (or explanantions) is not known, and the data does not clearly indicate a desirable course of action for making improvements.

Discussion

As is common to all studies, the researchers found some processes and tools beneficial and plan to employ them again in suitable situations. Other activities were less beneficial and are not likely to be repeated. After briefly reporting how the survey results were used, we will describe what we would do again, and what we would change, given a similar study.

As has been described, all members of the department had been involved to varying degrees in the development of the surveys in the spring of 1996. At the very least, they had attended several meetings in which they had brainstormed the list of skill areas essential to all graduates, and then voted to arrive at the final list. The survey was then conducted over the summer. Just before the fall semester began, staff participated in a two day retreat devoted to revision of the four undergraduate degree curricula. The first day of the retreat was used for presentation of survey results and decision making based upon those results. Staff were given the full list of written comments from employers and graduates and prioritized lists of the themes generated. They also received quantitative results in the forms of frequencies, and ranked and plotted means. Staff reviewed survey data in small groups to generate prioritized lists of aspects of the existing curricula to preserve, and new areas of focus for the revised curricula.

The greatest benefit of the survey was how it focused and galvanized the energies of the department. Involving staff in the development of the survey at the beginning of the curriculum revision process focused them on teaching and their learners. Ideas contributed by staff substantially improved the final surveys. Processes associated with the survey also appear to have lead to greater staff commitment as well as smoothed later stages of the curriculum development process. Evidence of this commitment includes a substantial portion of staff remaining in the halls to animatedly continue discussion of curriculum issues after the close of the two day retreat (after 5 p.m. on the Friday before classes were to start)! Almost every staff member later took responsibility for drafting at least one new subject in the new curricula. Survey results and the prioritized lists of goals generated during the retreat contributed to the first draft of these modules being noticeably cohesive.

In a similar situation we would again ask questions on general rather than discipline specific or technical skills. It is beneficial to focus on general skills. Through protracted discussions it became apparent that even in a single department there was so much variability in the degree courses, let alone the nature of the jobs students entered after graduation, that it would be impossible to come up with a single survey that asked questions on specific skills for all graduates. Even if different forms of the survey were developed for graduates of different degrees, the specific skills are so numerous that a survey would be too long and cumbersome and few would be likely to complete it. And most importantly, staff representing different disciplines and degree courses in the department came to realize that what was most important for their students' future careers as well as the industry, was that they became proficient in general skills. To paraphrase one staff member, "Its more important that they know how to look up the information than that they recall the dimensions of a brick. The properties of bricks will keep changing after our students graduate – what our students need is to know how to keep up with this new technical knowledge."

However, it is useful to supplement questions on predetermined skill areas and those with closed responses with open-ended questions. Comments generated from open-

ended questions were relatively simple to compile and analyze for trends, and the valuable information gathered from them more than justified the additional effort required. A few open-ended questions that are carefully worded for clarity and placed immediately after the list of general skills can generate very useful written comments from respondents. We would also recommend questions asking respondents to identify problems and generate solutions on issues they are qualified to answer (an example is asking graduates to list the three strengths of their degree program and three areas most in need of improvement). One obvious benefit is that respondents may list important skills that are newly emerging or have been missed by survey developers. We also found that the written comments of respondents were remembered by staff. Written comments added richness of detail and personalized the issues. Information gained from these qualitative questions often helped clarify understanding of quantitative results – especially important in this situation in which there were relatively few significant quantitative results.

The combination of items on general skill areas and open-ended questions can serve as a flexible design for surveys of this type. The surveys reported on in this paper have been developed with the intention of expanding their use university-wide. Although this "first draft" was developed by a single department, the general skills list would apply to most of the programs in the university. There would also be advantages in gathering this data across a wider range of employers and graduates. Additional department-specific closed response items, combined with open-ended questions, could gather discipline specific information. By beginning with a basic survey, each department could spend less time in survey development, but still refine and add questions as appropriate.

We also recommend reviewing the literature before each new survey effort as new developments could improve flaws in survey design. For example, it was only after this survey had been sent out that an article describing stages in new graduates' transition from higher education to work (Sagan, 1990) was discovered. As the graduate population surveyed in our study covered several stages hypothesized by Sagan, it is possible our study results are confounded by this phenomenon.

There are also several techniques used in the survey design or reporting of results that we would use again. First, we will continue to clearly differentiate between the importance and achievement of skills. Questions related to importance collect information on the scope and priorities of the industry. New areas may be demanded on the job that are not even addressed in the curriculum. Questions related to achievement provide feedback on how well graduates are prepared for the workplace. In this particular study, respondents appeared to clearly distinguish between importance and achievement, but asking both types of questions can be a control for this potential confusion in future surveys. Also, it is necessary for decision makers to keep the difference between importance and achievement in mind. For example, in the present study we found the skill area graduates had the lowest achievement in was also rated as one of the least important!

