Perceptions of the Co-op Experience for International Full Fee-paying Students

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Abstract
Interest continues to grow in the internationalization of co-op as revealed by the expansion of the literature on the topic. Studies or reports of international co-op relate to students from one country traveling overseas to complete their co-op placement in another country, often as part of an international exchange arrangement. Another cohort of students, international full-fee paying students, travel overseas for an entirely different purpose: to complete a degree or related program. Some of these students also participate in co-op programs. Our research sought to develop an understanding of international full-fee paying students' co-op experiences. The research, conducted within a socio-cultural framework using semi-structured interviews, focused on eleven international full-fee paying co-ops, within the context of a New Zealand science and engineering degree program. The findings suggest that, as might be expected, the co-ops gain content knowledge and process skills relevant to their specific discipline of study. Additionally, they gain a deeper understanding of science and engineering, and what it means to be a scientist or engineer. Issues of concern identified by the co-ops were relevancy of work experience for their home-country industry and some negative feelings about fitting in socially.

An increased interest in international co-ops has been witnessed over the past twenty-five years, beginning in the 1980s (Banks, 1985; Davie & Watson, 1988), and continuing to the present (Coll, 2003; Reeve, 2004; Srisa-an, 1998). In part this growth occurred as international travel became more affordable (Knowles, 1974; Coll, 2003), and Western people (advanced economies in general), including students, became more interested in international travel (Davie & Watson, 1988). Organization of international co-op was at first rather ad hoc in nature (Allen, 1976; Allen & Brown, 1978; Miller, 1975), but with increased interest (Allen & Brown, 1978; Seaverns, 1968) and the advent of World Association of Cooperative Education who often provides employer and academic contacts, international co-op exchanges have become more systematic and organized with a number of authors subsequently providing guidance to facilitate the international co-op exchange (see Reeve, 2004).

The driving force behind the internationalization of co-op varies. As noted above, in some cases this was a consequence of Western students wanting to have a more interesting co-op experience and being in a financial position to do so. However, international co-op exchange from non-Western countries into Western countries such as the USA and Europe had different aims (Srisa-an, 1998). For example, international co-op was seen as a means of helping the non-Western (often called developing) countries enhance their economic performance (Nicol, 1981; Srisa-an, 1998; Taylor, 2004; Yackovlev et al., 1981). Specifically, large scale infrastructural projects such as construction of hydroelectric dams required international expertise, and it was thought co-op could play a part in provision of skilled labor (Inglis, 1987; Yackovlev et al. 1981) often facilitated by multi-national aid organizations such as the UN (Nicol, 1981; Orfila, 1981).

Waryszak (2000) claims that there are differences in *social climate* cross-nationally. Perhaps because of this, placement experiences for co-ops in a country outside their homeland are thought to provide a number of advantages. Keen (2001) claims that international co-op is an *enriching experience* that "may make significant contributions to students' intellectual development" (p. 37). This theme is further supported by the work of Baxter Magolda (1999) who claims that international co-ops increase in epistemological sophistication, shifting to more pluralistic notions of knowledge acquisition (see Lee & Swinth, 1986). This is probably a feature of the so-called *enculturation of newcomers* into the particular discipline of inquiry via *legitimate peripheral participation* (Lave & Wenger, 1991) as proposed by Eames and Bell (2005), and supported in research by Paku and Coll (2005) into science and engineering co-ops.

Other authors point to more pragmatic career or experiential gains from international co-op. For example, Mehta (1998) suggests that USA-based co-op students, in particular, need international experience (see Banks, 1985; Heller & Geringer, 1984; Ormsby, 1989; Spinkle, 1981), in order to broaden their horizons and learn to appreciate the dynamism of Asia. Interna-

tional co-op from Mehta's perspective sees it is a good way for students "to understand the multifaceted operations of these [multi-national] companies" (p. 66). Marini and Tillman (1998) likewise suggest the rapidly changing nature of industry requires graduates to have a broader international perspective than they would likely obtain if they remain at home for their co-op placements. This perspective was probably a reflection of the call for mind-broadening experiences in higher education generally, rather than just in co-op, that emerged in the early 1980's (Banks, 1985; Ormsby, 1989; Saikali & Jain, 1997). The general view today seems to be that young people are going to be exposed to a much different world culturally than their predecessors (Orfila, 1981); as a consequence they need greater exposure to cultural experiences during their education, including co-op (Brewer, 1990; Mehta, 1998; Marini & Tillman, 1998; Saikali & Jain, 1997).

