

# Professional Integration of International Engineering Graduates in Canada: Exploring the Role of a Co-operative Education Program\*

SANDRA INGRAM, MARCIA FRIESEN and ANITA ENS

Design Engineering E2-262, Faculty of Engineering, University of Manitoba, Winnipeg, MB Canada R3T 5V6.  
E-mail: sandra.ingram@ad.umanitoba.ca

This paper presents findings from an exploratory study designed to examine the role of a cooperative education term in the integration of international engineering graduates (immigrant engineers) into the Canadian engineering profession. The participants in this study were all enrolled in a university-based qualifications recognition program, of which a co-operative education term is one critical component. Data were gathered through focus group interviews, which were designed to obtain their perceptions of the cooperative education experience and its relationship to their career development. Data were interpreted through a theoretical framework of cultural categories and social and cultural capital, with the aim of discerning enabling and disabling aspects of a cooperative education experience to immigrant professionals' career development. Data reveal that the most profound obstacles concerned participants' expectations and competencies in the cultural norms and interactional styles that are unique to the North American professional workplace. The implementation of a professional practice component in the academic portion of the university-based program (prior to cooperative education placement) helped students to develop a heightened awareness of cultural differences in the workplace. The co-op term built on this preparation and equipped them with opportunities to recognize and develop social and cultural capital in the Canadian context, relative to the cultivation of professional skills (soft skills) and exposure to mentoring and networking opportunities. Implications are drawn regarding the integration of immigrant professionals and the relationship of findings to other under-represented groups.

**Keywords:** cooperative education; immigrant engineers; social and cultural capital; professional integration

## 1. Introduction and background

### 1.1 Immigrant professionals in Canada

In North America, vacancies created by a burgeoning retirement-age population are filled by a workforce that is increasingly culturally diverse [1]. Immigration is projected to account for all net labor force growth in Canada within the next decade and all population growth within the next two decades [2]. Currently, Canada receives 200 000–250 000 immigrants annually, an increasing percentage of whom hold postsecondary qualifications, compared with the historical profile of the unskilled immigrant [3, 4].

Immigrant professionals undergo challenging adjustments not only to a new society, but also in finding career-related employment. The challenges are multiple. First, in regulated professions including engineering, registration with the provincial regulatory body is a legal requirement in order to practice professional engineering. A difficulty in having foreign credentials recognized by Canadian regulatory bodies is often cited by internationally educated professionals as the foremost barrier to career integration and career development. Yet, formal recognition of foreign credentials, resulting in professional licensing, has been identified as a

critical enabler of career development in International Engineering Graduates or IEGs [5, 6] and is accepted within the engineering profession as a necessary credential for career advancement and mobility. Second, IEGs face similar obstacles to women in their efforts to integrate into the engineering profession in terms of being outsiders to established professional networks. Third, IEGs face additional cultural and language based differences, often manifest in unfamiliarity with what can be called the 'culture of the engineering profession'. This encompasses formal and informal professional processes and practice norms, thus leading to isolation and failure to achieve meaningful career development in their newly adopted countries [3, 5, 7, 8]. Finally, real or perceived discrimination becomes another barrier for immigrant professionals, including IEGs, seeking employment [3]. Paradoxically, the need for immigrant professionals to contribute to the Canadian economy remains unmet due to the unfulfilled potential that internationally educated newcomers represent.

Depending on the country of origin, the ease with which career-related employment can be secured varies. Canada is a signatory to the Washington Accord, an international agreement that establishes reciprocity in the academic qualifications required for professional engineering licensing in countries

who are signatories to the Accord. Signatories include the United States and United Kingdom, and these newcomers typically face fewer obstacles in having their credentials recognized and subsequent employability [9]. Cultural similarities between Canada, the U.S., and U.K. also enhance cultural integration into the workplace.

However, most immigrants to Canada do not originate from Washington Accord countries. In order to meet the requirements for licensure, these IEGs undergo a review of all prior engineering credentials by the provincial engineering association (regulatory body), followed by an assignment of confirmatory exams to be administered to the candidate by the provincial engineering association. The confirmatory exams are assigned from the applicant's engineering discipline and represent technical subject matter typically found in the last two years of an undergraduate engineering degree program in Canada. Data from the engineering association and IEGs themselves report that the process is time-consuming (often two to five years, during which the value of prior credentials and experience is depreciating), costly, and consequently has a high attrition rate. Additionally, IEGs perceive the additional requirement of completing one year of Canadian engineering experience to be eligible for licensing as largely unfair [6]. While few published studies exist on the adaptation of immigrant engineers in Canada, pronounced feelings of isolation and marginalization have been anecdotally reported among IEGs engaged in the traditional licensing route [8, 10, 11]. With increasing immigration and a higher proportion of immigrant professionals entering Canada, governments are urging all professional regulatory bodies to develop alternative licensing pathways that are time-effective, fair, transparent, and consistent.

While this study addresses professional integration concerning foreign immigration to Canada, it is relevant to a global situation of increasing international mobility and migration afforded by the Washing Accord and Bologna Process, and increasing cultural diversity in the engineering profession. In addition, the theoretical frameworks presented are widely relevant to educational and professional situations beyond the context of the current study.

