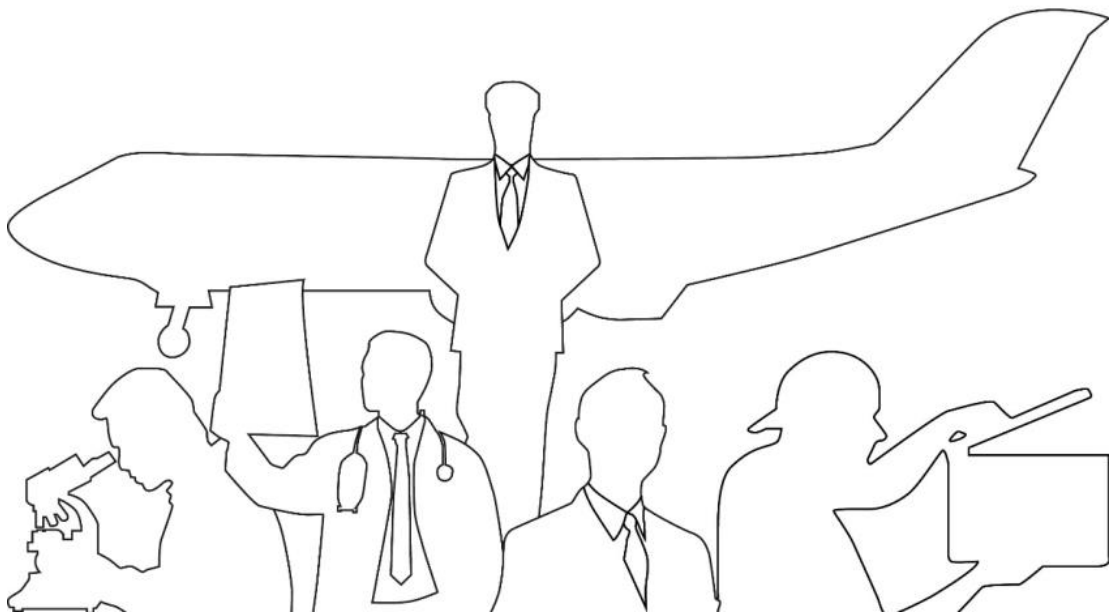


# Educating for Professional Identity Development

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Chin Pei, Tan





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**Educating for Professional Identity Development**  
**Opleiden voor de ontwikkeling van een professionele identiteit**

**Thesis**

to obtain the degree of Doctor from the

Erasmus University Rotterdam

by command of the

rector magnificus

Prof. Dr. H.A.P. Pols

and in accordance with the decision of the Doctorate Board

The public defence shall be held on

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By

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I started the journey with the interest to understand more about learning, to figure out what the data, theory and experiences (both my own and others) could explain. I hope that this effort will also benefit others.

Chin Pei, Tan, 10 September 2014.



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# Chapter 1: An Introduction to Professional Identity Development

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In preparing students for their role in their respective communities, vocational and professional education should provide for learning experiences that acculturate them to become the new and bona fide practitioners. In addition to acquiring pre-requisite knowledge and skills, the graduates need to have adequately integrated their learning and internalized the values and norms of practice to think, speak and act like the professionals (Buyx, Maxwell, & Schone-Seifert, 2008; Cooke, Irby, & O'Brien, 2010; Dall'Alba, 2009; Monrouxe, 2010; Sheppard, Macatangay, Colby, & Sullivan, 2009; Sullivan, Colby, Wegner, Bond, & Shulman, 2007).

For the transformation to take place more successfully, students have to be supported to understand their developing identities: in making sense of their experiences to relate to who they are, and who they might become as the professionals (Monrouxe, 2010). When explicit support for the development of their professional identity is not designed or provided for, students may inadvertently be influenced by the informal or hidden curriculum that can run counter to the desired outcomes of professional education (Haidet & Stein, 2006; Lempp & Seale, 2004; Monrouxe, 2010). The informal or hidden curriculum refer to the “influences that are implicit rules to survive at an institution such as customs, rituals and taken for granted aspects” (Lempp & Seale, 2004, p. 770).

