Service Quality of a Cooperative Education Program: Employers' Perspective [1]

Richard Chapman • Richard K. Coll • Kate Meech
The University of Waikato, Hamilton, New Zealand

Abstract
In this study employers were asked to rate the Co-operative Education Unit across five dimensions of service. Employers reported receiving good service across a range of service variables, with most satisfaction reported for student selection and coordinator communication. Areas of concern included a comparative lack of support for students on placement, and some ambiguity in the role of university academics. Employers' perceptions of service quality differed from those of the placement coordinators. This study indicates the importance for co-op practitioners to understand employers needs clearly in order to ensure that the placement process is managed effectively.

Many of the research reports in the co-op literature are concerned with aspects of cooperative education from the students' or placement coordinators' perspective (e.g., Apostolides & Looye, 1997; Coll, 1998; Coll, Halsey, & Eames, 1997; Dubick, McNerney, & Potts, 1996; Pickles, 1993, 1995; Redwood, 1995; Somers, 1995; Stull, Crow, & Braunstein, 1997; Wagstaffe, 1995; Wessels & Pumphrey 1995a, 1995b). By way of contrast, there are few reports of research into employers' views of co-op. Employers are an integral part of the co-op triangle, and clearly their continued support is crucial to the long term success of any co-op program (Coll, 1996; Hurd & Hendy, 1997; Varty, 1996). The fact that many employers show considerable loyalty to co-op programs is often taken as an indicator of satisfaction (Coll, 1996; Varty, 1996), but as Hurd and Hendy (1997) state "employers need data upon which to base their decisions, so it would be prudent for co-op practitioners to conduct research regularly to ensure that employer needs are in fact being met by cooperative programs" (p. 60). It is a key feature of Government strategy in New Zealand that tertiary institutions need to be more mindful of their students' needs (Coll, 1996; Hawke, 1988; Kelsey, 1993; Todd, 1994). The New Zealand State Services Commission and treasury believe that competition for students and finance will increase the efficiency of educational institutions in New Zealand. The New Zealand university system is now operating in a highly competitive market with tertiary institutions competing for student placements and the commensurate funding. The co-op program at Waikato has been a strong recruitment strategy and the future of the School of Science & Technology is dependant in no small way on its continued success (Coll, 1996). We share the view of Hurd and Hendy (1997) that knowledge of employers needs is crucial for the success. As a consequence we have undertaken a survey of our employers in an attempt to identify potential areas of non-performance. Our focus in this investigation has been on how well the Co-operative Education Unit at Waikato is performing in providing good service to our employers; rather than why our employers chose to be involved in a co-op program — although clearly the issues are related. We intend using the information gained from our research to fine-tune what has proven to be a popular and successful co-op program in science and technology. We conclude with a discussion of the implications of our study for other co-op practitioners.

Background to the Study

At the University of Waikato we offer co-op in the form of the BSc(Technology) degree, one of two undergraduate programs offered by the School of Science & Technology (Chapman, 1994; Coll, 1996). The degree consists of a full BSc degree, with two additional management papers (Chapman, 1995), and a total of twelve months relevant work experience. The work experience is normally carried out as two placements; one of three-months duration at the end of the second year, and the second of nine-months duration at the end of the third year. Student selection and admission to the program is carried out on a case-by-case basis, with students screened on the basis of academic record and personal interviews. We have been offering this co-op program for over twenty years and have seen a steady increase in enrolments (Coll, 1996). Currently nearly half the students in the School of Science & Technology are enrolled in the co-op program. Student placements are facilitated by the Co-op Unit, a team of academic staff who hold joint appointments between the subject discipline and the Unit. Because of the long history of the program we now have a large pool of employers who have regularly taken students for work placements.

Methodology

The research question was quite general and can be summarized as: "Are our employers satisfied with the service provided by the placement coordinators of the Cooperative Education Unit at The University of Waikato?" The sample comprised employers (n = 252) who had employed at least one student as part of the BSc(Technology) degree program within the last two years. Data collection was achieved using a survey instrument which consisted of a self-completion questionnaire containing 29 questions developed from the research question. The instrument was developed after consultation with a focus group of placement coordinators (n= 4) and data collection was preceded by a pilot study of four employers. The pilot study involved administration of the instrument to the employers, followed by in-depth interviews with the participants and further consultation with placement coordinators. The instrument was organized into four sections. The first section contained five headings, each representing a "dimension of service" of the co-op program. The second section requested respondents to rank the five dimensions-of-service in order of importance, and the third section gave the respondents an opportunity to provide an overall rating of satisfaction and to comment on the best and worst aspects of service. The final section contained six questions for the purpose of sample description, and to give employers an opportunity to provide suggestions about the service. In order to add an extra dimension to the research question, two versions of the questionnaire were devised. One version was administered to the employers and the second version was administered to the full complement of placement coordinators in the University's Co-op Unit (n= 8). The purpose of this was to discern any mis-match of perceptions between the two parties, thus providing a means of identifying the areas of service that required most improvement (Cina, 1989; Gulledge, 1996). This required some modification of the questions, for example, Q14 "The coordinators provide adequate support to students in our organization" was modified to read, Q14 "I provide adequate support to students in their placement organization." The questionnaire was administered by a mail-out procedure together with an explanatory letter and was followed up with a reminder letter one month later. There was a response rate of 70% for the employers and a full response for the coordinators.

