The influence of professional identity and self-interest in shaping career choices in the emerging ICT workforce

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Significant concerns have been raised about supplying sufficient numbers of qualified and experienced information and communications technology (ICT) workers to meet the ongoing demands of the industry. This paper explores how professional identity and self-interest shape the career choices of ICT students. In-depth semi-structured interviews were conducted with 52 ICT students from four Australian tertiary education institutions. The findings reveal that nascent professional identity (such as mastery, sense of belonging, and status and esteem) and self-interest (such as anticipated income, perceived opportunities, and work-life balance) work together to exert a strong push away from or pull toward, seeking an ICT career following graduation. The findings contribute to understandings of how ICT students conceptualize a professional career in the ICT industry and the expectations of the emerging ICT workforce. This can influence the development of career marketing materials to attract high-quality entrants into undertaking ICT qualifications and ultimately an ICT career and assist universities and professional associations in their efforts to attract and educate a diverse and inclusive ICT workforce.

Keywords: Professional identity; self-interest; career choice; ICT workforce; graduate employment.

The information and communications technology (ICT) industry is critical for developing and maintaining the ever-changing technologies which everyday society depends on. The ICT industry encompasses a broad range of technology-related activities including product development, business services, content and design, and technical services. The demand for ICT workers and skills remains strong (Deloitte Access Economics, 2019; IT Professionals Australia, 2019) and is expected to continue to continue to grow (Kaarakainen 2019) as science, technology, engineering, and math (STEM) workers are integral to innovation and global competitiveness in the digital economy (Finnie, Mueller, & Sweetman, 2018; National Science Board, 2020). However, despite the significant economic and social contribution of ICT work, skills shortage has become "a global phenomenon" (Nithithanatchinnapat & Joshi, 2019, p. 60). Attracting and retaining suitably qualified and experienced workers remains a major challenge for many OECD countries (Joia & Mangia, 2017; Windeler & Riemenschneider, 2016) which are reliant on high levels of worker migration to address labor shortfalls (Thomson, et al., 2018). The paradox is that at the same time "many IT professionals are struggling to land an interview, let alone a job" (Tomkin, 2019a, para 1) due to offshoring, a lack of workforce gender diversity (IT Professionals Australia, 2019) and increasing precarity due to growth in the online platform economy. Also referred to as the gig, on-demand, or platform-based economy this shift has fundamentally altered labor rights and work practices leading to high levels of ICT worker precarity (Cantarella & Strozzie, 2019). These combined factors may have dulled incentives to pursue an ICT career or qualification (Thomson, et al., 2018).

In most OECD countries, ICT professionals are likely to possess qualifications gained through study at a university or vocational education and training college (Australian Trade and Investment Commission, 2020). ICT enrolments in Australian universities have increased by 50% over the past decade (Deloitte Access Economics, 2019), however, attrition rates for ICT degrees are high resulting in low completion rates relative to enrolments (IT Professionals Australia, 2019; Kori et al., 2015; OECD,

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2017). A lack of graduate-level employment opportunities (Norton & Cakitaki, 2018; Ohei, Brink & Abiodun, 2019; Shadbolt, 2016) and a clear developmental pathway to guide career expectations and employability in the industry (McKenzie et al., 2017) also influential in shaping the supply of qualified ICT workers.

While the perceived difficulty of STEM subjects (Innovation and Science Australia, 2017) is acknowledged as contributing to decisions to pursue an ICT qualification, the desirability of seeking a career or qualifications in ICT is also influenced by a complex mix of sociocultural influences (Kaushik & Pullen, 2018; Sáinz & Müller, 2017; Van Oosten et al., 2017) including negative perceptions about ICT work and workers (Draus et al., 2014; Geneve & Ganito, 2011; Vainionpää et al., 2019). These complexities are considered in the work of Ahuja (2002) who argues that attraction to and advancement and retention in an ICT career are influenced by a mix of social expectations and structural factors.

Social factors include social expectations and stereotypes and challenges such as balancing the demands of participation in one life domain (such as caring responsibilities) with the demands in another domain (such as work or study). Structural factors include (1) ICT occupational culture centered on long work hours and individually focused behavior; (2) lack of role models; (3) lack of informal networks; (4) lack of mentors; and (5) institutional structures such as organizational hierarchies and the impact of globalization. Ahuja (2002) proposes that many of these factors also influence persistence and advancement in an ICT career.