To address the professional identity development of students in vocational or professional education, these fundamental questions need to be considered: What is professional identity? What factors contribute to its development? How can the students be supported in the development of their professional identity? The aim of this chapter is to give an overview of what the literature has to say about these. This chapter will also include a description and explanation about the significance of the educational context of the four research studies in this thesis, and the research questions these studies have been executed to answer.

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## What is Professional Identity?

Identity exists in the context of a social and cultural role. Each one of us takes on more than one identity and role in our lifetime – for example as a son, parent, spouse, member of a sports team or as a professional. As for the role of a professional, it is clear that the identity of a teacher differs from the role of a physician. Also, the identities of white collar workers differ from the identities of blue collar workers. A social-cultural identity is formed as a result of a trace of past interactions with the people, language, artifacts or elements associated with a particular social culture. The interactions may be in the form of discourses and practices. The external references, regulations and values of social groups, or formalized ways of carrying out work are internalized and become personally accepted (Holland, 1998; Monrouxe, 2010). The formed identity of a professional, that is shared by others in the same role, in turn becomes the basis for his or her future interactions: a dynamic existence that urges negotiation of meaning (Wenger, 1998) and provides for continual development (Holland, 1998) and transformation (Monrouxe, 2010). Wenger (1998) described succinctly that “the experience of identity in practice is a way of being in the world” (p. 151), and being acknowledged for that role.

With more rapid creation and development of knowledge in the globalized world, specialized knowledge is no longer in the domains of very few established professions such as physicians, lawyers and engineers. Post-secondary and higher education now have a wider range of certificate, diploma and degree programmes to cater to the preparation of personnel in professions for emerging and growing industries such as gaming, finance, banking, healthcare and aerospace. Related to such developments are increasing numbers of professionals who are obliged legally, or by the governing authorities, to provide a reasonable standard of service to their clients. This is because the clients are not likely to have the knowledge or information to evaluate their services, and thus need to be protected from “incompetence, carelessness and exploitation” (Eraut, 1994, p. 2). Services and products being introduced to the public include healthcare packages, insurance and financial products that are increasingly complex and not easily understood. These changes in society require the need for paying greater attention to the role of vocational and professional education in preparing students to perform competently and responsibly in

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professions of all types, extending beyond the established professions (Dall'Alba, 2009; Eraut, 1994a). The development of a professional identity that is aligned with the desired attributes of the professional-in-practice has to become a priority.

Professional identity is thus the self that has been developed with the commitment to perform competently and legitimately in the context of the profession, and its development can continue over the course of the individual's career. The completion of the formal professional education is typically required by the governing authorities to fulfill part or all the entry pre-requisites to become the new practitioner. Through the learning process in formal education, there should be a change in the "way one presents oneself to others and to oneself" (Ten Dam & Blom, 2006, p. 651). The professional identity developed from formal education orientates the self in profession related matters, and influences the learning, interactions and decisions made in the professional practice contexts (Bhattacharyya, 2008; Hunter, Laursen, & Seymour, 2007; Monrouxe, 2010). Part of the professional identity is also about taking responsibility for actions and decisions made in the professional context (Ten Dam & Blom, 2006). In practice, the developed self and identity becomes the driving force for the learning and application of knowledge and skills relevant to achieving effective outcomes in the professional context. It influences the following: (a) interpreting situations, (b) identifying relevant information that has to be gathered, (c) deciding the best approach to address the issues, and (d) implementing the solution.

### **Educational Context of the Research Studies**

All the research studies were carried out at the Republic Polytechnic (RP) in Singapore where, as of 2012, a student population of about 14,000 students was being prepared for a wide range of professions in 39 diplomas, and in across six schools and a centre (i.e. School of Engineering, School of Applied Science, School of Health, Sports and Leisure, School of Hospitality, School of Info-communications Technology, School of Technology for the Arts, Centre for Enterprise and Communication). Every year, students compete for places at the five polytechnics in Singapore and for particular diploma programmes. It is common for students to proceed with the assigned polytechnic and

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diploma programme to complete their diploma education despite not getting their first choice. This research site thus provides a fairly rich base for understanding the professional identity development of students with different levels of motivations and across different types of professions.