Results and Discussion

The results of the investigation are summarized in Table 1; we discuss the employers' views first, before comparing the differing perceptions of service quality of the employers and coordinators. This discussion is followed by our response to the issues raised by employers, and a discussion of the implications that our research may have for other co-op practitioners.

All of the questions were posed in a manner that suggested the employers were satisfied with

Table 1

Comparison between Employers' and Coordinators' Perceptions of Service Quality based on Likert Scale 1-5

Attributes	Employers' Perceptions Mean Response (Std Error)	Coordinators' Perceptions Mean Response	Difference	Correlation with Satisfaction
Communications				
1. Clearly communicating to clients the nature of the program and what it entails.	1.89(.06)	2.00	0.11	.338
2. Clearly communicating to clients the role of the university and coordinators.	2.24(.07)	1.80	-0.44	.488
3. Coordinators accessibility to clients.	1.88(.05)	1.20	-0.68	.563
4. Inform clients of issues relevant to their organisation.	2.27(.07)	1.60	-0.67	.513
5. Clients are provided with opportunities to comment on issues relevant to the program.	2.07(.07)	1.60	-0.47	.538
Placement Organization				
6. Contacting clients at a time when they can plan for projects for student placements.	1.97(.07)	2.00	0.03	.456
7. Contacting clients at a time when they can budget for student placements.	2.54(.08)	2.800	.26	.514
Student Selection				
8. Suggesting students whose personalities suit the organization they are placed in.	1.99(.06)	2.00	0.01	.497
9. Suggesting students who match the practical requirements of the organization.	1.76(.05)	1.80	0.04	.336
10. Ensuring students are motivated and interested in their projects.	1.65(.05)	2.00	0.35	.207
11. Ensuring students have the required level of technical skills.	1.95(.05)	2.40	0.45	.178
12. Ensuring students have the required level of writing skills.	2.21(.06)	2.80	0.59	.204
13. Ensuring students have the required oral communication skills.	2.12(.05)	2.20	0.08	.149

Table 1 (continued)

Comparison between Employers' and Coordinators' Perceptions of Service Quality based on Likert Scale 1-5

Attributes	Employers' Perceptions Mean Response (Std Error)	Coordinators' Perceptions Mean Response	Difference	Correlation with Satisfaction
Placement support				
14. Providing adequate support to students during placement.	2.19(.06)	1.20	-0.99	.517
15. Providing support to students, during their placement, when they need it.	2.56(.06)	1.20	-1.36	.468
16. Organization is required to assist students with their industry reports.	2.11(.06)	2.20	0.09	.190
17. Supervisors provide adequate support to students, while they are writing their reports.	2.54(.06)	3.00	0.46	.295
General				
18. The program provides clients with a flexible way to manage labour costs.	2.38(.07)	1.80	-0.58	.245
19. The program provides clients with a more convenient way to organize short-term employment.	2.28(.07)	1.80	-0.48	.273
20. The timing and duration of placements meet the requirements of our organization.	2.07(.06)	2.00	-0.07	.360
Overall Satisfaction	2.14(.06)	1.96	-0.18	

the service they received from coordinators: e.g., Q1. "On taking a BSc(Technology) student into our organization, we had a clear and accurate view of the program and what it entailed," and, Q8. "The coordinators understand the type of personality that suits our organization" and so on. Therefore, the average mean response for all service quality variables, taking into account standard deviations, gives an overall measure of employer satisfaction with the service provided. The overall mean response for the employers surveyed was 2.14. This combined with the high level of satisfaction to the specific question of satisfaction (82% strongly agree/agree) indicates that employers are in general happy with the service provided by the coordinators. However, the mean of 2.14 does suggest that there are still some areas that require improvement. The areas of most concern can be readily identified from the data in Table 1, and we discuss each of the five dimensions in turn.

The mean responses of the respondents for the communication variables (Q1-5) are all low, close to two. This suggest that employers are happy with the communication skills of coordinators, the only areas of concern being communicating the role of the university supervisor (Q2, mean 2.24) and informing employers of issues relevant to their organization (Q 4: mean 2.27).

The employers' perception of coordinator's knowledge of the placement organization shows some variation. A mean response of 1.97 (Q6) suggests that coordinators are contacting employers at a time at which they can plan for student placements, but a mean of 2.54 (Q7) indicates that this is not appropriately tied to a time when budgets are known.