Although Ahuja (2002) considers three career stages—career choice or attraction, career persistence or retention, and career advancement—this paper focuses only on the first. In doing so it is argued that Ahuja's model underemphasizes the potential impact of structural factors on intentions to pursue an ICT career. Many of these, such as information networks, mentors, and role models, are associated with the development of a nascent identification with the profession. Professional identity is an influential factor in shaping career orientation and formative career choices in STEM disciplines (Hernandez et al., 2017; McDonald et al. 2019). Created through the beliefs and attitudes, values, motives, and experiences individuals use to define themselves in their actual or anticipated professional life (Tomlinson & Jackson, 2019; Jonker et al., 2018), professional identity is influential because it provides an individual with an image of who they are and what they (will) do at work (Skorikov & Vondracek, 2011). Empirical research has highlighted the importance of work-integrated learning (WIL) in developing professional identity among higher education students (Jackson, 2019).

There has been a concerted effort by governments, universities, and ICT peak industry bodies to change attitudes about ICT work and attract students to ICT qualifications. These include initiatives focusing on nurturing early identification with the profession through mentoring programs for high school (Outlay et al., 2017; Sasson, 2019) and university students (Women in Technology, 2020a; Australian Computer Society, 2020). Because women are a minority in the ICT industry globally (Deloitte Access Economics, 2019; IT Professionals Australia, 2019; Mueller, et al., 2018; OECD, 2017; Vainionpää et al., 2019) and technology work has long been conflated with a certain kind of masculinity (Clarke & Teague, 1996; Vitores & Gil-Juárez, 2016) many of these initiatives have been explicitly directed toward girls and women (Gorbacheva et al., 2014). However, while there is clear merit in pursing such initiatives to bring more diversity into the emerging ICT workforce, career and study choice is also motivated by self-interest in terms of the potential economic and social benefits or material resources (Marks & Thompson, 2010) and individual beliefs can be acquired through a specific educational or career action. These include anticipated income, work-life balance and perceived employment opportunities students

expect to receive through employment in the ICT industry (Diaz Aranda & Jerrard, 2019). The extent to which WIL works to shape these expectations has been underexplored.

Although career choice can thus be understood to be moderated by both social and structural factors as manifest in the constructs of professional identity and self-interest (Brandmo & Nesje, 2017; Joia & Mangia, 2017; Marks & Thomspon, 2010; Tsakissiris, 2016), this relationship has been empirically underexplored. The perceptions and expectations of individuals who have commenced formal education towards an ICT career can provide insight into motivations for pursuing work in the industry. This paper explores, via interviews with ICT students, the influence of these constructs, separately and collectively, on intentions to a career in the ICT industry.

RESEARCH APPROACH

Biographical interviews (Parker & Merrylees, 2002) with 52 vocational education and training (VET) and university students undertaking study toward ICT qualifications were undertaken. Twenty-two of the respondents were vocational education and training students (median age 20) and 30 were university students (median age 25). The 13 female and 39 male respondents attended Australian tertiary education institutions located in south-east Queensland, Australia. This respondent gender split, 25% female and 75% male, closely resembles the participation rates in professional roles in the ICT industry in Australia (Deloitte Access Economics, 2019; IT Professionals Australia, 2019). The semi-structured interviews were approximately one hour in length, audio-recorded and professionally transcribed verbatim. The interviews explored respondent's beliefs and attitudes, values, motives, expectations, and experiences regarding a career in the ICT industry. Ethics approval was granted for this project (No. 1200000698) and informed consent was obtained from all study participants. This research adopted a critical realist ontology. The coding methods used by the researcher to analyze the data collected from respondents included open coding, emotion coding, versus coding and axial coding.

Significant themes relating to professional identity and self-interest identified during analysis of the data are identified in Figure 1. The findings are presented according to these themes. Illustrative quotes associated with each theme are labelled with a pseudonym to preserve the anonymity of respondents.

FIGURE 1: The conceptual framework drawn from the synthesis of the professional identity and self-interest literature and the significant themes which emerged from the data analysis related to the attraction to and engagement to the ICT industry.
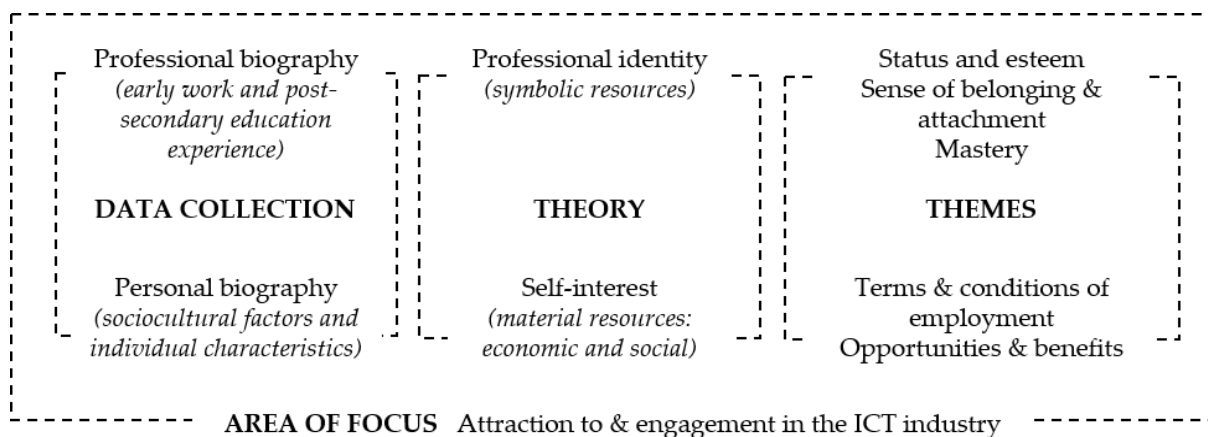
Seeking Status and Esteem through ICT Work