There are several inquiries reported in the literature that detail benefits and issues of international co-op for students (e.g., Beard, Coll & Harris, 2001; Saikali & Jain, 1997; Wong & Coll, 2001). Coll and Chapman (2000a) report gains similar to those accrued by co-ops who do local placements; self-confidence and perceptions of enhanced career prospects. Likewise, Saikali and Jain's (1997) report students gaining useful and different perspectives of industry, seen as beneficial because of the advent of multinational corporations mode of operation: "In the aerospace industry, a lot of programs will take place as joint efforts" (p. 14). This sort of experience is seen as especially helpful since "if one learns the basics before visiting the country, one will first off avoid shock over the unusual" (Saikali & Jain, 1997, p. 14).

Other gains considered to be unique to international co-op experiences include enhancement of language skills (Vozzella, 1990) and a more *world-minded attitude* meaning international co-ops may be more open to the prospect of international employment (Ormsby, 1989). Experience with a different business culture (Beard, Coll & Harris, 2001; Saikali & Jain, 1997; Wong & Coll, 2001), and general cultural experiences also are reported advantages for international co-ops (Coll & Chapman, 2000a; Heller & Geringer, 1984).

Along with reported advantages noted above, the literature suggests that the internationalization of co-op has given rise to a variety of issues or problems. Probably the most common is difficulty in finding employers to hire foreign students (Reeve, 2004; Heller & Geringer, 1984). Other difficulties include problems with immigration, language confusion in the workplace as a result of inadequate communication skills (Coll, 2003; Coll & Chapman, 2000a; Heller & Geringer, 1984), and perceptions of differences in cultural and business practice compared with local students (Coll, 2004).

There are also benefits reported for employers of international co-ops. For example, Vozella (1990) suggests employers gain productive labor and fulfill short-tern employment needs. These types of advantages are of course much in line with those obtained when utilizing local co-ops (Braunstein & Loken, 2004); but, Coll (2003) reports employers saying they sometimes gain access to labor at a time local co-ops are unavailable, and as well as useful insights to external business cultures.

The aforementioned literature focused on co-ops who travel overseas purely for their placement, often as part of an exchange arrangement (Reeves, 2004). There is, however, a different cohort of students who do international co-op placements; what we refer to here as international full fee-paying students. Such students travel overseas to complete and entire program of study; often three to four years in duration, and differ from study-abroad students who typically participate for one or perhaps two semesters (Heller & Geringer, 1984).). The expectation of such full fee-paying international co-ops would likely be similar to that of local co-ops or co-ops on international co-op exchange. One would imagine, for example that they expect to undertake placement work similar in nature to the work that locals do, gain similar advantages of co-op generally, perhaps along with additional advantages associated with an international co-op experience. The above literature about international co-op suggests full fee-paying international co-ops may likewise encounter problems similar to their counterparts on international co-op exchange.
This particular cohort is different from study abroad and international co-op exchange students in several important respects. First, they are paying 'international tuition fees, frequently many times higher than locals or study-abroad students especially in Western countries (see, e.g., University of Auckland [UoA], 2005; University of Waikato [UoW], 2005a). Overseas study for a long duration thus represents an enormous financial commitment, especially when one takes into account the fact that many of these students come from countries where local wages are low in comparison with most Western nations. Second, student visas seldom allow much work to be conducted during study, and there usually is an expectation (or indeed a requirement) that such students will return home at the completion of their studies (Immigration Service, New Zealand, 2005). Many Western universities and technical institutions now rely heavily on enrolments of international full-fee paying students because of the impact they have on institutional finances. For example, one New Zealand university reports having doubled the income generated from

international students over a two year timeframe to NZ$72 million, with just over 16% of total student enrolment being international full-fee paying students (New Zealand Trade & Enterprise, 2005).