This leads to another technique we will reuse. Graphing quantitative results provided much clearer understanding from which staff could make decisions. In particular, we would recommend graphing skills to compare importance and achievement. As described earlier, in the present study respondents tended to limit their responses to a small portion of the range and the differences between the means were often so small to be insignificant for practical use. This meant a ranking of means for the 22 general skills was misleading. We found graphing the means with importance on the *x* scale and achievement on the *y* scale had two benefits. First, it was much easier to see relative distances between means. Second, when the graph was divided into four quadrants (using the overall means for "importance" and "achievement") it was much easier to perceive areas for improvement as well as those in which to maintain the status quo (see Figures I & II).

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Insert Figures I & II about here

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Given what we learned from conducting these surveys, there are also some things we would change. First, the restricted use of the positive end of the response range by both graduates and employers is troubling. We would attempt to better control for this by augmenting standard closed-response scales with other kinds of questions. Two possibilities are ranking or distributing a set number of points across a list of skills. Also, as so much was learned from qualitative analysis of written comments, we would strongly consider using additional qualitative methods in future surveys. For example, following up with a portion of respondents via phone interviews could both collect more detailed information and perhaps act as a control for the response bias of more quantitative questions. We must also remain aware that items can be differently interpreted by respondents. Both literature review prior to survey development and incorporation of qualitative data gathering techniques can help prevent the use of, or control the damage from, inappropriate items. In the future we may also experiment with other methods of identifying employers. It is possible that asking graduates to supply employer names reduced the response rate and biased the study sample. There may be greater gain in increasing the response rate while sacrificing the chance to precisely pair employer and graduate surveys.

In reviewing what we learned from this study we would say that, for our particular population, employers and graduates do not differ substantially in their assessments of the importance of skills for the workplace, or even in their assessments of particular graduates' achievement of these skills. Although future survey designs may not be paired, we plan to continue to survey both these populations for several reasons. One is that we learned different information from the two groups on qualitative questions. Another is that proposed refinements in the response formats of quantitative questions may reveal differences, or even that differences may emerge as the industry and curricula change over time. And finally, although we feel that higher education should not be entirely directed by the needs of the workplace, neither do we feel that the needs of employers to have capable employees or of students to get satisfying jobs can be denied. Resnick (1987) so aptly pointed out the disparity between what is taught in school and the skills used in the workplace. Regularly collecting feedback from employers and graduates can help us improve curricula to close this gap.

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Table I:
Description of employer and graduate surveys

	Graduates	Employers
1) General Information	6 questions collecting employment information containing (when inclusion criteria were met) a request for supervisor's name and contact number.	1 open-ended question requesting a description of the organization's core activities.
2) Important Skills for All Graduates	22 closed response questions on a four-point scale indicating level of agreement, and one open-ended question inviting respondents to write in other essential skills that were not covered by the closed response items.	Same as for graduates.
3) Assessment of a Particular Graduate	For each of the 22 areas identified in the previous section, closed response questions indicating a) current level of competency, and b) whether competency was developed during university training, on the same four-point scale.	For each of the 22 areas identified in the previous section, closed response questions indicating the skill level of a particular graduate (named on the form) currently working for the employer, on the same four-point scale with a fifth option of "cannot comment." 2 additional questions asking how many other graduates from the same university had worked with the employer in a given time period, and whether and how the identified graduate differs from other employees.
4) Additional Open-ended Questions	Three questions asking respondents to write in a) three strengths of the university program, b) three weaknesses, and c) any other comments.	Two questions asking respondents to write in a) other areas of technical knowledge important for graduates to possess, and b) any other comments.

Table II:
Comparison of Employers' and Graduates' Views on Important Skills (Paired) ($p < .05$)

	Skill	More important to Employers	More important 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.	writing 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 judgment			✓
17.	Recognize and respond to environmental concerns			✓

Table III:
Employers' and Graduates' Written Comments on Other Essential Skills

	Graduates (n=187)	**Employers** (n=110)
Number respondents/ number comments	76/111	51/59
Most frequent comment category	Graduates need general intellectual and analytical skills (ex. 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 (ex. 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)

Table IV:
Comparison of Employers' and Graduates' Views on Achieved Skills (Paired) ($p < .05$)

	Skill	Ach. Higher According to Employers	Ach. 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.	writing 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 judgment			✓
17.	Recognize and respond to environmental concerns			✓