### *1.2 The role of cooperative education in career development*

While formal recognition of foreign credentials has been identified as a critical enabler of career development in IEGs [5, 6], little research to date has examined the nature and impact of cooperative education on the integration of IEGs into the Canadian engineering profession, more specifically regarding how such programs can facilitate soft skill

competencies. A cooperative education program is defined here to include one or more paid work terms that engineering students fulfill as part of their studies (typically, undergraduate engineering studies). For IEGs, a cooperative education context could include paid and unpaid internships that are a part of programs designed for foreign credentials recognition, technical upgrading, and/or seeking additional Canadian credentials. Soft skills are defined as non-technical professional skills used in everyday engineering practice and include proficiency in various communicative settings and contexts, working in multidisciplinary teams, leadership, and a commitment to professional ethics. These professional competencies include not only the skill itself, but also the norms of expressing these skills and the values inherent in the North American engineering profession (for example, the skills that constitute a strong team player in *the Canadian engineering profession*). Thus, students who participate in engineering co-op programs in a North American setting become conversant not only with the knowledge of their discipline, but also with culturally appropriate conventions for communicating that knowledge and navigating workplace processes and experiences.

Overall, many studies have documented the value of cooperative education programs in terms of both academic and employment-related outcomes, highlighting the professional benefits for engineering students in terms of equipping them for future career success including greater career satisfaction, higher earning potential and more commitment [12–15]. As such, a conjecture in this work is that soft skills may include a distinctly cultural component in which IEGs need to develop competency to decrease social isolation, develop social networking skills and become conversant in the culture of the engineering profession in North America.

Cooperative education work experiences may also provide a head start in helping the engineering student establish patterns of mentorship and networking that have been deemed pivotal to engineering success. For both women and under-represented groups who are effectively outsiders to the culture of engineering, such experiences yield promising potential for career development. Follow-up interviews with women participants from Ingram's 1997–1998 study who began working as engineers-in-training (graduate engineers) revealed that cooperative education, internship and summer employment programs played a significant role in boosting their self-confidence, assertiveness and sense of belonging in the profession [16]. Subsequent research [17, 18] highlights the experiences of practicing women engineers who benefited from an investment in the development of mentoring and

networking relationships as well as those who lacked such opportunities and the career deficits they perceived as a result.

More recently, a mixed-methods industry-based study of male and female practicing engineers at four Manitoba companies [19] found that while male and female engineers both reported benefits from educational work experience with their current employers in the form of cooperative education, internship and/or summer work programs, women's professional gains appeared to surpass the men's. Survey data indicated that women with prior work experiences with their current employers rated their mentor's knowledge of the business/profession higher than those women without that experience and it was rated higher than men's similar perceptions [19]. In-depth interview data point to a growth in self-confidence, and increased mentoring opportunities among female engineers, particularly those who had participated in prior work experience programs with their current employers. Interviews with women revealed that through such experiences, their opportunities to invest in mentoring and networking increased significantly and contributed to their potential for career advancement [16–19].

These results suggest that educational work experience programs may allow women the opportunity to 'scope out' their potential employers early on and cultivate soft skills through mentorship and networking. Thus, early exposure to the culture of the organization may lead to more informed, strategic decisions on key players, improving women's opportunities for integration into the culture of engineering.

### *1.3 Research objective*

Building on these findings which relate to the obstacles faced by immigrant professionals and to the influence of educational work experience programs on the career development of minorities, we explore the intersection of cooperative education and immigrants' integration challenges, and thereby examine the potential for similar positive outcomes for IEGs. By focusing on IEG participants' perceptions of a cooperative work term component as one aspect of a university-based qualifications recognition program in which they were enrolled, we sought to learn whether and how this information played a role—whether enabling or disabling—in professional integration.

## **2. Theoretical framework**

### *2.1 Social and cultural capital*

Previous research related to the integration of IEGs into the engineering profession has used a theoret-

ical framework based on the work of sociologist Pierre Bourdieu [5, 11]. Bourdieu's theory posits that capital exists in varied non-monetary but valuable forms that influence individuals' educational and occupational mobility within society [20, 21]. These forms include human, social and cultural capital. The artifacts and social arrangements that constitute forms of capital vary from culture to culture, are interrelated, and may be simultaneously accumulated [11].

Cultural capital refers to the different sets of cultural competencies that individuals learn through socialization, as well as a set of cultural resources that are institutionalized and understood to be prestigious (e.g. educational or professional credentials). These are influenced by class and other aspects, such as the social position of one's family [20]. Like economic capital, cultural capital tends to be controlled by, and serve the interests of, the most powerful class in society [22]. Cultural knowledge, often tacitly held, relates to skills, manners, norms, and dress specific to a context, such as a specific profession, institution, or social circle. Cultural capital can be delineated by three sub-types. Linguistic capital is a form of embodied cultural capital (cultivated within one's self by personal effort and investment). Linguistic capital represents language competence and fluency. Mastery necessitates knowledge of the subtleties of accent, grammar, spelling and style as well as understood norms of communication. Within the engineering profession, linguistic capital can be seen in an individuals' ease and competence in professional communication, for example writing letters and emails, interacting with colleagues, supervisors, or clients, appropriately persuading and influencing others, and handling conflict situations [11]. Cultural capital can also exist in an objectified type, i.e. material goods where the value is derived both from the artifact itself as well as the individual's ability to understand its cultural or symbolic meaning (e.g. artwork). In the engineering profession, objectified cultural capital is inherent in an understanding of workplace artifacts, systems, and processes. Finally, cultural capital can also exist in an institutionalized type, via institutional recognition or validation of academic or professional credentials. All three sub-types of cultural capital are relevant to the professional integration process of IEGs.