This study seeks to develop an understanding of full-fee paying international students' perceptions of being involved in co-op in another country. Remarkably, it seems no research has investigated the issues that full-fee paying international students encounter when engaged in co-op programs. Overall the aim of this research was to gain an understanding of the experiences of full-fee paying international students' involvement within a co-op program in science and engineering, with a particular focus on concerns and issues that students encounter during their co-op placements. An insight to the understanding and interpretation of doing science and engineering and being a scientist or engineer also was of interest.

The research reported here thus addressed the following objectives, and sought to:

- Gain an understanding of factors that influence full-fee paying international students to study science and engineering
- Investigate reasons full-fee paying international students choose to study abroad
- Gain an understanding of what the terms 'science' and 'engineering' and 'scientist' and 'engineer' means to full-fee paying international students, and
- Identify concerns of full-fee paying international students, before and during their co-op placements.

Methodology

Theoretical Basis to the Study: Socio-cultural Views of Learning, and Cooperative Education

Research into co-op has been the subject of much criticism for quality and substance (see Bartkus & Stull, 2004). In particular, co-op research is thought to lack theoretical foundation (Eames & Cates, 2004). Hence, our first step here is to detail the theoretical foundations for our work. The present work is based on socio-cultural views of learning. Socio-cultural views of learning are deemed appropriate for this type of investigation since they allow the focus to be placed on the situation of learning through participation in a specific educational context or environment. This provides researchers with an opportunity to view the learning of both the classroom and the workplace as distinct communities of practice (Eames, & Cates, 2004; Eames, & Coll, 2006). From a socio-cultural perspective, learning that occurs is based on the relationship between the student *and* the environment, and its historical and social surrounds, as well as internal aspects such as individual's beliefs, knowledge and cultural factors (Eames, 2002; Murphy, & Ivinson, 2003). In practical terms this means the social factors present in a given learning environment exert significant impact on what is learned and how learning actually takes place. To illustrate Eames and Bell (2005) describe how science and technology co-ops learn; through a process of learning *the rules of the game* for a given workplace. This learning entails not only learning science content (e.g., enhanced knowledge of science concepts) and processes (e.g., operating scientific instruments), but also learning how to conduct research, the aspects of research culture specific to that context, how to gain information, and the appropriate codes of conduct for research and of conduct for interpersonal interactions in the particular workplace. Eames and Bell note that these latter *social features* of learning are oftentimes less obvious to, or less valued by, students.

Context of the Study

The context for this inquiry is based in two co-op programs offered by the School of Science and Engineering at the University of Waikato. The co-op programs are: the Bachelor of Engineering (BE), and the Bachelor of Science and Technology (BSc (Tech)) degree, both four year degrees with six and 12 months of co-op placements, respectively. The BE degree was introduced in 2001 with the Cooperative Education Unit responsible for facilitating the work placement component; a function that originated with the School's founding co-op degree, the BSc(Tech). Due to enrolment increases with the new engineering degrees, the number of co-op students also has increased with some 200 students involved in the program annually. Science and Engineering currently have an enrolment of 1172 Effective Fulltime Students (EFTS) with full-fee paying international student enrolments comprising some 13% of this population at the time of the inquiry.

Research Methods and Interview Protocol Employed in the Inquiry

The socio-cultural analysis was conducted within an interpretive paradigm (Coll & Chapman, 2000b; Guba & Lincoln, 1989, 1994). An interpretive-based approach allows the researcher to gain rich, in-depth explanations to selected questions that contribute to understanding the perceptions of these students and the consequences of the events that have occurred within their work placement. It also permits the investigator to capture how participants view science or engineering, and the emotional/affective dimensions of their experiences (Coll, & Chapman, 2000b; Garavan, & Murphy, 2001).