RP leverages on problem-based learning (PBL) to prepare their students for professional practice in knowledge-driven and dynamic work environments (Yew & O'Grady, 2012). PBL is a pedagogical strategy for socializing students for professional practice in such environments. The following section presents an overview of PBL, its relevance to professional education and professional identity development, and how it has been implemented at the polytechnic.

### **Problem-based Learning (PBL)**

PBL was first introduced in medical education at McMaster University in Hamilton, Canada to better equip students for their transition from the pre-clinical to clinical phases of their education, and in so doing prepare them more effectively for professional practice (Barrows & Tamblyn, 1980; Boud & Feletti, 1998). PBL has since been introduced to medical education in other universities such as Maastricht University in the Netherlands, University of Manchester in the United Kingdom and Queensland University in Australia, and other areas of professional education such as business administration, chemical engineering, engineering studies, law schools, leadership education, nursing, social work and teacher education (Hung, Jonassen, & Liu, 2008).

Why is PBL used for professional education? The aim of the approach is to facilitate students to learn in ways that mirror professional practice (Barrows & Tamblyn, 1980). In PBL, the feature is the use of problem triggers placed in a context e.g. medical phenomena and professional practice situations. Small groups of students work on the problem together: they analyse the problem, identify learning issues that are helpful for developing an adequate explanation for the phenomenon, follow up to research and prepare their explanations. When required, they would also determine the course of treatment, action or solution that best addresses the phenomenon. So instead of the conventional method of learning the theory followed by solving a given problem, students are first

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presented the problem to be “diagnosed” and then solved. Content is thereby learnt in a situated manner.

The role of the tutor is to provide guidance for the students’ learning process of constructing and acquiring knowledge: the activation of prior knowledge, search and processing of relevant information, thinking and reasoning the best response to the given problem (Hmelo-Silver, 2004; Norman & Schmidt, 1992). PBL tutors scaffold the learning using both hard and soft scaffolds (Choo, Rotgans, Yew, & Schmidt, 2011). Hard scaffolds are material supports such as worksheets that are made available for the students to use. Soft scaffolds are provided by the tutor based on their observations of learner needs, such as asking questions to prompt thinking and managing team dynamics to promote more productive learning (Saye & Brush, 2002). Tutors who demonstrate, guide and provide explicit feedback have been found to be influential in medical and healthcare students’ clinical reasoning (Ajjawi & Higgs, 2008; Beckett & Gough, 2004; Diemers, Dolmans, Verwijnen, Heineman, & Scherpbier, 2008).

The “reversed” learning approach in PBL and the facilitative style of teaching allows students to acquire practical reasoning skills, such as clinical reasoning; the exposure to a number of the professional practice contexts in the problems enable students to transfer their learning with greater ease (Schmidt, 1983; Barrows & Tamblyn, 1980). Through actively engaging with, exploring and understanding the various aspects of professional practice in the regular encounters with problems, students are also expected to develop a more realistic sense of what it means to be the professional. These characteristics of PBL are all helpful for preparing students for work.

PBL also promotes flexible thinking and lifelong learning, which are useful and increasingly necessary abilities in dynamic work environments. Compared to the traditional lecture-tutorial approach, in PBL, students take greater ownership and responsibility for their learning to actively work on the problems, and learn relevant knowledge (Hmelo-Silver, 2004; Schmidt, Loyens, Van Gog, & Paas, 2007). Students are also given time for self-directed learning. As such, when they become more

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adept at the PBL process and the use of learning strategies, they are expected to be more ready to learn at the workplace.

Schmidt et al (2009) identified three main types of PBL implemented in the world, each with a different intent and emphasis for the use of PBL. Type 1 refers to the use of PBL to help students acquire content in a more relevant and meaningful manner. Type 2 describes the use of PBL to enable students to learn practical reasoning and problem solving skills. Type 3 is the category of PBL implemented for helping students to develop the capacity for self-directed learning. PBL when implemented in a comprehensive manner is inclusive of all “three types”. They suggested that the mixed findings of the effectiveness of PBL in education could be a result of the implementation of different PBL types.