Definitions of social capital center on the idea that social networks have value and represent opportunity to its members. Social capital is the accumulation of resources based on, first, access to, and secondly, inclusion and participation in social groups. This access and subsequent inclusion provides benefits from the resources of the social group, where these resources may include informa-

tion, support, status, and relationships of influence and support that eventually enhance an individual's access to employment, mobility through occupational ladders and entrepreneurial success [20]. Social and cultural capital are also mutually implicated; for example, through informal networks (social capital), individuals are able to learn about, understand, and value the predominant organizational culture (cultural capital) and become known in a broader context than is usually afforded by everyday workplace interactions [23]. In the engineering profession, indicators of social capital include "engineers' awareness of and participation in professional networks and events specific to their industry or discipline, receiving or being sought for professional mentorship, invitations to participate on boards or councils, and familiarity with and personal connection to key organizations and key people in one's respective professional field" [11, p. 4]. Although IEGs may have well established social capital in their home countries (inclusion and status in networks), they typically lack this valued form of capital in their new surroundings, as it requires cultivating relationships with others in the field and thus depends on access to the professional community, as well as cultural fluency to understand the network's purpose, resources, and tacit expectations of participants. As IEGs attempt to gain entry to the Canadian engineering profession, lack of professional connections can contribute to a sense of marginality and isolation [8] and constitutes the absence of a significant factor in career development.

While the preceding discussion has outlined social and cultural capital generally, these notions take on particular significance within the engineering profession specifically for women and under-represented groups, both at the academic and professional levels. Both groups are historical outsiders to what has been termed the 'culture of engineering'—the pervasiveness of largely male, white and privileged patterns of values, norms, and interactional styles in engineering that emanate from the military origins of the profession [24–26]. As a result of their accumulated advantages, which include hands-on tinkering and a societal approval for their fascination with technology, young men receive positive socialization experiences for a career in engineering. Through time, male engineers adept at the dominant culture, cultivate an interactive style that involves aggressive displays of technical ability, self-promotion and self-confidence.

In contrast, women and under-represented groups historically have faced significant barriers to penetrating the culture of engineering and achiev-

ing professional success due, at least in part, to their lack of access to and acquisition of valued forms of cultural and social capital [24–26]. Similar obstacles exist for immigrants from racial and ethnic backgrounds different from the dominant culture. For example, Friesen [8, 11] examined experiences of IEGs enrolled in a program to assist in their integration into the engineering profession in Manitoba. She found that their outsider status in terms of cultural knowledge and lack of access to engineering networks within Canada were larger obstacles to achieving professional integration than were their technical competencies as engineers.

## 2.2 Cultural categories

Laroche's [27] and Laroche and Rutherford's [1] work on the challenges faced by immigrant technical professionals in adapting to North American work cultures is valuable in understanding the obstacles faced by IEGs in the engineering workplace. Derived from Hofstede's [28] extensive study on categories of cultural comparisons, Laroche [27] applies these categories to the technical workplace in North American settings, providing the caveat that cultural generalizations cannot accurately explain all individual situations, which are also mediated by personality and organizational culture.

The first category of cultural comparison refers to power distance, which is a continuum indicative of the relative psychological space between individuals holding different levels of power in an organization and in society. The forty countries included in Hofstede's study spanned a continuum from low power distance (low hierarchy), where individuals strive for a highly democratic and interdependent society to high power distance in which society is organized in steep hierarchies with individuals bounded by clearly defined roles. Power distance dictates unwritten rules of appropriate behavior and interaction specific to the given culture, and power distance affects how employers and employees relate. For example, in general, highly participative or low power distance cultures such as North America will expect high initiative from employees to begin and carry forward tasks with minimal initial instruction and ongoing guidance and, correspondingly, employees will expect a degree of flexibility and independence in carrying out their scope of work. In contrast, in highly hierarchical or high power distance cultures, more representative of South America and Asia, employees will work only within a scope clearly defined by the superior. In a high power distance culture, employees will know that going beyond the scope without prior instruction or approval to do so would be a sign of insubordination and disrespect.

Hofstede's distinction between individualistic versus collective societies offers a second category that further explains cultural differences in behaviors and potential for misunderstanding [27]. In highly individualistic societies such as the United States and Canada, the individual is seen as the focal point of social relations. Society's priorities are thought to be best supported when rights and responsibilities are embedded at the level of the individual. Thus, individualistic cultures value personal accomplishment, autonomy, independence, and individual rights. In contrast, in highly collectivist societies such as Asia and South America, the group (family, organization, political party, etc.) is seen as the focal point of social relations, and the rights and responsibilities of the group outweigh those of the individual. Thus, collectivistic societies value identity with, accomplishments of, and loyalty to the group. In engineering practice, information sharing is often mitigated by one's cultural position on the individualism–collectivism continuum. In the former environment, information is shared and provided on an as-needed basis; in a collectivistic context, information is shared extensively beyond those directly impacted by or in need of the information. This cultural continuum can be very evident in one's expectations of teamwork in engineering practice.