Student selection is an area of high satisfaction for employers with low means for most student selection variables; selection of students with the right personality (Q8, mean 1.99), and matching students with the practical requirements of the organization (Q9, mean 1.76). With the exception of ensuring students have the adequate writing and oral communication skills (Q12, mean 2.21 and Q13, mean 2.12), all the means were under two for the student selection process.

Placement support was the area of greatest dissatisfaction for the employers surveyed (overall mean for Q14-Q17 2.35), with most concern related to report writing (Q17, mean 2.54) and providing support to students when they most need it (Q15, mean 2.56).

The results for the employers' general perception of the program are interesting. They indicate that for our employers, the timing and duration of the placements (Q20, mean 2.07) are more important than other advantages such as providing a convenient means of organizing short-term employment (Q19, mean 2.28), and flexibility in managing labour costs (Q18, mean 2.38).

Factor analysis consisted of a principal component analysis of employer responses to the twenty variables (i.e., Q1-Q20), and yielded an initial five factor solution that accounted for 62 percent of the variance (Table 2). The five factor solution produced in the factor analysis distributed the twenty variables identically (except in order) to the dimensions developed for the questionnaire. The subsequent service quality model for the Co-op Unit is illustrated in Figure 1.

In order to interpret the results of the five areas of service investigated in the survey the respondents were asked to rate each of these areas in order of importance. By matching areas of dissatisfaction with areas of importance, the Co-op Unit was then able to identify the most important areas to target for improvement. The respondents overwhelmingly rated student selection as the most important dimension (student selection 77% most important, and 15% next most important). This result is consistent with the employers overall satisfaction with the program. It is pleasing that the dimension rated as most important by employers, is the one in which the Co-op Unit is performing best. Communication and contact timing are the next most highly ranked in importance (9% and 10% most important and 39% and 23% second most important for communication and timing respectively).

Correlation data (Table 1) suggest that most variables are positively correlated with satisfaction. However, ANOVA analysis indicated that there

Table 2

Factor Analysis of Service Quality Dimensions

	Factor Loadings				
	1	2	3	4	5
Technical	.83139	.06743	.01089	.09506	.07322
Motivated	.74604	.12684	-.04981	.28583	.07247
Oral Skills	.68812	.05162	.20442	.15090	-.11982
Practical	.67308	.18525	-.01767	.08699	.24311
Written	.53908	-.02825	.42599	-.15309	.05402
Personality	.53907	.31786	.12827	.20071	.45602
Issues	.07508	.77001	.24395	.03607	.17058
Clear-Uni.	.15320	.75491	.09588	.27762	-.05389
Clear-Pro.	.15681	.71476	-.04029	.30344	-.14163
Comment	.12095	.70679	.10109	.00630	.36080
Accessibility	.00917	.49494	.34688	.08957	.18750
Timely	.77590	.19488	.78393	-.06079	.12901
Supervisors	.01164	-.00649	.75602	.02401	.16744
Adequate	.12643	.32236	.70289	.05013	.21065
Organization	.06975	.09312	.55667	.31167	-.12289
Convenient	.62090	.11581	.01933	.83371	.12780
Flexibility	.23340	.12451	.11129	.74943	.11514
Requirements	.18130	.27253	.02816	.63557	.16881
Budget	.11725	.02419	.14280	.17324	.81221
Projects	.80270	.18055	.17305	.13104	.80377

Key

Technical, ensuring students have the required level of technical skills; **Motivated**, ensuring students are motivated and interested in their project; **Oral Skills**, ensuring students have the required oral communication skills; **Practical**, ensuring students have the required level of practical skills; **Written**, ensuring students have the required level of writing skills; **Personality**, suggesting students with personalities that suit the organization they are placed in; **Issues**, inform employers of issues relevant to their organization; **Clear-Uni.**, clearly communicating to employers the role of the university supervisor and coordinators; **Clear-Pro.**, clearly communicating to employers the nature of the program; **Comment**, employers are provided with opportunities to comment on issues relevant to the program; **Accessibility**, coordinator accessible to employers; **Timely**, providing support to students during their placement when they most need it; **Supervisors**, supervisors provide adequate support to students during their placement; **Adequate**, providing adequate support to students during placement; **Organization**, employers providing assistance to students when writing their report; **Convenient**, the program provides employers with a more convenient way to organize short term employment; **Flexibility**, the program provides employers with a flexible way to manage labour costs; **Requirements**, the timing and duration of the placement meet the requirements of the organization; **Budget**, contacting employers at a time when they can budget for student placements; **Projects**, contacting employers at a time when they can plan for projects for student placements.

are only three variables where there is ninety-five percent confidence that the means are independent. Consequently, causality between service variables and satisfaction is assumed for the following three variables: coordinators' ability to ensure students are interested in, and motivated towards the type of research the employer desires from the placement, providing employers with a more convenient way or organizing short-term employment, and the assistance university supervisors give students with report writing. Hence, adequate performance for these variables is critical to ensuring the satisfaction of employers. However, due to the interrelated nature of the variables, the performance of all variables is critical to an increase in overall service quality.