In an attempt to address the mixed findings on the effectiveness of PBL in education, particularly in medical education, Schmidt et al (2009) carried out a meta-analytic study involving one single medical school in the Netherlands, where 270 comparisons could be made between the school’s implementation of a PBL curriculum and seven other Dutch medical schools. It was found that the students from the PBL medical curriculum in Maastricht University performed much better, in terms of interpersonal skills and practical medical skills, than those in the seven other Dutch medical schools that did not implement PBL. The mean high school national examination grade point average for all the eight medical schools between 1989 and 1997 were about the same, meaning that the students were on par in terms of academic ability when they entered medical school. At the medical school in Maastricht University, the dropout rate was found to be lower, and students took less time to graduate. The Maastricht medical students’ perception of the quality of curriculum was also consistently measured to be higher than those in other forms of curricula. In terms of medical knowledge and diagnostic reasoning PBL appears to be as effective as other forms of curricula in helping students to learn; the effect sizes of the differences were positive but small.

**Professional Identity Development through PBL.** As a pedagogical approach for socializing students for professional practice, PBL is expected to have an influence on students’ understanding of what it means to work in their chosen profession, and thereby contribute to



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students' professional identity development. Empirical studies have linked PBL with increased self-efficacy in the role of the profession (Dunlap, 2005); increased knowledge about the professional practice such as norms, role obligations and responsibilities of specific roles in the professional team (Jones, Peiffer, Lambros, & Eldridge, 2010); and positive change in attitude and behavior (Elcin et al., 2006). There have also been studies about how PBL can be improved or be part of internships, in order to help students learn professionalism that contributes to their professional identity development. Examples are: (1) the use of formal wiki space for collaborative learning (Varga-Atkins, Dangerfield, & Brigden, 2010); and (2) the use of PBL to support learning in clinical education (Tim Dornan, Boshuizen, King, & Scherpbier, 2007) and student teacher internships (Mulcahy, 2006).

**PBL Implemented at the RP in Singapore.** The baseline pedagogy at the polytechnic is PBL. The PBL structure implemented at the research site is a one day, one problem approach, which aims to be inclusive of all three types of PBL as classified by Schmidt et al (2009). Students actively engage in gaining knowledge and skills through collaboratively solving a problem within the course of a day (Yew & O'Grady, 2012). Each class consists of twenty-five students. The lessons for each module take place once a week over a fifteen-week semester. Both formative and summative assessments for the learning process (problem solving approach and skills, self-directedness in learning) and acquisition of knowledge are in place at the polytechnic to provide adequate feedback for student learning. The main exceptions to the use of the PBL approach at the polytechnic are practical skills modules which require the demonstration and safe use of equipment (e.g. use of lighting equipment in theatre management), and practicum modules where students learn in a simulated work environment that serves real clients (e.g. the restaurant service and culinary skills module for students preparing for the hospitality industry).

### **Factors Contributing to Professional Identity Formation**

We have defined the concept of professional identity as the self that has been developed with the commitment to perform competently and legitimately in the context of the profession. Its development can continue

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over the course of the individual's career. In the literature we found five key dimensions that contribute to the formation and development of a professional identity. These dimensions are 1) *knowledge about professional practices*, 2) *having the professional as a role model*, 3) *experience with the profession*, 4) *professional self-efficacy*, and 5) *preference for a particular profession*.

The first dimension, *knowledge about professional practices*, anchors the knowledge in terms of the professional contexts and central aspects or tasks of the profession. These are important for students' introduction and initiation into the profession. The knowledge of the discipline that the students gain, and the technical terms they learn to use, provide a start for them to begin identifying with and be identified with the community of practitioners (Beagan, 2001). However, to prepare for the professional practice, the students need to not only acquire (1) domain knowledge, but also to (2) understand and adequately internalize values and the norms of practice, the rules and regulations determined by the relevant professional bodies and government licensing authority, (3) achieve a reasonable idea of the roles they would be expected to perform, the responsibilities they would have to bear and the outcomes they would be accountable for (Buyx, et al., 2008; Cooke, et al., 2010; Dall'Alba, 2009; Monrouxe, 2010; Sheppard, et al., 2009; Sullivan, et al., 2007). These will enable them to make reasonable judgments about the appropriateness of decisions and actions in the professional role.