Two further cultural categories are the continua of risk, ranging from cultures that are risk tolerant to cultures that are risk-averse [28] and context, ranging from high context to low context cultures [27]. Risk aversion and tolerance relate to the comfort level in a society towards the unknown. In highly risk-averse societies, rules, structures, and protocols are developed to moderate the level of uncertainty in daily realities. In risk tolerant societies, adventure into unknown terrain is tolerated with its accompanying mistakes or tangents. Risk tolerance is also associated with a high degree of entrepreneurship, consistent with cultures where political, economic, and legal structures may not be consistent or reliable, and individuals and groups are used to 'finding their own way'. Rather than representing rigid rules, risk tolerance and aversion are nuanced behaviors in varied situations. In engineering practice, for example, one's risk tolerance determines the amount and precision of data required to move forward in decisions, as well as the approach to problem-solving. Risk tolerant cultures will favor back-of-the-envelope approaches leading early to practical efforts, while risk-averse cultures will favor extensive analysis prior to any commitments.

Finally, context determines how people approach communication and personal interaction or rapport. In high context societies, people attend to the

circumstances and cues around the message to a larger degree than in low context societies, where the message itself is important with less attention paid to surrounding details. High context individuals will require relationship building and personal interaction as a preamble to conducting business in order to establish rapport and trust, while low context individuals will often consider such endeavors to be a waste of time, preferring to get right to the point with a colleague or client.

Building on these categories, Laroche [27] and Laroche and Rutherford [1] demonstrate that for immigrant professionals, adaptation to the workplace of their adopted country can be fraught with potential for misunderstanding and miscommunication. None of the behaviors along the continua of these cultural categories are inherently wrong. However, when cultural expectations differ on one or more of these continua, behaviors and actions that are highly appropriate in one cultural context may be considered highly inappropriate, unprofessional, or incompetent in the North American context. In practice, lack of awareness and differences in cultural frameworks may translate into lost opportunities for immigrant professionals, which could deter career advancement.

For example, in an analysis of the barriers described by health care professionals from non-Western nations adapting to the Canadian organizational culture, Austin [29] describes a 'double culture shock' whereby there is a continuous negotiation on the part of newcomers not only to the country, but to the norms and practices of their profession. "Misunderstanding regarding critical Western-democratic assumptions implicit in health care (such as partnerships vs. paternalism, interdisciplinary team work vs. hierarchical directives, and individualistic vs. collectivist ideals) may significantly compromise quality and pose unacceptable risks for both the professional and the patient" [29, p. 136]. The lack of awareness and inability to operate along the expected cultural styles may manifest in ways that are interpreted by those in dominant positions in the Canadian health care structure as incompetence, inexperience, or lack of initiative, which in turn results in feelings of anxiety, helplessness, or withdrawal in non-Western educated health professionals. Austin's [29] study illustrates the potential for misunderstanding that can damage immigrants' self-concept, professional practice, and possibilities for career advancement.

In this work, social and cultural capital and cultural categories constituted the framework within which the data were interpreted. Data reflected participants' experiences of the co-op work term and its relationship to their career development.

### 3. Background and setting

The site for this study was the Internationally Educated Engineers Qualification Program (IEEQ) at the University of Manitoba, Canada. The University of Manitoba is a research-doctoral institution, offering degrees in civil, mechanical, electrical, computer and biosystems engineering to an undergraduate enrolment of approximately 1100 students. Developed in 2003, IEEQ is a qualifications recognition program that provides an alternative licensing pathway to IEGs and is recognized by the provincial engineering association, the Association of Professional Engineers and Geoscientists of Manitoba (APEGM) as leading to IEGs' professional registration in Manitoba. It was the first such program in Canada until 2007, when Ryerson University in Toronto began offering a similar initiative. The IEEQ Program responded to the need for a more time-effective, alternative licensing pathway with lower attrition rates to the traditional confirmatory exam pathway administered by the regulatory body. In addition, a major motivation was to address the subtle, yet equally pervasive problem of social isolation reported by IEGs particularly in the form of a lack of access to engineering support networks, as well as to incorporate some form of labor market entry that the confirmatory exam pathway lacked [8, 9].

International engineering graduate applicants to the program are initially assessed by the provincial regulator, APEGM. Those assigned five or less confirmatory exams by APEGM in order to be eligible for professional registration, are eligible to apply to IEEQ as an alternative to confirmatory exams. They are also required to meet specific English language competency requirements. The 12-month, full-time program is composed of eight months of senior-level engineering courses, followed by a 4-month engineering work term. The objective of the coursework is to confirm technical competency in the IEG's respective engineering discipline; the objective of the engineering work term is to gain Canadian professional experience and to begin to build a professional network. In addition to coursework and a work term, IEEQ also includes an explicit and ongoing focus on cultural orientation, language development, and professional networking opportunities.

A significant part of the IEEQ Program is a mandatory course, 'Practicing Professional Engineering in Manitoba (PPEM)'. This course is delivered exclusively to IEEQ participants, and is designed to develop understanding of cultural categories as outlined earlier, how they manifest in the engineering profession, and the potential impact of cultural differences on professional integration and

career development. The primary textbook for the course is Laroche, 2003. The course further addresses employment-related topics, Canadian engineering ethics, and Canadian engineering law.

Participants in the IEEQ Program are typically between 30 and 50 years old and have immigrated to Canada one to three years prior to enrolling in the IEEQ Program. All hold an undergraduate degree in engineering from their home country, and most have significant professional experience in their home country as well. Approximately 75% are male. The top five countries of origin represented in the IEEQ Program are India, Philippines, China, Pakistan, and Ukraine.