The survey instrument also provided respondents with an opportunity to specify the best and worst aspects of service. The results of this section were quite variable. The responses were, however, in general similar to many of the responses in the other sections of the questionnaire; for example, employers again emphasized the importance of successful matching of students and many responses indicated that in their view this was achieved to a high degree of satisfaction. Employers also identified other factors as the best aspects of service including: the professionalism, commitment and enthusiasm of coordinators, early approach, and the quality of the students. A small number of employers expressed considerable dissatisfaction with some aspects of service, mostly in lack of follow-up to requests for information and clarification of discussions. Other comments from employers were: inadequate contact with coordinators, ambiguity regarding the role of the university supervisor, circumventing appropriate hiring channels, unavailability of promised research facilities, lack of some specific technical skills, and lack of forewarning of site visits.

Employers also made a number of interesting recommendations of new areas of service desired

Figure 1

Service Quality Model Used in the Study

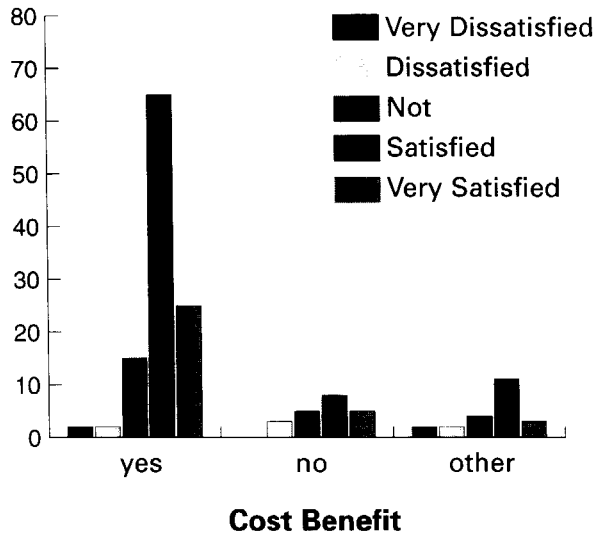
to improve the service provided by the Co-op Unit. These included: provision of a database of all available students, sending a letter before the placement commences confirming the appointment and starting date, the establishment of a confidentiality agreement between The University and organization, provision of a detailed description of the placement tasks prior to placement, seminars in which employers can discuss their research interests and skill requirements, and the establishment of scholarships that could be used to promote research in certain areas.

Seventy percent of the employers felt that there was a cost benefit for the students as a result of their work placements. However, only one employer provided a detailed breakdown of the financial benefit to their organization as a result of participation in the co-op program. This employer cited a departmental saving in that the administrative overhead attracted for student employment (10%) was considerably lower than the charge associated with a full-time employee (120%). Interestingly, a number of employers felt that although there was no tangible cost benefit to their organization, the use of co-op students provided other spin-off benefits, for example, "provides an opportunity to evaluate the calibre of students" and "improves morale, as full-time staff can then take time off." A high proportion of employers reported that the principal reason for involvement in the co-op program stemmed from a commitment to being involved in the education of young people. That is, even if the employers felt their organization failed to accrue any direct cost-benefit, they had a desire to "benefit the community."

There is evidence of an association between employer satisfaction and perceived cost benefit of involvement with the co-op program (Figure 2). The majority of employers who indicated that they perceived a cost benefit from their involvement are satisfied with the performance of the Co-op Unit. This suggests that there is a link between satisfaction and involvement.

Employers indicated that August, September and November (in New Zealand) are the best months for co-ordinators to approach their organization. Other employers indicated that they wished to be approached as early as December preceding the placement year; that is, for a placement beginning November 1998, they wished to be contacted in December 1997. The data indicate that there is a considerable range in responses given by employers. Hence, it is important that coordinators endeavor to spread their initial approaches throughout the year to meet the individual needs of employers.