The second dimension, *having the professional as a role model*, refers to students having access to professionals as role models to look up to, and learn from. Students can observe from their role models: (1) ways to approach, reason and deal with profession-related issues; (2) understand what it means to act professionally, and (3) to behave and dress appropriately for the role (Ajjawi & Higgs, 2008; Beckett & Gough, 2004; Timmerman, 2009). The feedback and critique from the role models in their interactions help to shape their thinking and reasoning (Ajjawi & Higgs, 2008; Beckett & Gough, 2004). These provide students with concrete and experiential ways of bridging the learning in the classrooms and real world practice (Goldie, Dowie, Cotton, & Morrison, 2007; Ottewill, 2002). Further, having more than one role model makes room for students to explore provisional selves, as they make choices about the kind of professional they want to become (Ibarra, 1999). Learning from role

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models is not a passive process, but an active one where students are engaged in learning to think, reason and act like the professional.

The third dimension is *experience with the profession*. Experience is defined as authentic contact with clients in a professional context that enables students to learn about the professional practice and the role of the professional (Dornan & Bundy, 2004). Experiences in the field contribute to students' understanding of what it means to act as a professional-in-practice (Lave & Wenger, 1991). These experiences are useful as they provide opportunities for students to reconcile what they have learnt in the classroom. They can also use their learning strategies to organize their knowledge for practice (Beckett & Gough, 2004; Prince, Boshuizen, Van der Vleuten, & Scherpbier, 2005), and pick up the necessary skills for organizing and prioritizing assignments and tasks at the workplace (Fitzpatrick, While, & Roberts, 1996).

Three types of scenarios are common in education to involve students in professional work experiences. In the first scenario, apprenticeship is a necessary part of the requirement to qualify for practice, a classic example being medical education. In the second scenario, students work part-time in the field, are members of a profession-related interest group or are student members at a professional association. The third scenario involves educational institutions that have chosen to include internship, industry engaged projects, community service projects or early work experiences as an integral component of their curriculum to expose their students to real world experiences (Diemers, Dolmans, Verwijnen, Heineman, & Scherpbier, 2008; Hunter, Laursen, & Seymour, 2006; Sullivan, et al., 2007). With adequate support, such as guidance for reflecting on their experiences, students would gain more from the learning opportunities that present themselves at the workplace (Beckett & Gough, 2004; Goldie, et al., 2007).

Given that students have not graduated and are probably not yet accepted as "full participants" or full members in the profession, they also will not have experienced the responsibility and accountability of the professional role (Lave & Wenger, 1991). Hence, to describe their involvement in the particular profession, the factor *experience with the profession* would be more appropriate than *experience in the profession*.

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The fourth dimension is *professional self-efficacy*. Perceived self-efficacy is “concerned with judgments of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122). Self-efficacy research in education has shown that such personal beliefs influence students’ decisions to put in effort to successfully complete their tasks (Bandura & Schunk, 1981; Zimmerman & Kitsantas, 1999; Zimmerman & Ringle, 1981). Students with higher self-efficacy also show more perseverance to fulfill their tasks.

The fifth dimension is *preference for a particular profession*. Studies in motivation have shown that when students personally identify with the importance of their learning — and hence experience greater autonomy in their learning — they are more likely to work hard, enjoy school, and cope with failures (Ryan & Connell, 1989; Ryan & Deci, 2003). Besides the United States, similar results have been found in studies involving students from the People’s Republic of China and Korea, suggesting that these observations are not culturally biased (Jang, Reeve, Ryan, & Kim, 2009; Vansteenkiste, Zhou, Lens, & Soenens, 2005). Having a strong *preference for a particular profession* (“I would really like to become an engineer”) would thus be expected to facilitate the focus and commitment in learning, and as a result contribute to the development of their respective professional identities. Professional identity development is part of what Berger and Luckmann (1966) described as secondary socialization and is contingent on the primary self that has been formed during upbringing and education. The level of compatibility or contradiction between the primary and secondary self, or the relevance of the secondary to the primary self, influences the assimilation and integration of the secondary self (Berger & Luckmann, 1966).

In summary, the five key dimensions described above are expected to contribute to the professional identity development of students over the course of their vocational and professional education. There are currently no existing scales that measure all five dimensions.

### **The Role of Vocational and Professional Education in Supporting Students’ Professional Identity Development**

This section will provide an overview of the perspectives in the professional education literature about higher education’s function in

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preparing students for their future professions. In particular, how students can be supported in the formation and development of their professional identity over the course of their profession education.