As a profession, established ICT workers are typically highly skilled, well-remunerated and perceived as capable and credible (Diaz et al., 2019; Tomkin, 2019b), characteristics associated with high status occupations. In Australia the medium annual wage growth was 2.1% higher than the CPI with a median base salary of $100,000 (IT Professionals Australia, 2020, p. 8). Consistent with prior research (Diaz et al., 2019) expectations of high status positively influenced respondents' decision to pursue a career in the ICT industry and associated qualifications. Indeed, respondents in this study, the majority of whom had not yet worked in the ICT industry, believed that society and employers valued the skills of ICT professionals because they "are the reason why they [the community] can use the Internet and their laptops work and they can use an iPad" (Daniel).

Although encouragement from friends and family influenced decisions to pursue an ICT career (Sáinz et al., 2012; Stockdale & Keane, 2016), respondents believed that "a lot of people, when you talk to them have no idea about the industry" (Barbara). Notwithstanding this lack of understanding, high levels of encouragement to undertake a career in the ICT industry were reported and the families of most respondents (n=50 of 52) were reported as holding the ICT industry in high regard. Indeed, as evidenced by the following quote rather than diminishing the status enjoyed by the profession, respondents generally felt that this inability to fully understand ICT work worked to further reinforce the status of the profession because not everyone possesses the ability or skills to do (or even understand) ICT work: "Mum and Dad definitely want me to stay in it. They think the whole computer world is amazing because they're all not up with technology. So, they think it's the smartest thing." (Barbara)

Contrary to existing research which has suggested that the male geek stereotype of ICT workers (Carrigan, 2017; Cundiff, 2018; Kenny & Donnelly, 2019) negatively impacts decisions to pursue a career in the industry (Chipidza, et al., 2019; Draus et al., 2014), respondents did not equate geek with negative connotations. Instead, perhaps in what could be considered a result of the popularization of the nerd persona through the big bang theory (Weitekamp, 2015) or IT crowd (Gorbacheva & Coldwell-Neilson, 2016), such labels were typically considered complimentary. Indeed, for some respondents, it was arguably these very stereotypes that attracted them to seek a career in the ICT industry. As Gary said "for myself, I don't see any negatives . . . it's something that I personally find is a nice thing to be said about me because I like it. I like the things that are attached with being a nerd."

Developing a Sense of Belonging and Attachment with the ICT Profession

Professional identity allows an individual to feel a sense of belonging and attachment to a profession (Skott, 2019), however, this sense of belonging or attachment did not appear to be an antecedent for the active pursuit of a career in the ICT industry. Feelings of connection with the ICT profession were notably absent among respondents, with many reporting feeling "on the edge" of the industry. Instead, the completion of an ICT qualification, combined with employment in the ICT industry, appeared to be a prerequisite for respondents to claim the identity of ICT professional; both vocational education and training and university respondents associated more strongly with their student identity than any nascent professional identity.

Professional identity is developed through "community membership where we define who we are by the familiar and the unfamiliar" and requires the active engagement of its members (Sachs, 2001, p. 154). Consistent with this understanding, professional identity was more evident in those respondents with an employment history in the ICT industry. In the absence of work experience, professional

networking (Bridgestock, et al., 2019) and membership of professional organisations (Roy, 2019) can be influential in the development a nascent professional identity (Mackay, 2017; Starcic et al., 2017). However, although respondents professed high levels of engagement with ICT-related hobbies and a strong commitment to pursuing an ICT career, low rates of participation in professional networking and membership of professional organisations were reported.

Only three of the twenty-two vocational education and training respondents were aware of the existence of ICT professional organisations, but none had ever received promotional materials or been invited to attend networking functions. University respondents commented on the lack of proactivity of professional organisations in soliciting student members; even those who had received promotional materials suggested that they would be more likely to participate or seek membership "if they [ICT professional organisations] actually advertised more…like accounting ones, they want you to join" (Adam).