The work term is comparable to a cooperative education program in that IEEQ staff coordinate and monitor the placement of students into the engineering workplace where they fulfill a paid work term, providing them with a Canadian engineering employment experience. Once participants successfully complete the IEEQ Program, they are eligible to register with APEGM as engineers-in-training, placing them at a level commensurate with students graduating from an accredited engineering program offered at a Canadian university [8]. Upon a further demonstration of four years' engineering experience (of which three years can be pre-immigration (non-Canadian)), IEGs are eligible for full registration (licensure) as a professional engineer or P.Eng.

### 4. Methodology

The purpose of this qualitative study was to explore the perceptions of IEGs relative to their co-op experiences, and to develop potential insights into what IEGs identify as enabling and disabling factors within their co-op experiences relative to their longer-term career development. Ultimately, such insights may inform beneficial practices regarding the integration of IEGs into the professional workplace. The experiences of a single intake of IEEQ Program participants during the 2009–2010 academic year were explored using data collected through two focus groups, co-op work term reports, and program documents. Upon approval of the research protocol by the University's research ethics board, the researchers approached the class of 23 IEEQ Program students at the end of the academic term in April 2010 and informed them of the goals and intent of the study, inviting their participation. The first focus group meeting was held with seven students who accepted the invitation, just prior to beginning their co-op work term and then a subsequent focus group was held four months later, at the completion of their work term. One participant, a mechanical engineer, had not

secured a placement until just prior to the second focus group meeting. Of the remaining six students, three were enrolled in electrical and computer engineering, one in mechanical engineering, and two in civil engineering. In terms of country of origin, three were from the Philippines, one from China, one from Pakistan, one from Algeria, and one from Ukraine. They ranged in age from mid-twenties to early forties, and they had been in Canada from one to two-and-a-half years prior to starting the program in September 2009. The group consisted of six males and one female. The settings for their co-op work terms were varied and ranged from private consulting and manufacturing companies to public sector utilities.

Focus groups are loosely structured gatherings of 4–12 people who engage in a discussion guided by the moderator. The primary advantage of a focus group is the ability for discussion to expand beyond the preconceptions of the researcher(s) and to provide data about key issues important to group participants [30].

Co-op work term reports from IEEQ participants fulfill a written requirement of the IEEQ Program and are submitted to the program director upon completion of the work term. They describe the nature of the work carried out and are also a reflective account from the student's perspective of how the term related to their professional and personal goals. Four participants submitted co-op reports for our analysis. This study complied with the university's ethics review process ensuring respondents' anonymity, confidentiality and opportunity to withdraw without penalty, and was approved by the university's human ethics board. Each participant in the research group has been assigned a pseudonym.

For the purposes of this paper, we are reporting on preliminary results from data collected from the first and second focus group sessions with students and from the course syllabus and required textbook for the course *Practicing Professional Engineering in Manitoba*. The course textbook was consulted to follow up on participant references to this textbook's content in the first focus group. Reported themes were supported by data from transcripts of the second focus group held with students and student work term reports. This data is part of a larger dataset in the overall study, which subsequently also included a focus group with the co-op experience employers of IEEQ students.

Both the first and the third authors (who were independent and not affiliated with the IEEQ Program) were the primary researchers who collected the data and analyzed it. Data from the focus groups was transcribed and, together with co-op reports, this material was entered into NVivo, a qualitative

data management and analysis software program, for coding, evaluation, and analysis. Each member of the research team, after reading the transcripts several times, coded them separately and then shared perceptions of the predominant, recurring themes, revealing a high degree of inter-rater reliability in categories of focus. This was the more open, unstructured phase of analysis with an emphasis on descriptive coding. For example, data from the first focus group was coded for two phenomena, derived from participants' comments, but also enhanced through prior research experience and a broad literature review: cultural adjustment and co-op placement expectations.

The researchers then compared coding categories and verified them until they reached agreement on themes that addressed the central research questions. The second phase of coding was more interpretive and analytical, using the constant comparative method to allow detailed findings to emerge in a clear and systematic manner [31]. Evidence was examined for both common themes and differences across and between data files. This approach allowed for a gradual process of abstraction towards the theoretical constructs. The cultural categories theoretical framework, described above, emerged inductively from this approach as a useful lens through which to examine the experiences of IEGs. Focus group transcripts and a manuscript of this paper were returned to interview participants for review and comment through the process of member checking [32]. While the small number of participants (7 in the first focus group and 6 in the second focus group) needs to be acknowledged, the methodology nonetheless allows deep and descriptive analysis that can form a grounded theory for further exploration in subsequent research.

## 5. Findings

### *5.1 Early experiences of professional integration: Anticipation of cultural adjustment*

The discussion in the first focus group session with IEEQ participants was primarily designed to explore participants' personal and professional expectations of the upcoming co-op work term. In this meeting, the notion of cultural adjustment for IEGs to the Canadian work context was a pervasive theme. Much of the discussion focused on participants' exposure to Canadian communicative patterns and how they differ from their own cultures. They voiced their expectations of conversational encounters that may occur with colleagues and supervisors during their work term that may demonstrate these differences. There was also a strong link made to the PPEM course and how it

helped provide participants with a solid foundation for upcoming challenges. Having been recently sensitized to the concepts of cultural categories and how they lead to culturally-aligned differences in behaviors, the participants educated the researchers on their significance during the first focus group meeting and then used the language of the text [27] to talk about their cross-cultural workplace communication experiences during their co-op placements in the work term reports and second focus group.