### **Function of Vocational and Professional Education**

**Lave & Wenger's concept of legitimate peripheral participation for vocational or professional learning.** Lave and Wenger (1991) propose that learning to become a practitioner should include the characteristics of the future practice, and not focus merely on the epistemological component or the gaining of knowledge and technical competence. They describe as legitimate peripheral participation learning that is “located in the social world” (Lave & Wenger, 1991, p. 36) and where learners have “access to resources for understanding through growing involvement” (Lave & Wenger, 1991, p. 37) in the social world. Learning is to take place in the context of the profession and practice. The accumulated learning experiences will enable the learner to increasingly identify with, and be identified with the practitioners. The identity formed will, however, consist of both shared and individual characteristics (Wenger, 1998) as the learning has to also be reconciled with the primary self. Lave and Wenger refer to professional identity as *identity in practice*.

**Dall'Alba's longitudinal study of medical students in Sweden.** Dall'Alba's research examined the students' development of *professional ways of being* over the course of their medical education. In particular, the differences in approach the students' took when they were in the role of the student doctor, and what had led to the differences.

In Sweden, Dall'Alba carried out a longitudinal study with 13 medical students at the Karolinska Institute (Dall'Alba, 2009; G. Dall'Alba, 2002; Gloria Dall'Alba, 2004). The medical programme at Karolinska Institute was based on the normative or conventional curriculum design and pedagogy, where the focus was on the “acquisition of biomedical knowledge and skills primarily through lectures, laboratory work, practical skills classes, clinical seminars and observations and involvement in clinical practice” (Dall'Alba, 2009, p. 94). She interviewed them at the end of each of the semester in the clinical component of the medical programme (semesters 6 – 11 or a total of six times), and also

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observed them providing patient consultations and interacting with health professionals. The data collected were related to students' "engagement in, and observations of medical practice", and were analysed for the students' development trajectories (Dall'Alba, 2009, p. 113).

The way the students fulfilled the role of the physician was found to be different (Dall'Alba, 2009). For the most part, the students seemed to be learning the "routines and traditions of practice", but they were also found to be critically reflecting on the practice of medicine (Dall'Alba, 2009, p. 95). The students took one of two approaches. They would "adopt a more biomedical approach in learning to practice medicine" (Dall'Alba, 2009, p. 95) which focused on medical history taking, physical examination, the disease and treatment. Or, they would take into account broader perspectives such as the patients' life world when they assessed symptoms and propose treatments; and in this second approach they were definitely more supportive in the way they interacted with the patients (Dall'Alba, 2009). The second approach also allowed for efforts to collaborate with patients on the healthcare which could have implications on the patients' compliance to the prescribed treatment, subsequent visits and seeking of alternative treatments.

Dall'Alba found that the students' development was influenced by their understanding of medical practice at the start of their medical education (Dall'Alba, 2009; G. Dall'Alba, 2002; Gloria Dall'Alba, 2004), and impacted by their experiences with the "web of interrelationships that included the healthcare system, its procedures and functions"(Dall'Alba, 2009, p. 115) over the course of their medical education.

The implication of the findings for education was the need to provide the necessary support for students to integrate their knowledge with medical practice so that they were able to develop attitudes and behaviors that were aligned with the planned outcomes of medical education (Dall'Alba, 2009; G. Dall'Alba, 2002; Gloria Dall'Alba, 2004; Dall'Alba & Barnacle, 2007).

**An international research project on the relationship between learning and work.** In an international research project involving 500 students from Australia, Sweden, Norway, Poland and Germany, the researchers studied the relationship between students' and recent

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graduates' conceptions of learning and work (Dahlgren, Reid, Dahlgren, & Petocz, 2008). The purpose of the project was to understand how higher education could (1) bridge students' academic learning with their professional work, and (2) contribute to the development, articulation and implementation of existing qualifications frameworks in Europe and Australia. The development of a shared framework would enable greater employability for the graduate students in these countries. The scope of the study included both specific disciplines and professions, and examples were political science, statistics, music, design, psychology, engineering, and law.