Data collection consisted of semi-structured interviews conducted in English as the primary language. Two critical aspects of this approach

concern how the researcher asks the questions and how the responses are interpreted (Denzin & Lincoln, 2003). The flexibility of this technique allows the researcher to probe unexpected issues that arise or pursue a response for a greater depth of understanding (can avoid superficial responses). In particular, participants and researchers can clarify misunderstandings that may occur, especially for those students where English is not their first language. The interview data were subsequently transcribed and participant validated.

Data Triangulation

According to some interpretive based researchers, any theoretical concept should be addressed by at least three empirical indicators (measurements, observations, datum evidence) (Wengraf, 2001), in what is commonly referred to as data triangulation (Coll & Chapman, 2000b). Guba (1981) also considers triangulation a necessity, since data obtained from multiple perspectives and a variety of methods may loose relevancy if not carefully examined (Jick, 1979, cited in Carruthers, 1990).

In the present work data triangulation was achieved by examination of transcriptions of interviews in conjunction with examination of the participants' placement reports, along with follow-up interviews to clarify ambiguity that were noted within the original interview transcripts. Placement reports are completed by all co-op students as a requirement for the assessment of a co-op placement. In these reports, all co-op students are required to reflect on their personal development throughout the duration of a placement.

Sample Description

The participants were identified from class lists of those international full fee-paying co-ops enrolled in any of the School's co-op programs (i.e, the BE or BSc(Tech)). They were specifically chosen if they self-identified as being a full-fee paying international student. The sample of eleven students represented a number of different nationalities, primarily Southeast Asian with a few of other nationalities. These co-ops were enrolled in following degree majors: three mechanical engineering, two software engineers, two electronics engineers, one biochemical engineer, one materials and process engineer, and two biology BSc(Tech) students.

Research Findings and Discussion

At the time of the interviews, the participants were at different stages within their co-op degrees; that is, some had either completed a placement whereas others were yet to complete one. Those that had completed a placement tended to give more comprehensive responses to most questions, including those questions pertaining to perceptions of the nature of science/engineering and scientist/engineers. The findings are summarized in Tables 1-3; any names used in citations from interview transcriptions are pseudonyms. For the sake of linguistic convenience hereinafter the international full fee-paying co-ops are referred to as *international co-ops.*

International Co-ops' Reasons for Studying Science and Engineering

To gain an understanding of these international co-ops background it was of interest to investigate their reasons for studying in a field of science and engineering. The most common response provided by these co-ops was that of family influence: "My parents are involved in electronics", "My sister studied science", "My dad was an engineer" were some of the reasons why these students were interested in studying in this particular field. Family involvement in careers of science or engineering was given as a direct reason for the participants choosing to continue in the same line of work as parents or siblings. Some participants also mentioned the influence of a secondary teacher who were deemed "interesting" with an "informative way of teaching" their subject.

Other participants said that they were science or engineering *hobbyists* who had a general interest in things such as "cars and machinery" or that they were "interested in programming." Some of these co-ops felt that they might experience competition for co-op placements, not just with domestic students, but also with other international students. This was of major concern to some participants, and in some cases, a deciding factor in enrolling in engineering. For example, at Waikato, most international students major in management studies (45% of the total international enrolments in the year of this study). As such, there is more competition for co-op students. Mark, an electronics engineering major, initially considered a management degree, but felt that this might hinder his career opportunities upon graduation: "I noticed that a lot of international students applied for the Bachelor of Management and Computer Science [degrees], and I thought; yeah up to four years later most of the students will apply for the same job, which is not good for me." There are clear indications here that Mark intends to seek New Zealand-based employment; a point we return to later.

International Co-ops' Reasons for Studying Abroad

New Zealand was the destination of choice for the participants in this study for a variety of reasons. Parental and family influence again was the main factor, with some students mentioning they had extended family members already living in New Zealand. Some were thus directed to study in New

Zealand by their parents: "Because my mother said so!" Interview data were supported by notes in student placement reports with one student writing: "My father's relatives are here, they immigrated before us". Others said in their interviews that their parents felt New Zealand would provide a better education compared to their home country: "My mother think[s] that Chinese education [is] not so good for me."