Issues discussed included differences in communication styles with those in authority, levels of assertiveness in workplace interactions, and accepted notions of how to relate to mentors. Three participants from the Philippines, which ranks as one of the most hierarchical countries in the world in terms of power distance [1] drew attention to some critical communication differences that they expected to encounter once in their placement. Maria, Carlos and Manuel had each worked for brief periods in technical environments in Canada. Maria, who had just started her co-op term the week of the interview, already had some prior work experience with her co-op employer. She remarked on the interactional differences she had seen thus far:

Yeah, like in Asia you call ‘Sir, Madam.’ Here, you’re just like ‘Hey—how are you doing?’ There it’s like ‘Hi Sir, good morning.’

Similarly, her classmate, Carlos noted how the two cultures approach work tasks in terms of supervisory directives. These data implied an understanding of differences in tolerance to risk.

And when it comes to work, North Americans are not very detailed when giving instructions. They will let you do what you think is right, yeah. Because if you are dealing with a high power [distance], it’s just like following [. . .] their instructions, just doing what they want you to do, and you don’t have the chance to give your ideas.

Participants were already contrasting more formalized and deferential communication patterns in their home countries and their ability to assert themselves and come across more confidently in the North American workplace. As Maria stated,

I’d like to add like in terms of cultural [differences], I still have some thoughts on speaking up or challenging the manager. Like once he asked something, I still will ask ‘how do you want it to be like?’ . . . in terms of cultural [differences], because I’m younger and we grew up that we don’t challenge our elder people, we just listen and we just do what they say . . . I just need more confidence really in speaking up and presenting ideas.

Her observations were confirmed by Carlos:

Yeah, we came from the same country, so yeah that’s how we do it. We have this respect on the elder people

[. . .] also we expect more that, they know more than us, that’s our perception . . . So yeah, that’s what I’m confused until now—how to be assertive but not over-doing it.

Despite constraints associated with coming from cultures with higher power distance, participants demonstrated optimism about being able to navigate the cultural challenges that lay ahead. Much of their optimism was grounded in the preparation they attributed to the IEEQ Program and from taking the PPEM course during their eight-month academic term which they had just completed. As Manuel put it:

We know for a fact that we are technically very capable, just like we are. We are putting ourselves [out] just like a bird: we cannot fly without any air, so IEEQ’s really our air so that we could fly.

Samir and Carlos stated outright that the PPEM course was extremely helpful. Samir noted, “The [PPEM] course that one was very, very, very helpful for me.” He elaborated that he might not have finished the IEEQ Program had it not been for that course. Both the course content and the instructor were credited with supporting the students. Carlos noted the usefulness of course content in informing his interpersonal communication skills:

I believe that I am more prepared right now than eight months ago because as I go back, I see a difference in how I integrate with my workplace. I learned lots of things in [the instructor’s] class. So now, I know how to deal with my workmates, and I really understand now how to adjust to them because in my workplace we’re almost as I call it United Nations because we are very, very much culturally diverse.

Thus, despite participants’ expectations that the co-op work term would involve adapting to differences in cultural conventions in the workplace, there was an overall sense of optimism that they had been well prepared during the academic coursework phase, specifically through the PPEM course.

In describing their expectations of and early experiences in their co-op work terms, data from the participants were largely framed by the theoretical framework of cultural categories. Data highlighted participants’ awareness of the various dimensions of cultural differences and its subsequent manifestations. In particular, most data were reflective of anticipated power distance differences, and in particular, manifestations in communication norms and appropriate demonstrations of initiative in the workplace. To a lesser degree, participants’ discussions on communicative norms can also be interpreted as building an emerging understanding of the enabling functions of social capital and cultural capital in workplace success, in terms of demonstrating behaviors considered appropriate and thus being accepted into a group,



and in terms of understanding the interactional expectations in the workplace, respectively.

### 5.2 Reflections on the cooperative education term: Growth in professional skills and confidence

The aim of the second focus group interview held at the end of the co-op work term was largely to explore participants' experiences in and perceptions of their co-op term as it was coming to a close. Work term reports and data from the second focus group revealed a variety of ways in which participants developed their technical and soft skills over the four month period. A striking theme was the confidence participants gained from their work experiences overall and how equipped they perceived themselves to be to contribute to the profession in Canada.

Throughout the co-op term, participants gained experience with a variety of interactional norms particular to the Canadian engineering workplace as well as the specific organizational culture. These situations in which soft skills were developed and refined included numerous face-to-face meetings, and phone calls with supervisors, staff, and clients. In some cases, participants made regular and significant face-to-face contact with those beyond their immediate group, including technicians and technologists, shop-floor workers and the sub-trades. Written communication was varied and included proposal and report writing, specifications, reviewing documents and written correspondence with clients.

Participants had anticipated language differences, including differences in accent, terminology, cultural expression and norms of behavior in their co-op terms. After their co-op term, they reported that they were still adjusting to interactional styles related to cultural norms dictating communication, issues they had explored in the academic preparation program and first focus group session [33]. Carlos observed the kinds of interactional choices that many participants were still faced with months after they began their work term:

Yeah, I'm still feeling my way. For example, if they're discussing something beside me or near my cubicle, I don't know if they want me to participate, to suggest something, or . . . sometimes I have an idea, but I cannot tell them my idea because I don't know how they will interpret my action. They might think I am suddenly barging into their conversation without asking permission.