Figure 2
Employers' Perception of Cost Benefit and Satisfaction



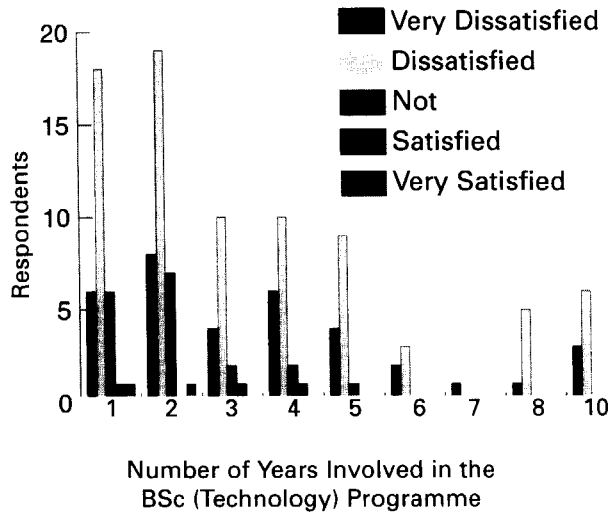
Employers prefer the shorter three month placement with some 60% rating it as their preferred option. Some seven percent of employers indicated that the preferred duration of the placement was dependent on the project involved, and eleven percent had no preference. With a response of 75%, November is clearly the preferred month for the beginning of the placement — a further 11% indicating no preference. A small number of employers (3%) indicated more than one particular month in which they would prefer placements commence.

The average time employers have been involved

with the program is three years, but few employers have been with the program longer than five years. This suggests there may be some difficulty in maintaining long term relationships — but may also indicate employers changing needs and financial circumstances. For example, there has been a considerable contraction in funding provided to Government research organizations in New Zealand in recent years, and it is likely this has some influence on the ability of such organizations to take on co-op students. There is evidence of an association between the number of years an employer has been involved with the program and their satisfaction with the service provided (Figure 3). Predictably, the longer the employers have been involved with the program, the greater the degree of satisfaction.

It is interesting to compare the perceptions of service quality of the employers and coordinators (Table 1). Clearly some caution must be exercised in this process due to the large difference in the number of respondents for the two groups, but the comparison is useful in providing some indication of any mismatch between employers' and coordinators' perceptions of service quality. Coordinators perceive overall service quality more favorably than employers. The variables that employers perceive less favorably than coordinators are: providing timely support to students during placements (Q15, difference in means -1.36), providing adequate support for students during their placements (Q14, difference in means -0.99), informing employers of issues relevant to their organization (Q4, -0.67), coordinator accessibility for employers (Q3, difference in means -0.68), providing a flexible way of managing labour costs (Q18, difference in means -0.58), providing a more convenient way to organize short-term employment (Q19, difference in means -0.48), providing opportunities for employers to comment on issues (Q5, difference in means -0.47), communication of the role of university supervisor (Q2, difference in means -0.44), and the timing and duration of placements (Q20, difference in means -0.07). The remaining eleven variables are perceived more favorably by employers than coordinators with the greatest differences being relating to student selection: ensuring students have the right technical skills (Q11, difference +0.45), ensuring students have the required writing skills (Q12, difference +0.59), and ensuring motivation of students (Q10, difference +0.35). The only other large difference was in the provision of adequate support for the students during report writing (Q17, difference +0.46).

Figure 3
Duration of Employer Involvement and Employer Satisfaction



Our Response to Employers' Views

The analysis of the results suggests that employers are in general satisfied with the service provided by the Co-op Unit. However, the results have also suggested areas of employers' perceptions of dissatisfaction with service quality. We have already addressed some of these issues and have undertaken to address the remaining issues in the upcoming placement season.

Lack of student support in our view may have arisen from inequitable workloads within the Co-op Unit resulting in some coordinators having so many commitments that they were not able to provide adequate support. This means that some

students and employers are happy about their support, but others are not satisfied. Redistribution of workloads within the Unit has already occurred and we believe this will ensure that all coordinators have more time available to provide the support needed by students on placement.

We hold an annual meeting of employers who act as an advisory committee to the University in relation to the BSc(Technology) degree program. This meeting provides an opportunity for University staff to inform employers about curriculum matters (e.g. introduction of new courses and degree programs) and further allows employers to comment directly to staff of the Co-op Unit. This had traditionally been held at the end of the academic year (November - December in New Zealand) and we have often encountered difficulty in finding employers who are able to attend. Based on the survey results and some anecdotal feedback we have decided to shift the timing of this meeting to earlier in the year. This will be a time of year that is not so busy for employers and this will hopefully enable us to get more employers involved in this important exercise.

It is interesting that employers indicated that they are unclear about the role of the university supervisor. This is consistent with students' views as discovered in a previous investigation (Coll, Halsey, & Eames, 1997). This ambiguity about the university supervisors role seems to arise in part from a lack of commitment on the part of academic staff to their supervisory role in co-op placements. This issue is difficult and on-going, and has proven a challenging one to address. Put simply, the coordinator is responsible for securing the placement, providing support during the placement, coordinating the assessment and so on. The university supervisor is required to provide academic support in the form of advice on matters of specialist scientific content, and to assist in the writing of the placement report. In part, this problem reflects the increasing workload of academics in this University. A partial solution to the problem has involved coordinators also assuming the role of University supervisor where they have appropriate expertise in the subject. This means that academic staff now have fewer co-op students to supervise which will hopefully lead to an improvement in service. It does of course increase the workload of the placement coordinators, but they are in general more motivated about the co-op program and their greater sense of commitment means they take these duties more seriously.