In the absence of a concerted effort by professional organisations to attract student membership or provide mentoring, some respondents reported seeking out relationships with industry professionals by attending industry events and attempting to create their own professional relationships. Daniel's comment was "I go to some of the events and stuff and I talk to one or two people. . . I don't really have any close working connections or anything, so that is a bit of a problem. But I'm trying.".

Despite, or perhaps because of, the low representation of women in the ICT industry, based on their experiences at careers fairs and networking events, female university respondents believed that being a female was potentially beneficial to their employment prospects in the industry: "I was the only girl in the room, people from businesses would automatically jump on me. I had several companies hand me business cards and say, "Call me when you finish your degree". (Elisa)

It should be noted that although female respondents did not appear to be deterred by being a minority member of the profession and often "the only girl in the room", many had experienced exclusionary behaviour in their ICT classes and workplaces. Most also reported instances where they felt they had to justify their ability more than their male colleagues:

> I feel under pressure because normally. . . if I'm 80% good at something, that's fine. I can ask for help with the other 20%. Here I have to feel like I'm 100% good. I have to prove at every turn that I deserve to be there. That's a little bit exhausting. (Kym)

These recounted instances of experiencing overt misogyny in their studies and formative ICT work experiences appeared, at least within this small sample, to have had a somewhat limited negative impact on intentions to pursue an ICT career.

Connecting Mastery and Self-Efficacy through ICT Work

The successful transition from tertiary education to professional employment is underpinned by a strong professional identity and mastery of a professional discipline (Tomlinson & Jackson, 2019). Consistent with research examining mastery in STEM occupations (Blotnicky et al., 2018), there appeared to be an intimate connection between perceptions of self-efficacy and career aspirations for most respondents in the sense that ICT had played a prominent role in the life of respondents from an early age. Anticipated job satisfaction was strongly evident in the data for both university and vocational education and training respondents with expectations of mastery and intellectual autonomy

being aligned with respondents' broader expectations of and commitment to working in the ICT industry.

Alongside autonomy and creativity (Sia & Appu, 2015), the potential to undertake work which is satisfying and interesting at a personal level has been found to be an intrinsic factor for career choice (Agarwala, 2008; Cerinsek et al., 2013). Respondents reported being attracted to the ICT industry because they considered the work would be both interesting and challenging "because you always learn new things about computers" (Barbara). Most respondents (n=48 of 52) expected their skills would be continuously extended and they would be "constantly problem-solving" as "the best thing about programming is that it's one massive logic puzzle. . . that goes on and on" (Chris). Indeed, a small number of respondents (three) reported that they had decided to shift careers to pursue a career in the ICT industry precisely because they felt they were not sufficiently challenged in their current industries.

Self-efficacy, or the confidence in one's capability to control their motivations and behavior to accomplish goals, is created and reinforced through mastery experiences (Bandura, 1997). Social persuasion, through influential people such as family, friends, and peers, plays an important role in increasing an individual's self-efficacy (Gebauer et al., 2019) and career optimism in ICT students (Garcia et al., 2015). Male university respondents in this study expressed a high level of self-efficacy and career optimism when discussing a career in the ICT industry. By contrast, as has been found in similar studies (Ding & Lehrer 2018; Lehman et al., 2016), many female respondents, despite reporting high grades or industry work experience, reported a lower level of self-confidence in their ability to perform a professional ICT role. A low level of self-efficacy was also prevalent among respondents identifying as an international student attending a vocational education and training college, despite many having already completed tertiary qualifications, sometimes at a higher level than their current studies, in their home country. (A domestic student is an Australian and/or New Zealand citizen, Australian permanent resident, or Australian humanitarian visa holder. Students who do not hold one of these visas or citizenships are an international student; their education is not subsidized by the government and these full-fee paying students pay significantly more for their degree than domestic students). Notwithstanding the connection between self-efficacy, intrinsic motivation, and commitment to an occupation (Hofman et al., 2012), despite reporting low self-efficacy the majority of respondents remained highly committed to pursuing a career in the ICT industry.

Expectations Associated with ICT Work

Students who choose to study ICT place a high value on status and wealth and are participating in tertiary education for the extrinsic reward they hope to accrue such as a better job or more money (Sax et al., 2017). The overall perception of respondents was that "money is a big factor" (Brent) in pursuing a career in the ICT industry, for some to the extent that "if it was going to be low paying. . . I wouldn't be here" (Valentino). Indeed, the appeal of earning "better than most of my family makes" (Fred) or "a massive salary" (Kerry) was a driver for many respondents as it symbolized success. The expectation of high earning potential in the years following graduation was particularly attractive to vocational education and training students and to university students who were still living at home with their parents and had little in the way of personal savings. Despite respondents identifying pay as an important motivating factor in pursuing a career in the ICT industry, few (eight) reported expending substantial effort to confirm the accuracy of their income expectations.