A number of the participants were of Chinese decent. With this in mind, it is worthwhile to note that education has been perceived to be of particular importance in the Chinese culture. Lee (1996), for example, says competition to succeed tends to be intense in the Chinese culture, and education is thus perceived as being extremely important (Holmes, 2005). In the current study, English-speaking universities in particular were perceived to be more prestigious - offering a "better quality education." One student, for example, felt that the tertiary education was superior in "Western countries." This may be based on negative perceptions of universities in his own experience back in China. For example it was noted that the university "lacked facilities," and was seen as "over-populated" and for one particular student, they perceived that lecturers were "substandard" compared to the lecturing that they have received abroad. The participants also felt that they thought they would "have more flexibility within course selection." This is a little ironic given that BE degrees in particular in New Zealand are highly prescriptive in nature (see, e.g., UoW, 2005b) as a result of requirement for professional accreditation.

Perhaps not surprisingly, the majority of the participants intended to "find employment in New Zealand and migrate here." (see note) At least in part, this may represent a perception that the skills gained from New Zealand degree programs provide better options to those offered in their home country. Others spoke of becoming accustomed to a New Zealand work environment, which they considered very different form their home country. Craig, for example, spoke of his perceptions about differences in working etiquette: "A typical work week here involves working Monday to Friday 'nine-to-five', but in China, it is common for people to be working on [a] Friday evening which is not expected of New Zealand people working here."

International Co-ops' Perceptions of Their Placement Experiences

The international co-ops in the present work reported their co-op placement experiences in similar terms to reports of domestic students in previous research (see, Eames, 2003; Paku, & Coll, 2005). So for example, they felt they were able to enhance their learning by "developing in new skills," as well as "developing skills learnt previously at university." Interview data were supported by notes in student placement reports with one student writing: "My course work at the university provides some help with the lab work…The long and demanding lab sessions [at university] prepared me for the work at [the company]." However, the co-ops here were learning new skills and taking on new information *in English*, which was for all of the participants a second language. For some, it was a learning experience just to be working and in a particular science-related field: "I never really experienced, you know, working in the lab." This they felt provided them with "work practice" and an "understanding of the work environment."

Most important was that these co-ops felt that they were able to learn about their industry of interest, and in particular their field of study: "The placement gave me a perspective of what is software engineering, and what a software engineering career looks like." For others, a gain in personal self esteem and confidence was of particular note: "It's put up my confidence I wasn't really confident on the technical side and how good I'm going to be in the industry." Many in this cohort of co-ops felt that they were able to interact both on a professional and social level with their fellow employees; for most this was seen as a great opportunity to be able to practice and develop upon their verbal and written communication skills. To illustrate, Craig a software engineering student, talks of the development of his communication skills during his placement.

> *So yes communication is the biggest thing I learnt from the first placement and how to talk to people and things like that. Now I find it [communication] much better than about a year ago…but still I haven't got to the point [where] I am 100% confident, like sometimes when we talk to people because we don't know all the vocabularies, sometimes you are feeling a little ashamed to ask, yeah, with understanding what I've been told and sometimes you spend a little bit more time try[ing] to think what that guy told me, and sometimes it doesn't straight go into my mind.*

This type of response is generally consistent with prior research. For example, Coll (2003) reporting that international students from Thailand felt they improved their communication skills during co-op placements - in particular their English language skills. This was despite many of the Thai participants also started they had concerns about their ability to communicate in English. Consequently, a similar finding emerged in the current study, as discussed below.