Summary and Implications of the Research for other Co-op Practitioners

The results of our study have highlighted areas of employer satisfaction and some areas of dissatisfaction which may well have relevance for other co-op practitioners. The research has enabled us to get a clear view of service areas rated as most important by employers. These areas were: student selection and matching to employers needs, communication, and timing of initial contact. Because these variables are rated so highly by employers, it makes sense for co-op practitioners to place most emphasis on performance in these areas. The matching of students to employers needs is the core business of co-op practitioners, and it is perhaps not surprising that it is rated so highly by many employers. Other research reports have noted that employers place great importance on the so-called soft skills (e.g., Hodges, Rainsbury, Sutherland, & Wong, 1998; Sweeney & Twomey, 1997). Hodges, Rainsbury, Sutherland, and Wong (1998) describe how interaction with employers and agencies enabled the identification of graduate competencies of most importance to employers. Skills like communication and interpersonal skills were rated highly, with less emphasis placed on technical skills. The lack of emphasis on technical skills may mean that the employer assumes students possess the required technical skills, and once that has been established other skills assume greater importance (Hodges, et al., 1998; Sweeney & Twomey, 1997). That is, because possessing technical skills is not an issue in practice, it is attributed relatively low status by employers. Indeed, in our case, because of our preselection process, our students invariably possess the requisite technical skills. In fact an issue of concern for students identified in a previous study is that they have felt inadequately chal-

lenged in some placements (Coll, 1996). Soft skills are difficult to measure, and in order to obtain some insight into our students' abilities in this area we employ a novel model for the structure of our Co-op Unit. The co-op coordinators at Waikato all hold joint positions between departments and the co-op unit (Coll, 1996). Because coordinators are involved in teaching students in lectures and laboratory classes, they are able to get to know students well. This helps in identifying students academic and practical ability; and also enables coordinators to gain a clearer picture of students' abilities in these less easily measured skills. Such an approach, we believe, improves the likelihood of obtaining a suitable match, and the structure of our Unit may be of interest to other co-op practitioners.

It is possible that employers needs may change over time, and our research has indicated there is a perception amongst employers that co-op providers need to be flexible, for example, in the time of initial approach to an organization — that is, operating on a time-frame that is attuned to employer needs rather than those of the co-op practitioners. Clearly this requires good knowledge of individual employer needs and circumstances, especially in relation to the timing for budgetary estimates.

A further interesting outcome of the research was the difference in perceptions of service quality between our employers and placement coordinators. The research design employed enabled us to get a clearer picture of where we were performing inadequately. It also highlighted priority areas for improvement. We have put in place some mechanisms to address the issues raised by employers, and it is important that we follow up on these initiatives in the future, to assess their value in improving our service. As Hurd and Hendy (1997) point out, it is important to monitor employers' needs and perceptions regularly. Thus we intend carrying out a further study after allowing sufficient time to see if the changes we have made have had a positive impact. It was interesting that coordinators views were different from those of employers in some key areas, and it is possible that this is also the case for other co-op practitioners. Overall, our results have indicated that we need a clearer understanding of our employers' needs, and to provide stronger support for our students whilst on placement. It is our view that it may be prudent for other co-op programs to consider an investigation of the type we have reported here. In doing so they will likely obtain different results than did our study, but no doubt will, like us, discover issues of importance that require attention.

In conclusion it is of interest to note that a quantitative survey of this nature is useful in providing a general overview of employers' perceptions of service quality. Quantitative and qualitative methods of inquiry each possess advantages and disadvantages, and the choice of methodology often comes down to a trade-off between breadth and depth (Patton, 1990; Peshkin, 1993). As Patton (1990) points out "the advantage of the quantitative approach is that it is possible to measure the reactions of many subjects to a limited set of questions, thus facilitating comparison and statistical aggregation of data. By contrast, qualitative methods typically produce a wealth of detailed data about a much smaller number of people and cases" (p. 165). Hence, a useful follow-up study for us, and of interest for other co-op practitioners, may be to carry out an in-depth investigation using fewer employers, in order to gain more detailed information about some of the issues uncovered in surveys of this type.