Concurrent with the strong influence of expectations of a high income there also appeared to be evidence of "enlightened self-interest" (Rocha & Ghoshal, 2006, p. 593) which links job satisfaction to opportunities to utilize ICT skills to help others (Adam et al., 2006). Some respondents focussed on enhancing the well-being of others where ICT work was "not so much the money, it's just more the need to help others" (Arthur). Similarly, respondents who had worked in the ICT industry valued the potential to make income through creative work: "you could make an app that makes $1 million overnight" (Daniel).

Career choice also is influenced by the perception that the type of work undertaken will have a positive influence on an individual's wellbeing (McLean, et al., 2019). Although prior research has suggested that students, regardless of gender, who aspire to raise a family are disinclined toward ICT study (Sax et al., 2017), most respondents believed it was possible to achieve work-life balance in the ICT industry and that this was an important factor in their decision to study ICT. For example, university student Rose indicated that she was specifically pursuing a career in the ICT industry as she didn't "want to be working until late at night, bringing work home all the time". Respondents with children expected employers would accommodate requests for flexibility and they would be able to "find an organisation that understands that I'm going to have to have set hours. I can't work back" (Zoe). Thus, in addition to a good income, respondents believed that ICT offered a career with flexible work arrangements which would support good work–life balance:

> I want a job that's a bit less high-pressure than my parents. They're both very stressed a lot of the time. I don't want to be quite that stressed and that's kind of given me an idea of what I don't want to do. I want to be – not relaxed, I want to work hard, but I just – when I finish I want to finish. (Rose–University student)

In contrast to these perhaps idealistic expectations, respondents already working in the ICT industry confirmed the long and unpredictable working hours they were expected to work. University student Michael emphasized the need to "be prepared to work outside of hours. . . [and] to be called in early hours of the morning". Although excessive working hours and negative work–life balance have been identified as possible disincentives for deciding to pursue a career in the ICT industry (Holtgrewe, 2014), this did not appear to be a deterrent to continuing or returning to a career in the ICT industry for those with previous industry experience. For instance, university student Beatrice had experienced long working hours in the ICT industry and not only expected this to be part of any graduate role but explicitly connected these working conditions to the challenge and intellectual stimulation offered by ICT work:

> People were sleeping in the office and that sort of thing in a big, massive proposal that they were doing and stuff like that. So, I'm expecting it to be a bit crazy, but I think if it wasn't crazy, if it didn't have the variety, I wouldn't be interested. (Beatrice)

Managing family and work responsibilities is a significant challenge for women in the ICT sector (Trauth et al., 2008) resulting what has been referred to as a leaky pipeline of female ICT workers (Rajenderan & Zawawi, 2019; Seward, et al., 2019). Indeed, this was a very real consideration for some female respondents who highlighted the "challenge [of] staying up to date with current trends and technology, especially when starting a family" (Kerry). These female respondents anticipated that they would be forced to choose between having a family and working in the ICT industry: "you heard a lot of talk about how it was wrong for her to have a baby" (Barbara). There was some belief among female respondents that "businesses, in general, are getting better with supporting mothers that are coming

back to work" (Beatrice), however, female respondents who did not have children did feel that this benefited in the job market:

> The employer I'm with now, the first thing she asked me was oh, do you have kids? I know that's illegal and unacceptable, but in a job interview, you can't really tell them that. I had the answer she wanted anyway. (Kym)

Perceived Opportunities and Challenges Associated with ICT Work

While respondents reported that their families and peers "could see the potential opportunities that [working in the ICT industry] could have in the future"(Kym), they also anticipated a range of occupational challenges, not least of which was increasing global labor market competition in securing and retaining a role in the industry. The impact of outsourcing and offshoring of ICT functions (Fuchs, 2014; Holtgrewe, 2014; IT Professionals Australia, 2019) was recognized as a significant issue: "You're not just competing against someone sitting next to you, you're competing against people from all around the world. I think outsourcing is becoming the norm rather than the exception now." (Chris)

Respondents highlighted the potential value of the ICT skills developed through their education as transferable skills that would enhance their employability based on the belief that these skills and knowledge underpin "everything . . . and it's only going to increase" (Chris). As such there was a belief that completing an ICT qualification had the potential to facilitate access to employment opportunities in other industries if graduates were unable to secure suitable work in the ICT industry. Similarly, enrolling in a double degree program that included ICT was viewed as being particularly advantageous as many industries were believed to utilize "a lot of IT systems" (Kerry). A domestic student is an Australian and/or New Zealand citizen, Australian permanent resident, or Australian humanitarian visa holder. Students who do not hold one of these visas or citizenships are an international student; their education is not subsidized by the government and these full-fee paying students pay significantly more for their degree than domestic students. The possession of technical knowledge and the ability to apply it in a range of contexts led respondents to believe that many organizations outside of the ICT industry favoured graduates with ICT skills when filling vacancies:

> That's why they liked me because I had the background. I had the computer system knowledge that supports everything that we did. So yeah, like even if I don't necessarily go into a strictly IT path I have the benefit and obviously, they're going to utilize my skills. (Kerry)

The fast pace of technological change means ICT professionals must maintain and upgrade their ICT skills, as well as developing a range of complementary skills such as project management, interpersonal communication, and business skills to remain employable (Goles et al., 2008; Holtgrewe, 2014; Stal & Paliwoda-Pękosz, 2019). Most university respondents were also concerned that their ICT skills could quickly become outdated if they did not invest in upskilling but were also concerned as to how they would manage this requirement. Similarly, most vocational education and training respondents were completing or planning to complete a bridging course to attend university to upgrade their ICT qualification following completion of their vocational education and training course.

Notwithstanding their passion for ICT, investment of time and money in associated tertiary education, and high degree of confidence in finding work in the ICT industry (n=50) many respondents had also created contingencies to be executed in the event they were unable to find suitable graduate roles in the industry, or for some reason might later decide to pursue a career in a different sector. However, the recognition of these challenges and the need for further education and training and contingency plans

were not a strong disincentive to pursue a career in the ICT industry; most respondents expressed a high level of confidence that the benefits and opportunities presented by working in the ICT industry outweighed the challenges and that ICT work was preferred to alternative careers.

Connecting Professional Identity and Self-Interest in Career Choices

Professional identity alone is insufficient to explain career choices as individuals are also strongly governed by self-interest (Gerbasi & Prentice, 2013). Interests and identities reciprocally and discursively form one another (Ackroyd & Thompson, 1999) as "identity provides the norms and the values which determine what is valuable to the subject (in other words, what is in their self-interest)" (Reicher & Hopkins, 2001, p. 77). Identification occurs when individuals align their interests with others. Materialistic concerns impact the way identities are constructed (Jenkins & Delbridge, 2010). The interaction between self-interest and professional identity can thus be conceptualized as "the pursuit, appropriation and defence of symbolic and material resources" (Marks & Thompson, 2010, p. 324). Self-interest influences an individual's pursuit of a profession due to the material benefits to be gained.

That ICT students believe a career in the industry will provide them with a professional status supported by a high income, increased employability and career opportunities, flexible work arrangements, and intellectually challenging and autonomous work suggests professional identity and self-interest work together to shape career decisions. For example, although numerous respondents highlighted that many of their friends were working in the ICT industry there was little evidence to suggest that respondents were pursuing a career in the ICT industry to feel a sense of belonging or attachment with their peers or the profession more broadly. Rather these decisions were associated with obtaining the economic benefits they had observed others achieve by working in the ICT industry. Thus, professional identity was influential in driving career decisions in so far as personal identity resources like status were believed to facilitate the acquisition of self-interest resources such as high income. Respondents perceived that the heavy reliance on and integration of ICT in all aspects of society would guarantee that they would be highly compensated for their work, well regarded and ,because of their highly valued and transferable skills, that employment opportunities would be abundant. Respondents also anticipated a good work-life balance because ICT work was perceived to be autonomous, thereby allowing respondents to be in control of their work hours, and to work from other locations.

As shown in Figure 2 the pull factors toward an ICT career span both self-interest and professional identity, while those which push an individual toward an alternative career are predominantly associated with self-interest. However, although the relationship between professional identity and self-interest proved to be influential in driving student career decisions, not all factors had the same level of influence. A lack of a sense of belonging or attachment to the ICT industry did not appear to negatively influence respondents' decision to pursue a career in the industry. Similarly, comparatively lower levels of self-efficacy were not a significant influencer for female respondents regardless of their level of study. Furthermore, potential challenges to job security and employment opportunities due to workplace practices such as outsourcing, and offshoring were not considered by respondents as enough disincentive to seek an alternate career. The need for upskilling was identified as a challenge although it could be argued that vocational education and training respondents already discerned the need to upskill to enter the ICT industry or at least to enter at a level that would offer their desired level of remuneration. Long work hours have been reported as the reality of ICT work (Hsu et al., 2019), and

were recognized by many respondents as being likely, however, many still believed flexible work practices were more possible in ICT work than alternative careers.

As the participants in this research were respondents who have already commenced their journey toward an ICT career and thus already made substantial financial and time commitments, further research involving respondents who have decided against a career in the ICT industry could further validate the push and pull factors.