From the project, a few studies were published with most focusing on different professions and disciplines (Johansson, af Segerstad, Hult, Dahlgren, & Dahlgren, 2008; Nyström, Dahlgren, & Dahlgren, 2008; Reid, Nagarajan, & Dortins, 2006; Reid & Petocz, 2002), and one study that provided an integrated view of the project (Reid, Dahlgren, Petocz, & Dahlgren, 2008). All studies involved semi-structured interviews: some were longitudinal with the same students interviewed before they graduated and again after they had started work, and others were cross-sectional with junior and senior students interviewed. No quantitative data were collected.

In the integrated study, Reid, et al., (2008) concluded that for higher education to be of quality and have utility value, teaching and curriculum development needed to contribute to the students' *professional formation*. Professional formation is the development of their professional identity and work readiness, which are "influenced by the ways that the sense of profession was communicated and articulated to students through the design and pedagogy of the educational programme" (p. 734). Given that the formal education is the main gateway to students' initial experiences with the work of the profession, there is a need to expose students to "different content in professional contexts, and supported by role modelling by professionals who are willing to participate in the learning environment" (p. 740).

There are two schemas suggested for integrating teaching and curriculum development with professional learning. The first schema recognizes that the design of teaching and curriculum includes three

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components: (1) decontextualized knowledge and skills, (2) content specific and contextually situated knowledge and skills, and (3) generic skills that are transferable across contexts. Each educational programme consists of different proportions of each component, but it should ideally contain less of the first and more of the latter two components.

The second schema is based on Reid and colleagues' studies in music, law and mathematics education (Reid, et al., 2008). It consists of hierarchical stages of development in students' conceptions of professional learning. They are (1) *Extrinsic Technical*, (2) *Extrinsic Meaning*, and (3) *Intrinsic Meaning*. Extrinsic Technical refers to the conception that professional learning consists of the accumulation of knowledge and skills utilised in work contexts. Extrinsic Meaning refers to the development of an understanding, and hence meaningful use of the resources in the profession. The Intrinsic Meaning conception of professional learning is about how it contributes to who they are becoming, and the transformation in the way they conduct themselves and engage with the world as the new practitioner. Dahlgren et al., (2008) propose that such transformations in the second schema requires education to make "more explicit the reasons for studying particular technical components, their role in the range of professional skills that were required, and the broader applicability of such skills in a professional and even personal context" (p. 145).

**Carnegie Foundation for Advanced Teaching studies on Educating Physicians, Lawyers, Nurses and Engineers.** The Carnegie Foundation for Advanced Teaching in the United States carried out a series of comparative studies on five professions: legal, clergy, engineering, nursing and medicine. The researchers conducted site visits to the sampled cross-sectional selection of institutions in the United States and Canada. These institutions were diverse in terms of geographical locations, size, institutional mission, funding status (public or private), types of pathways (in particular for nursing, e.g. baccalaureate, associate degrees, master' entry programmes), and institutional types [in particular medical education, e.g. "research intensive and community based medical schools, academic medical centers and non-university teaching hospitals", (Sullivan et al, 2007, p. 4)] (Sullivan et al., 2007; Sheppard et al., 2009; Benner et al., 2010; Cooke et al., 2010). The project resulted in the publication of books on each profession in the period, 2007 to 2010. The



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purpose of the large scale project was to study best practices, determine the direction for higher education's preparation of students for professional practice and identify the gaps that needed to be bridged. The project involved core groups at each institution, namely the administrators, faculty and students. The research method included interviews, class observations, conducting of national surveys, and studying of reports produced by the authorities in the professions e.g. the National Academy of Engineers.

Carnegie Foundation for Advanced Teaching recognized that professional education had a key role in transforming the students to become ready for professional practice. The main finding from the project that was common for all the studied professions was the need to address the *professional formation* of students throughout their education. This required no less than a reform of the curriculum to support students in making sense of the learning for practice, and experience the synthesis of the intellectual, technical, moral and ethical aspects of professional service and responsibility (Sheppard et al., 2009; Cooke et al., 2010). To experience the complexities of real world practice, a curriculum such as in law education, has to be designed to include social and ethical considerations (Sullivan et al., 2007) and not merely rely on structured case studies stripped of real life issues. Technical knowledge and skills, such as in engineering education, have to be learnt with reflections on the implications of their application in society. This enables students to understand their roles, responsibilities and accountability of their respective professions. Ideally the knowledge about their profession would contribute to their commitment to life-long learning and achieving good standards of practice (Sheppard et al., 2009).