A further option is to consider a mixed-methodology research design. There have been a number of calls for the use of a combined methodological approach to research in education (Denzin, 1970; Fraser, 1991, 1994, 1995; Patton, 1990; Reichardt & Cook, 1979). Reichardt and Cook (1979) identify three advantages of combining quantitative and qualitative methods. Firstly, much educational research has multiple purposes, that is, interested in both process and outcome. Thus, analysis of monitoring, impact assessment, and causal explanation represents a broad range of tasks most efficiently achieved by a combination of methods. Secondly, the two different methods build upon each other. As an example, choosing a statistical model to fit the data, interpreting the output

results, and generalizing the findings to their settings all rely on qualitative knowledge "quite simply, researchers cannot benefit from the use of numbers if they do not know, in common sense terms, what the numbers mean" (Reichardt & Cook, 1979, p. 23). Thus, for example qualitative data may prove valuable in establishing if statistically significant differences observed in a quantitative study are in fact meaningful, or simply indicate the presence of statistical rareness (Carver, 1978, 1993). Finally, triangulation through convergence, affords more confidence in the interpretation of the data (Denzin, 1970; Mathison, 1988; Patton, 1990). Denzin (1970) points out that convergence resulting from triangulation is at its most convincing when the methods of data collection are at their most disparate, that is, in quantitative and qualitative data. Denzin (1970) suggests that this occurs because the two different data collection methods can, potentially at least, provide the means for detecting and reducing the bias inherent in a single method.

The use of a combined methodological approach is clearly likely to be more challenging for co-op practitioners, but this strategy is gaining momentum in education research (e.g., Blumenfeld & Meece, 1988; Fraser, 1991, 1994, 1995; Gogolin & Swartz, 1992; Schulman, 1988). Patton (1990) asserts that it is the research question itself that should dictate which method, or if a combination of methods is appropriate, "which research design is best? Which strategy will provide the most useful information to decision makers? There is no simple, immediate, and universal answer to that question. The answer in each case will depend on what intended users want to know, the purpose of the study, the funds available, the political context, and the interest/abilities/biases of the researchers" (p. 95-96). Thus, some research questions will be readily answered using qualitative means, others quantitative methods, and some will be best addressed using a combination of the two. As Patton (1990) put it "the challenge is to find out what information is most needed and most useful in a given situation, and then to employ those methods best suited to producing the needed information" (p. 96).

References

Apostolides, V., & Looye, J.W. (1997). Student assessment of the co-op experience and optimum integration of classroom learning with professional practice. *Journal of Cooperative Education*, XXXII(3), 16-30.

Blumenfeld, P.C., & Meece, J.L. (1988). Task factors, teacher behaviour, and students' involvement and use of learning strategies in science. *The Elementary School Journal*, 88(3), 235-250.

Carver, R.P. (1978). The case against statistical significance testing. *Harvard Educational Review*, 48(3), 378-399.

Carver, R.P. (1993). The case against statistical significance revisited. *Journal of Experimental Education*, 21(4), 287-292.

Chapman, R. (1994). Cooperative education in science and technology: BSc(Technology) the degree that works. In C. Eames (Ed.), Industry and Education: The Cooperative Venture. *Proceedings of the Asia Pacific Conference on Cooperative Education* (pp. 48-51). Auckland, New Zealand: New Zealand Association for Cooperative Education.

Chapman, R. (1995). A management course for science and technology undergraduates; A response to the needs and concerns of the workplace. In V. Lewis, B. Bailey, C. Williams-Myers, & J. Yee-Sing (Eds.), Cooperative Education: A Partnership with the Workplace. *Proceedings of the Ninth World Conference on Cooperative Education* (pp. 34-35). Kingston, Jamaica: World Association for Cooperative Education.

Cina, C. (1989). Creating an effective customer satisfaction program. *Journal of Consumer Marketing*, 3(1), 9.

Coll, R.K. (1998, August). International cooperative education placements: Benefits and barriers. Paper presented at Asia-Pacific Regional Conference, Hong Kong.

Coll, R. K. (1996). The BSc(Technology) degree: Responding to the challenges of the education marketplace. *Journal of Cooperative Education*, Vol. XXXII(1), 39-45.

Coll, R.K., Halsey, E., & Eames, C. (1997). Keeping the customer satisfied. *Journal of*

Cooperative Education, Vol. XXXII(3), 31-40.

Denzin, N.K. (1970). The Research Act. *A Theoretical Introduction to Sociological Methods*. Chicago: Aldine Publishing Company.

Dubick, R.A., McNerney, R.B., & Potts, B.K. (1996). Career success and student satisfaction: a study of computer science cooperative education graduates. *Journal of Cooperative Education*, Vol. XXXII(I), 66-74.

Fraser, B.J. (1991). Two decades of classroom environment research. In B.J. Fraser & H. Walberg (Eds.). *Educational environments: evaluation antecedents and consequences* (pp. 3-28). London: Pergamon Press.

Fraser, B.J. (1994). Research on classroom and school climate. In D. Gabel (Ed.), *Handbook of Research on Science Teaching and Learning*, New York: Macmillan.

Fraser, B.J. (1995). The learning environment in science classrooms and its effects on learning. In A. Hofstein, B-S. Eylon & G. Giddings (Eds.) *Science Education: From Theory to Practice.* (pp. 331-346). Rheovot: Weizmann Institute of Science.