International Co-op' Views of Science and Engineering

International co-ops' understanding and perceptions of science and engineering appears to be influenced by their placement experiences. These again were similar to responses reported by other co-op students (i.e., local co-op, not internationals, see Eames, 2002). The international co-ops in the current study had a fairly simple understanding of science/scientists, compared with their views of engineering and engineers. Dionne, an electronic engineering student, is a good example. She described an engineer as someone that "researches and makes it actually happen" where her understanding of a scientist was described as being someone that "researches". Science was described as "being research," and "the way of the world." In general, students perceived a scientist as being someone that "researches," "finds new information and formulas," thus "providing the theory for the engineer." The majority of students also distinguished between the roles of a scientists and engineers: "[Science] is understanding how it works and the [engineering] is using the understanding to make things." In summary, engineering was typically seen as a *practical subject*, involving skills aimed at *making and designing things*, using *machinery*, and engineers were thus "more practically-oriented people" than scientists.

International Co-ops' Concerns About Their Work Placements

Despite student perceptions that their communication skills had progressively developed during their placements, communication was still a major concern to some – because English is a second language for all participants. Mark, for example, expressed concerns about not being able to cope with the work environment because he felt he would not be able to readily understand the meaning of terms used in the industry: "Once you get the project you never do that before, you never heard of it before and so you are a little bit confused or afraid [as to whether] you can handle it or not." Other's like Jack a mechanical engineering co-op and Kelvin, a biologist, were concerned about "not being able to relate to peers" on an informal level and were concerned about "not understanding colloquial terms, or having appropriate work ethics." This is similar to views expressed by Dionne, who commented that "it is really hard to fit into their conversation sometimes, because they are too professional and at a different level. So they will be talking politics and science, and it's just hard to catch up [understand]."

Mark and Craig both felt that their general work skills learnt in New Zealand would probably not be that relevant in their home country, with Mark commenting, "I think the electronics technology in New Zealand is [much] more developed than in China. Also I think that it's a good idea to keep learning some knowledge, some research in New Zealand." Craig endeavored to find a job in New Zealand during his studies. He felt that it would provide him with better relevant work experience as well: "Since I have learnt [my] skills here, I will practice [my] skills here."

The international co-ops in this study also were concerned that they might be treated differently than other employees, and most thought it very important for them to "fit into the work environment." Anna, a biology co-op felt that she could not easily socialize with her co-workers or participate in social events. She identified this as an issue for her to address for her next placement: "Things that I need to improve on in the next placement are to gain better understanding of the company by participating in meetings and social events, and in turn, socialize more with my co-workers." For one participant, the experience of not fitting in created considerable personal concern. Sam, a biochemical engineer student, felt he was "singled out" during his placement. Sam was employed to work on a research project for a three-month period and, as a consequence, he was required to work with other engineers who provided supervision: "I got to work in the control room, a place that people in the factory have to learn to work in over time, I felt that they [factory people] had a grudge towards me, because of the way I was treated."
Despite this outcome for this student, this scenario is uncommon within our program. Although, he felt he received special attention, which may have occurred in this instance, we have found that regular placing of students annually has allowed for employees to be more aware of the presence of co-op students for a short term placement (see Coll, 1996).

Conclusions and Discussion

From the research findings reported here, it seems that co-op was a useful learning tool for these international co-ops in the same way as reported for co-op generally, and for international co-op exchange students. The international co-ops in the current study report similar advantages to international co-op students in particular (Beard, Coll & Harris, 2001; Coll & Chapman, 2000a; Wong & Coll, 2001). The co-ops in the present work also report gaining an understanding of science and engineering that they felt improved due to going on placement, as noted elsewhere (Eames & Bell, 2005). As a consequence they felt they gained an insight to their potential future careers as engineers or scientists. An international co-op experience thus seems to have helped many of these students address concerns of self confidence and personal esteem (Coll 2003), and they felt that they

have been able to put their communication skills into practice through their placements.