FIGURE 2: The individual, social, and structural factors which influenced participants' career choice, persistence, and career advancement in the ICT industry
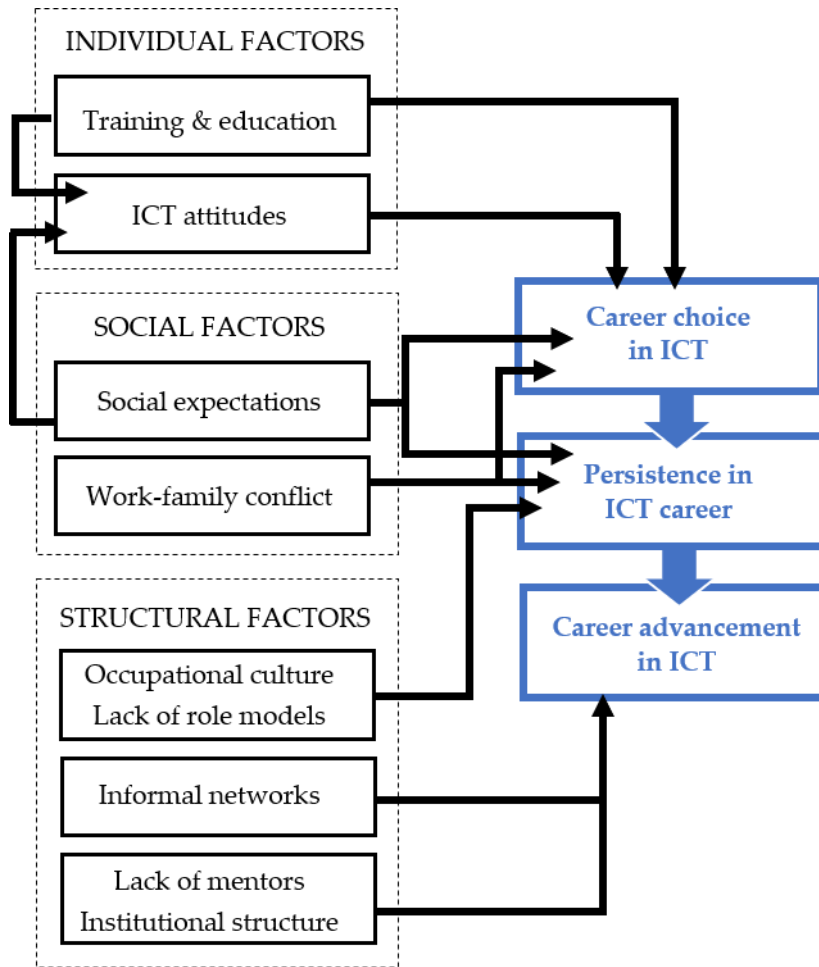
The Contribution of WIL in Influencing Career Choices

Many ICT students are already well immersed in ICT through their hobbies, personal interests, and part-time work experiences. However, this does not suggest that there is no place for WIL for ICT students. Done well WIL can provide access to role models (Jackson, 2019), help to foster informal professional networks and create effective mentoring structures for emerging professionals (Bridgestock et al., 2019) which will be essential for identifying and navigating graduate work opportunities.

It is important that WIL opportunities provide a diverse range of experiences and career options (Staehr et al., 2014) and highlight the transferability of ICT skills beyond traditional ICT roles. This expansion will have benefits for the employability of ICT graduates across a range of labor market scenarios. Some success has been found in participation in cross-disciplinary problem-based service-learning projects designed to meet community needs (Saulnier 2005). In addition to developing mastery and self-efficacy such participation has the additional benefit of developing soft skills and instilling social responsibility as a core professional value (Lennox, 2008).

It is also important that a number of different WIL options are presented for students to choose from to maximise the number of students who can participate in a WIL activity (Staehr et al.,, 2014). If work placements are offered they must be appropriately staffed and supported. Many students find it extremely stressful and difficult to find their own placements:

> This semester I was going to look for [a work placement] but the way they did it I had been on holiday right up until the first week of semester so I did not have any time to look for a work placement beforehand. So I got here and within two weeks you have to find a placement or you have to drop out of this course and that would put back my graduation and all that sort of stuff. It was a bit of a time crunch so I found anything I could...They have maybe 20 places for a hundred and something people…[and the rest] have to find their own which is for the vast majority of people. (Ian)

A combination of social persuasion and vicarious experiences of the career success of others perceived to be similar have been found to be particularly important for developing self-efficacy beliefs in women who are seeking to enter or are working in, typically male-dominated fields like ICT (Lamers & Mason, 2018; Zeldin & Pajares, 2000). The researchers argue that early investment in WIL can therefore have benefits across an ICT professional's career, especially for women, as these have been identified as key factors impacting retention and advancement within the industry. However, as highlighted by Bowen (2019) educators need to ensure students are aware of potentially gender-biased attitudes and behavior that may exist in the workplace and are empowered to raise concerns during work placements.