Gogolin, L., & Swartz, F. (1992). A quantitative and qualitative inquiry into the attitudes toward science of conscience college students. *Journal of Research in Science Teaching*, 29(5), 487-504.

Gulledge, L.G. (1996). Satisfaction measurement more than doing surveys. *Marketing News*, 30(22), 8.

Hawke, G.R. (1988). Report on Post-Compulsory Education and Training in New Zealand, prepared for the Cabinet Social Equity Committee. Wellington, New Zealand: Office of the Associate Minister of Education.

Hodges, D., Rainsbury, E., Sutherland, J., & Wong, C. (1998, August). Collaborative assessment: The employers' perspective. Paper presented at Asia-Pacific Regional Conference, Hong Kong.

Hurd, J., & Hendy, M. (1997). What we know about co-op employers' perceptions of cooperative education: A synthesis of research in the United States and Canada. *Journal of Cooperative Education*, XXXII(2), 55-62.

Kelsey, J. (1993, October). Commercialisation and contestability of legal education. *Proceedings of the Law Teacher's Conference*. Christchurch, New Zealand: New Zealand Law Society.

Mathison, S. (1988). Why triangulate? *Educational Researcher*, 17(12), 13-17.

Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods*. Newbury Park, California: Sage Publications.

Peshkin, A. (1993). The goodness of qualitative research. *Educational Researcher*, 22(2), 24-30.

Pickles, T. (1993). Value and quality of industrial placements: Students views. In R.J.A. Bradley & A.N. Glynn (Eds.), *Proceedings of the Eighth World Conference on Cooperative Education* (pp. 209-212). Dublin, Ireland: World Association of Cooperative Education.

Pickles, T. (1995). Upgrading the industrial placement experience. In V. Lewis, B. Bailey, C. Williams-Myers, & J. Yee-Sing (Eds.), Cooperative Education: A Partnership with the Workplace. *Proceedings of the Ninth World Conference on Cooperative Education* (pp. 74-74). Kingston, Jamaica: World Association of Cooperative Education.

Redwood, M.E. (1995). Evaluating cooperative education. In V. Lewis, B. Bailey, C. Williams-Myers, & J. Yee-Sing (Eds.), Cooperative Education: A Partnership with the Workplace. *Proceedings of the Ninth World Conference on Cooperative Education*. (pp. 76-77). Kingston, Jamaica: World Association of Cooperative Education.

Reichardt, C. S., & Cook, T. D. (1979). Beyond qualitative versus quantitative methods. In T. D. Cook & C. S. Reichardt (Eds.) *Qualitative and Quantitative Methods in Evaluation Research.* (pp. 7-32). Beverly Hills, CA: Sage Publications.

Shulman, L.S. (1988). The nature of disciplined inquiry in education. In R.M. Jaeger (Ed.), *Complementary Methods for Research in Education* (pp.1-58). Washington DC: American Educational Research Association.

Somers, G. (1995). The post-graduate pecuniary benefits of co-op participation: A review of the literature. *Journal of Cooperative Education*,

XXXI(I), 25-41.

Stull, W.A., Crow, D., & Braunstein, L.A. (1997). An investigation to identify needed research in cooperative education. *Journal of Cooperative Education*, 32(2), 30-35.

Sweeney, M., & Twomey, P. (1997, August). "Preparing Graduates for 2020: The Role of Cooperative Education." Paper presented at the 10th World Conference on Cooperative Education, Cape Town, South Africa.

Todd, J. (1994). *Funding Growth in Tertiary Education and Training: Report of the Ministerial Consultative Group*. Wellington, New Zealand: Government Printer.

Varty, J.W. (1996). Partnership an essential condition for sound cooperative education practice. *Journal of Cooperative Education*, XXXI(2-3), 132-139.

Wagstaffe, D.R. (1995). Advantages of cooperative education to students. In V. Lewis, B. Bailey, C. Williams-Myers, & J. Yee-Sing (Eds.), Cooperative Education: A Partnership with the Workplace. *Proceedings of the Ninth World Conference on Cooperative Education* (p. 83). Kingston, Jamaica: World Association of Cooperative Education.

Wessels, W.J., & Pumphry, G. (1995a). The effects of cooperative education on job search time, quality of job placement and advancement. *Journal of Cooperative Education*, Vol. XXX(I), 42-52.

Wessels, W.J., & Pumphry, G. (1995b). The impact of cooperative education on wages. *Journal of Cooperative Education*, Vol. XXXII(I), 36-51.

[1]Correspondence should be addressed to Richard K. Coll, The University of Waikato, Private Bag 3105, Hamilton, New Zealand. Electronic mail may be sent to r.coll@waikato.ac.nz.