A distinguishing feature of the research findings for the current study is that the co-ops expressed concerns that their work experience may well not be of relevance in their home countries. It is important to note that this is only their *perceptions* of this situation. In contrast, Coll (2003) found the opposite: that is, that New Zealand international co-op exchange student's felt the opposite – that they gained more valuable experience (see also Coll, Pinyonatthagarn & Pramoolsook, 2004 for Thai student views). The participants in the present work felt this might occur because the industry in New Zealand was more developed than at home. However, this also is the case for the co-ops in the work by Coll (2003) and Coll, Pinyonatthagarn and Pramoolsook (2004). Hence, this observation may simply be indicative of the co-ops in the current study desire to migrate. Indeed this was seen as a major advantage of doing a placement in New Zealand; namely, that it would facilitate migration. If this was to occur then the reported benefits of international co-op for developing countries would probably not be realized (Inglis, 1987; Nicol, 1981; Orfila, 1981; Yackovlev et al., 1981).

In terms of negative experiences, the co-ops here reported similar concerns to those of international co-op exchange students; namely, communication skills (cf. Coll, Pinyonatthagarn & Pramoolsook, 2004), fitting in (Coll, Pinyonatthagarn & Pramoolsook, 2004), and coping with a different working environment generally (Coll & Chapman, 2000a). In this study, for some co-ops, there was the feeling of inadequacy with respect to socialization in the workplace. Such experiences are undoubtedly negative and potentially undermine student self-confidence (Wessels & Pumphrey, 1995).

Implications for Co-op Practice

The implications this work might have for co-international co-op and those involved in the management or facilitation of international co-op will vary depending on the match of other contexts with the context for this work. As noted elsewhere the findings from research of the nature reported here can not be generalized – more appropriate is the notion of transferability (Coll & Chapman, 2000b; Guba & Lincoln, 1989, 1994).

First is a general methodological observation; namely, that this work seems to reinforce the value of socio-cultural learning theories as a lens for investigating co-op student experiences. The sociological factors noted by Eames (2002), Eames and Bell (2005), and Eames and Cates (2004) emerged from this work. Hence, one recommendation for other researchers is to consider the use of socio-cultural views of learning to inform interpretive research of this nature as it provides some useful insights into co-op experiences.

Second, a general observation is that this study supports other literature about the applicability of co-op as an educational vehicle for learning in a different context, and for a particular cohort of co-op students. As noted above, this cohort has different needs and expectations of co-op, and it is noteworthy that they accrue similar benefits reported for local co-ops, and international co-op exchange students (Dressler & Keeling, 2004; Reeve, 2004).

There also are some implications specifically for co-ops and placement coordinators involved in placing co-international co-ops. First, if international co-ops are expected to return home, the results of this study suggest that careful thought needs to go into deciding if the co-op work in the host country is relevant and useful in the co-ops' home country. Hence, guidance about programs needs to take such factors into account. If, as seems to be the case here, the intention is to migrate (and of course assuming such a notion is consistent with migration regulations in the host country) this is less of a concern.

Finally the results suggest that socialization is a major concern for international co-ops. Hence, a recommendation is for placement coordinators to choose carefully placement environments that are supportive and welcoming for international co-ops. Perhaps as noted by Coll and Chapman (2000a) an environment in which there are people of a similar age to the co-ops would be most appropriate.

Note: This might seem an unrealistic expectation given that as we noted above, student visas normally preclude work and require students to go home after completion of their studies. However, recently the New Zealand immigration authorities in fact encourage applications from international students studying in New Zealand especially for those acquiring skills deemed in demand (see Immigration New Zealand, 2005).

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APPENDIX A

TABLE 1. International co-ops' perceptions of their placement expectations and experiences