Promoting student involvement in professional associations can also provide a vicarious exposure to the world of work which is compatible with the goals of WIL, though not necessarily a formal part of it, which can nurture a nascent sense of belonging with the industry. Professional associations should be encouraged to recruit on campus at both universities and vocational education and training colleges and to promote and support early student involvement. The involvement of industry professionals from these associations will yield learning opportunities for students and may also increase the pool of potential industry partners willing to provide quality WIL placements, guest speakers for lectures, and real-world industry projects for project-based units.

CONCLUSION

The importance of attracting high-quality applicants to an industry upon which all aspects of society rely is indisputable. The study demonstrates that the decision to pursue a career in the ICT industry is a deliberate one and that professional identity and self-interest are both influential in this choice. While a mutually reinforcing relationship exists between professional identity and self-interest when analyzing student accounts of deciding to enrol in tertiary education to pursue a career in the ICT industry, this research found that professional identity influences ICT career choice in individuals only when self-interest is met.

ICT professional organizations and education providers continue to develop and support initiatives focused on increasing attachment to and understandings of the ICT industry (Hernandez et al. 2017) such as internships, networking events, and mentoring programs (Australian Computer Society, 2020; Women in Technology, 2020b). While these strategies are important in creating connections to the industry, new strategies may be needed to promote STEM education and careers (Boston & Cimpian, 2018) which recognize that individual's decisions to pursue an ICT career are based on a desire to realize self-interest through professional identity. Thus, rather than limiting initiatives to those that seek to create a sense of belonging and attachment to the ICT industry approaches must also respond to how trends in graduate employment opportunities (including salaries and expectations of the terms and conditions of employment) as well as expectations of the nature of ICT work shape career decisions.

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About the Journal

The International Journal of Work-Integrated Learning (IJWIL) publishes double-blind peer-reviewed original research and topical issues dealing with Work-Integrated Learning (WIL). IJWIL first published in 2000 under the name of Asia-Pacific Journal of Cooperative Education (APJCE). Since then the readership and authorship has become more international and terminology usage in the literature has favored the broader term of WIL, in 2018 the journal name was changed to the International Journal of Work-Integrated Learning.

In this Journal, WIL is defined as "*an educational approach that uses relevant work-based experiences to allow students to integrate theory with the meaningful practice of work as an intentional component of the curriculum. Defining elements of this educational approach requires that students engage in authentic and meaningful work-related task, and must involve three stakeholders; the student, the university, and the workplace*". Examples of practice include off-campus, workplace immersion activities such as work placements, internships, practicum, service learning, and cooperative education (Co-op), and on-campus activities such as work-related projects/competitions, entrepreneurships, student-led enterprise, etc. WIL is related to, but not the same as, the fields of experiential learning, work-based learning, and vocational education and training.

The Journal's main aim is to enable specialists working in WIL to disseminate research findings and share knowledge to the benefit of institutions, students, co-op/WIL practitioners, and researchers. The Journal desires to encourage quality research and explorative critical discussion that leads to the advancement of effective practices, development of further understanding of WIL, and promote further research.

The Journal is ongoing financially supported by the Work-Integrated Learning New Zealand (WILNZ), www.nzace.ac.nz and the University of Waikato, New Zealand, and received periodic sponsorship from the Australian Collaborative Education Network (ACEN) and the World Association of Cooperative Education (WACE).

Types of Manuscripts Sought by the Journal

Types of manuscripts sought by IJWIL is primarily of two forms; 1) *research publications* describing research into aspects of work-integrated learning and, 2) *topical discussion* articles that review relevant literature and provide critical explorative discussion around a topical issue. The journal will, on occasions, consider best practice submissions.

Research publications should contain; an introduction that describes relevant literature and sets the context of the inquiry. A detailed description and justification for the methodology employed. A description of the research findings - tabulated as appropriate, a discussion of the importance of the findings including their significance to current established literature, implications for practitioners and researchers, whilst remaining mindful of the limitations of the data, and a conclusion preferably including suggestions for further research.

Topical discussion articles should contain a clear statement of the topic or issue under discussion, reference to relevant literature, critical and scholarly discussion on the importance of the issues, critical insights to how to advance the issue further, and implications for other researchers and practitioners.

Best practice and program description papers. On occasions, the Journal also seeks manuscripts describing a practice of WIL as an example of best practice, however, only if it presents a particularly unique or innovative practice or was situated in an unusual context. There must be a clear contribution of new knowledge to the established literature. Manuscripts describing what is essentially 'typical', 'common' or 'known' practices will be encouraged to rewrite the focus of the manuscript to a significant educational issue or will be encouraged to publish their work via another avenue that seeks such content.

By negotiation with the Editor-in-Chief, the Journal also accepts a small number of *Book Reviews* of relevant and recently published books.