Upon further reflection, he added that his shy personality could be a factor as well.

Most participants described their co-op workplace setting as multicultural, consisting of Canadian-born and varied immigrant employees, resulting in many accents to be understood. Adapt-

ing to different patterns of language use was a persistent theme among participants. In many cases, language concerns were mitigated through the use of company-specific intranet, emails and electronic meeting minutes to corroborate what they understood from face-to-face interaction or to fill in what they may have missed. For a few participants, e-mail and standardized formats and processes for written communication also eased the burden of discerning how much initiative to assert, who was in charge of a given task, or the next step to take.

Thus, ongoing interactional challenges for participants can be interpreted as relating more to the acquisition of cultural capital, specifically regarding linguistic capital.

Despite the challenges inherent in communicative situations, participants gained increasing confidence regarding workplace interactions. Maria's comments illustrate a growing assertiveness and comfort with Canadian workplace interactional norms:

I have a feeling already of the environment and workplace. The other day I surprised myself because the division manager was just at the sink and I said 'hi'. I know back in the Philippines, I was just like, 'hello sir, hello sir,' like that, but then here I can just say hi—I even wave my hands. After that, I realized I guess I'm okay with the Canadian way now.

The PPEM course within the IEEQ Program had exposed students to the importance of mentoring and networking to career advancement and gave them a head start on these processes by organizing formal networking events and directing students to formal mentoring opportunities [33].

The cooperative education work term built and expanded on this foundation; many participants capitalized on the opportunities to increase professional relationships. In the second focus group meeting participants indicated resulting feelings of belonging and a sense of connection, both socially and professionally.

The extent to which opportunities for informal networking and mentoring presented themselves is noteworthy. Many of the participants described their workplaces as having a social approach to integrating employees and their families. Events such as group lunches, birthday celebrations, barbecues, golf tournaments, and family days were cited. Some companies even organized external volunteer opportunities such as fundraising for cancer support through dragon boat races and involvement with local Habitat for Humanity projects. While these events had a more formalized aspect to them, they help engender informal relationships that could lead to acceptance and a sense of belonging. For example, in one company's lunch-

room, a ping pong table was introduced to help facilitate interaction among employees. Prior to its existence, employees tended to engage in little or no cross-cultural or inter-departmental interaction over the lunch hour.

For Samir, the volunteer efforts he was involved with in his company supplemented his own volunteer work at a local food bank. Together, they reveal the power of networking through which not only did his English communication skills improve, but also his ability to connect to key contacts in his field:

When I came here, I didn't have any friends. My English was very bad, so I was taking English courses. My Canadian friend told me 'if you want to have a network, you should volunteer.' We don't have this volunteering culture; we don't have that in my country . . . So he took me to [local food bank], and I'm doing that I think for two years. Each Friday I go there to volunteer. I'm a host. And during that time I really improved my English there because I talked to people and I made very good connections. For example I didn't know about IEEQ, but I met a person there who was volunteering too who is the president of a very big company here. He said I can help you and he called his friend who is the president of [electrical utility]. And he said 'okay I have an engineer here and what's the process to get into [electrical utility]?' The [utility president] said, 'He can't get in because he doesn't have the license but the best way is to take a class called IEEQ Program' and that guy called IEEQ Program . . . because of that networking, because of that volunteering job, like I am here now.

Similarly, regarding mentorship, some participants reported forming meaningful and career-advancing relationships on their own initiative resulting in momentous gains. Carlos noted that the experience not only increased his technical skills and knowledge, but also gave him access to various project opportunities:

I have lots of informal mentors. Because when I entered the co-op, I realized that I want to be a hydraulic engineer—it's a branch of civil engineering—and then in our department I'm working with highly, highly skilled professionals with a PhD degree. So those are the people that I consider my mentors. They're developing me to be a hydraulic engineer, they, they are teaching me everything about hydraulics. In the four-month [co-op] period, I was able to get involved in four major projects in hydraulic engineering and that's because of my supervisors who I consider my informal mentors.

While the data from the first focus group highlighted participants' anticipation of differences across cultural categories, the data from the second focus group demonstrated increases in participants' social capital and cultural capital. Social capital acquisition was implied by the participants' feelings of inclusion in the workplace and their accumulation of networking experiences. Linguistic capital appeared to be the most challenging area of

cultural capital acquisition. In both cases, data implied a heightened awareness of the importance of social and cultural capital to career success, as well as an appreciation of the magnitude of the task of achieving these forms of capital.

## 6. Discussion

The primary research question addressed in this study explored IEGs' perceptions and experiences in their co-op term, in order to develop insights into the disabling and enabling factors within their co-op experiences relative to their long-term career development. In this work, social and cultural capital and cultural categories constituted the framework within which the data were interpreted.