Figure I:
Quadrants of Effectiveness in Teaching Important Skills for Graduates

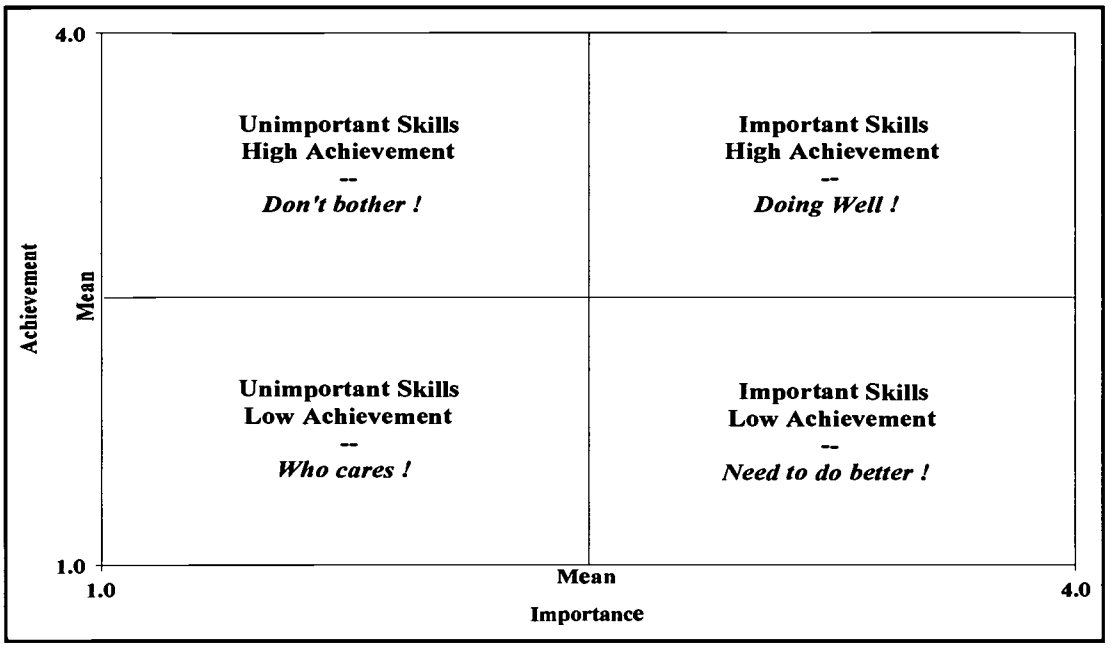
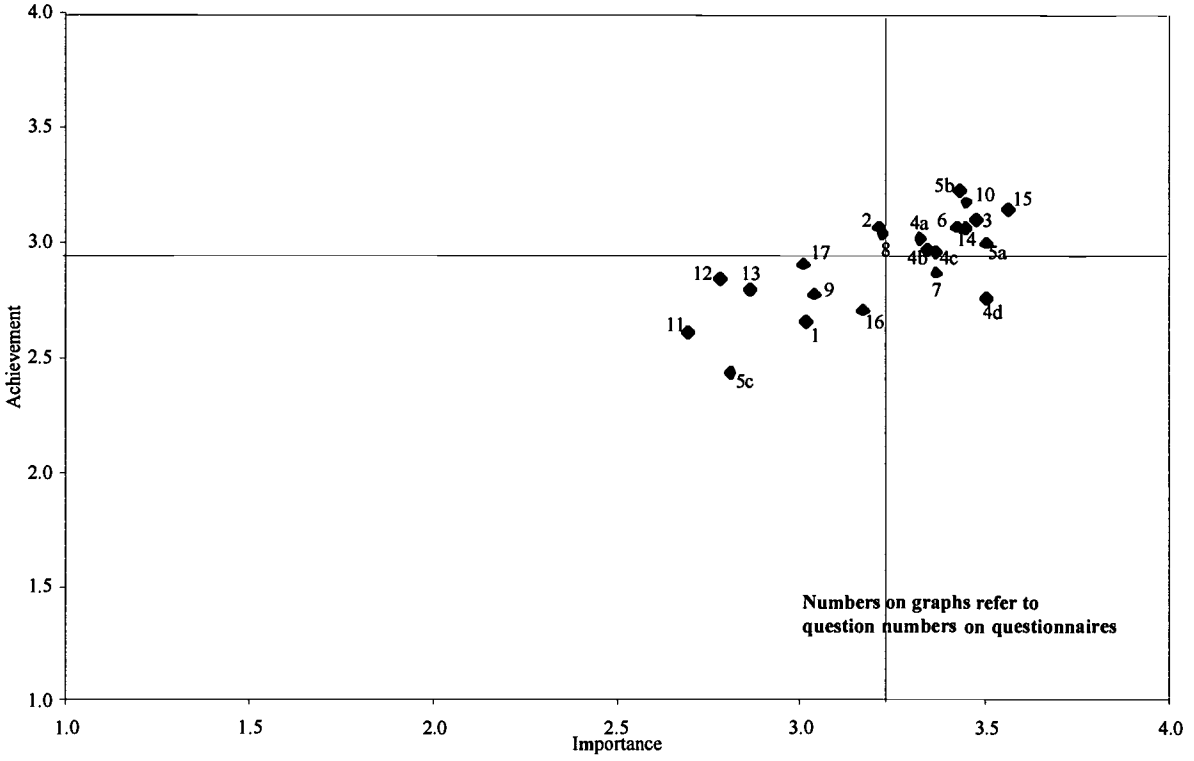


Figure II:
Scattered means of employers comments on importance and achievment of essential skills for graduates



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