International Co-ops' Reasons for Studying Science and Engineering	
Knowledge	Realizing the importance of their field of study in technology and every day living
	"The main reason I chose software engineering was because I realize everything that works has to have a little bit of program it. E.g. like TV, you have to programme in order for the TV to work."
A general interest	Computers and writing computer programs
	Cars and machinery
	Engineering as a result of realizing the competition within other degrees e.g. management
	Interest in animals
Influences	Family influence or family working within the field of science and engineering
	Parents/sibling who are engineers/scientists
	A good teacher
International Co-ops' Reasons for Studying Abroad	
Profession	See as enhancing career prospects
	To obtain a widely recognized degree and education
	Prestige and recognition of degree status abroad and or/of University
	Intentions to obtain employment in NZ and eventually migrate here.
	Gaining migration status to live and work in NZ
	Gain experience, gain employment
Knowledge	Gaining skills and knowledge that they see as being unattainable in their own country
	Immersion within other cultures differing from their own
	Able to transfer degree/credits to NZ universities
	Quality education
	Having access to a flexible course selection within their degree
	Cost
International Co-ops' Perceptions of Their Placement Experiences	
Knowledge and skills	Learned and developed new skills related their degrees.
	Learned to work and communicate within a team
	Learnt about the industry and more about their field
	Design work (engineering)
	Communication - At a professional and personal level
	Learning good work practice and what the working environment is like
	A gain in personal self esteem and confidence
International Co-ops' Concerns About Their Work Placements	
Knowledge	Being able to cope with the work, not understanding the meaning of terms and concepts used
	"Once you get the project you, you never do that before, you never heard of it before and so you are a little bit confused or afraid [as to whether] you can handle it or not", Putting theoretical applications into practice in the real world
	"at university you just think about marks, but over there [industry placement] companies money [is] at stake"
Enculturation	Felt that gaining respect of these people was required
	Being "singled out" on placement thought that the workers would resent him especially not knowing that he was a student employed for a short period of time.

APPENDIX B

TABLE 2. International co-ops perceptions of 'science' and 'engineering'

Science	**Typical responses**
Stereotypical images	Research, everything technical, new technology, breakthrough
Investigating the world	Body of knowledge used to analyse the world, involves everything
	The way the world goes
	A scientist applies science looking at things logically and understanding how it operates
Knowledge scientifically	Theoretical, developing new technology, a way of explaining things
	The incorporation of different people from different related sciences
	Having a hypothesis, an experiment and proving the theory
	It's a way to look at things…interpret it and understand things
Engineering	
Stereotypical images	A concept of machinery, maths, design and money, involving lots of skills
Knowledge	Coming up with solutions and a way to improve it to make the product better, the study of how to apply the technology
	Finding out the problem and like a researcher you need to think about it again and again to find the problem and find the way to improve it, a cyclic process.
	I don't know about engineering
	The use of our knowledge of our world to improve the way we live
	Scientists explain things and kind of, try to use it…as technology or something that's useful
Improving technology	Helping to get things better, designing new efficient systems, the use of knowledge to improve the way we live
	Development, practical and involving a lot of skills
	Making things and designing things and putting science into application.

APPENDIX C

TABLE 3. International co-ops' perception of a 'scientist' and 'engineer'

Scientist	
As a profession	Researches and finds new information and formulas
	Comes up with new ideas, new theory and new technology
	Studies the world we live in and seeks to understand it
	Tests samples and creates stuff
	Have ideas
	Applies science to look at things logically…and try to understand how it operates
	Discovers new principals, algorithms or a new function, does experiments and research
Stereotypical images	Male, wears a lab coat, passionate, unconcerned about personal appearance, someone that is advanced academically
	Use their knowledge to find solutions or answers, they have the ideas, engineer prove it and find a better solution in real life
	They are academics
Engineer	
As a profession	Research and designing, using knowledge to look for a better way to do things, someone practical
	Develop new technologies; improving things to make them better, develops new concepts from a scientist's theory
	Someone that helps scientist
	They have little room for error
	Someone having a similar role to a scientist
	Somebody who is interested in helping society
	A scientist comes up with the idea and the engineer with help them to prove it and to implement it into real
	Engineers basically uses the application of the science what he has been around, getting into the industry,
	Engineers are more [focussed] towards labs and gaining more and more skills
Stereotypical images	Male with a construction hat, someone having a similar role to a scientist, someone that is 'brainy'
	An engineer is not seen as being a scientist
	Engineers and scientist are the same
Knowledge	Uses the science knowledge, researchers that make things work
	Someone that has gained more practical experience than a science-type person
	Develops new concepts from a scientist's theory
	They make things for users, so people can use it
	Calculating very accurate calculations
	One understands how it works and the other is using the understanding to make things