In discussing their expectations regarding the co-op placements, focus group participants identified challenges they perceived they would face in adapting to a Canadian workplace environment. These challenges however were not linked directly to the co-op term nor to the IEEQ Program overall; rather, they represented situational realities faced by IEGs seeking to re-establish their careers in their adopted countries. More specifically, as their comments illustrate, the most profound obstacles they expected to encounter were those that relate to cultural norms and interactional styles unique to the North American workplace. Clearly, in terms of cultural capital and more specifically linguistic capital, as evidenced by differences in greetings and interactional styles, data implied that participants were highly aware of their lack of facility in these more subtle, yet influential assets for career development rooted in North American cultural conventions. Furthermore, Laroche [27] and Laroche and Rutherford's [1] application of Hofstede's [28] distinctions between high and lower power distance cultures, individualism vs. collectivism, risk aversion vs. tolerance and high and low context cultures received significant support through this study. As the data reveal, IEGs approach the Canadian engineering workplace with established forms of cultural knowledge that in many cases differ dramatically from the dominant culture.

Nonetheless, despite these potential constraints, enabling factors were found that were linked directly to the IEEQ Program, and particularly the PPEM course. For example, the exposure participants received to cultural concepts through the course text and the opportunities to engage in mentoring and networking even prior to their co-op placement appear to have provided many with a head start in the development of social capital, an equally significant counterpart to cultural capital in developing engineering career success. The enriched benefits of academic preparation prior to the co-op

work term have been recently highlighted [34] in terms of establishing the beginnings of soft skill training and mentorship exposure. Moreover, being part of a program in which they could safely discuss differences and feel supported by their instructor and program staff and peers, may help to ameliorate feelings of isolation and marginalization reported [8, 11] among IEGs involved in the traditional licensing pathway.

The co-op experience allowed for the nurturing of these soft skills, which increased participants' English language fluency and their comfort with written and oral communication. However, awareness of their own language abilities implies that the development of linguistic capital remains an ongoing challenge. Nonetheless, in the context of technical and social competence, it may be that the language barrier, although still present, is a lesser hindrance to career progression for these IEGs than other cultural competencies.

That some participants were successful in building informal mentoring and networking relationships during their co-op work term is a finding of significance. Owing to the more casual nature of informal relationships that require self-initiative, in contrast to more formalized organizational efforts, these newly formed relationships are a sign of interactional ease of participants within the professional environment. Such findings support those uncovered by Ingram and Mikawoz [17] with respect to the power of informal networking, including volunteerism in expanding the soft skill acquisition of women engineers.

The data implied that an *awareness* of cultural differences and expectations—as a precursor to developing competency in the cultural expectations and norms of the Canadian engineering profession—was an enabling factor in the co-op work experiences and ongoing career development, mediated directly through their participation in the IEEQ Program. Thus, while women and IEGs as under-represented groups in engineering can both benefit from soft skill development opportunities and access to mentorship and networking, there is an important distinction between the two groups that this paper highlights. International engineering graduates, unlike women undergraduates, are engineers with prior work experience in their home countries. Thus, it is not the lack of soft skills that is an issue for immigrants; rather, it is the unfamiliarity and/or lack of fluency with the Canadian expectations or manifestations of these soft skills, or what may be called the task of *translating* existing skills to a new environment.

A few limitations of this study should be noted. First, data was drawn from a small sample of IEEQ students and thus may not be generalizable to all

IEGs participating in co-op programs. In addition, individuals who volunteer to participate in studies may show initiative in other areas as well: perhaps participant gains in social capital are indicative of this type of initiative taking and thus more common for similar individuals who are willing to take risks and connect theory to practice. Accordingly, the awareness of cultural differences as they impact the workplace and of mentorship and networking in Canadian work contexts as reported by this group may not be shared by other IEEQ students, or for that matter by the other students in the 2009–2010 cohort who were approached to take part in the study. Finally, this paper was based on a pilot study and further research will need to be conducted to substantiate the exploratory data and reveal further themes.

## 7. Conclusion

As demographics and economic realities continue to affect the engineering workplace, effective communication and other soft skills will become increasingly valuable. Furthermore, addressing both the need for immigrant professionals to contribute to the economy and the underrepresentation of professionals such as immigrant engineers in the field seems attainable, given the promising reports of most of the IEEQ students who participated in this study. This pilot study has revealed that academic preparation through a program that provides IEGs with the opportunity to develop social and cultural capital through explicit instruction in cross-cultural differences, mentorship and networking may be one successful avenue in reducing the barriers that IEGs face in securing relevant professional employment. The subsequent co-op term that forms part of the program builds on this foundation and has the capacity to solidify the bridging of soft skill translation from other cultures and assist immigrant professionals to re-establish their careers with the opportunity to achieve career advancement in their newly adopted countries.

*Acknowledgment*—The authors express gratitude to the Social Sciences and Humanities Research Council of Canada (SSHRC) for a supporting grant.

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**Sandra Ingram**, Ph.D. is Associate professor in Design Engineering, Associate Chair (NSERC Design Engineering) and adjunct professor in Biosystems Engineering at the University of Manitoba in Winnipeg, Canada. She is responsible for teaching the technical communication course in the faculty as well as an integrated approach to communications in the Biosystems Engineering department. Her research interests include professional skills in engineering, women in engineering, and post-graduate training of engineers.

**Marcia R. Friesen**, Ph.D. is Director of the Internationally Educated Engineers Qualification Program, Assistant Professor in Design Engineering, and Adjunct Professor in Electrical & Computer Engineering at the University of Manitoba, Canada. Her research interests include qualifications recognition for immigrant professionals and professional engineering culture.

**Anita Ens** is a Ph.D. candidate in Language and Literacy in the Faculty of Education at the University of Manitoba in Winnipeg, Canada.