In summary, the curriculum should be coordinated to support the development of habits of mind and practice that meet the expectations of the profession and the society (Sheppard et al., 2009; Cooke et al., 2010).

**Re-conceptualization of epistemology in higher education to take into account the learner's role in the meaning-making process.** Dall'Alba and Barnacle (2007), and Barnett and Coate (2005) argued for an *ontological turn* in education to support students in constructing, interpreting and using their knowledge reflexively. For example, to help

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students develop their approaches to resolve an issue, compare different approaches and understand the implications of their decisions. Authentic contact with patients or clients and feedback from seniors and mentors can further contribute to develop the healthcare professional's commitment and care for the achievement of patient or client outcomes (Dall'Alba & Barnacle, 2007).

### **Professional Identity Formation and Development as an Outcome of Vocational and Professional Education**

Various perspectives have thus emphasized how vocational and professional education can support students' professional identity formation and development: (1) by enabling students' active engagement with the resources of professional practice through participation in aspects of the practice (Lave & Wenger, 1991) e.g. practicum, apprenticeship and internship; (2) being aware of how students' understanding of professional practice has an influence on their learning (Dall'Alba, 2002; Dall'Alba, 2009; Reid, et al., 2008); (3) ensuring students know the relevance of their learning in the professional context (Reid, et al., 2008; Dall'Alba & Barnacle, 2007; Barnett & Coate, 2005); and (4) supporting students in their synthesis of the intellectual, technical, moral and ethical aspects of professional practice to apply to complex real world scenarios (Cooke, et al., 2010; Sheppard, et al., 2009; Sullivan, et al., 2007).

How do these efforts transform the students from lay persons to new practitioners? In this chapter, we have mentioned five key dimensions identified from the literature, that contribute to students' formation and development of professional identity: (1) *knowledge about professional practices*, (2) *having the professional as a role model*, (3) *experience with the profession*, (4) *professional self-efficacy*, and (5) *preference for a particular profession*. The first three dimensions refer to the gaining of knowledge about professional practices, the active modelling on the role of the professional, and having authentic experiences with the profession. They clearly map with our findings from the literature on how the professional education can support student learning for developing professional identity. In addition, the strength of students' professional identity is determined by two other facets, professional self-efficacy and preference for a particular profession. All five facets have, however, not been empirically validated as a construct.

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The use of a validated measure and construct will pave the way for developing generalizable ideas about professional identity formation and development. Not only can a measure be used for tracking the development of large groups of students' at the programme, cohort or institutional level, it can also facilitate the comparison of pedagogical approaches for their role in the development of students' professional identity. The construct can act as a guiding frame of reference for the design of professional education programmes. The construct can also provide a lens for gaining insights from qualitative data about (a) students' perspectives of how they have experienced learning to become a professional, (b) educators' perspective for how students can be effectively prepared for professional practice, and (c) changes observed in students as a result of their learning experiences.

There is no existing measure based on these five dimensions of professional identity development. The available measures will be described in the following section.

### **Professional Identity Measures and Constructs**

We found five instruments that are intended to measure the construct of professional identity in the literature. Overall, they are limited in the number of factors and/or limited in the types of professions within which they can be used for studying professional identity formation and development of students in vocational and professional education. They are: (1) the Professional Identity Scale (PIS) (Adams, Hean, Sturgis, & Clark, 2006), (2) the Professional Self Identity Questionnaire (PSIQ) (Crossley & Vivekananda-Schmidt, 2009), (3) the Teacher Professional Identity Scale (TPIS) (Cheung, 2008), (4) the Professional Socialisation Scale (PSS) (Du Toit, 1995), and (5) the Professional Role Orientation Inventory (PROI) (Bebeau & Monson, 2012).

Adams, et al.'s (2006) PIS has been created for the purpose of identifying if, and how, the strength of professional identity influences learning in social and healthcare education. It consists of one factor, with the items adapted from Brown's group identification scale (Brown, Condor, Mathews, Wade, & Williams, 1986). The PIS consists of nine items, like: "Being a member of this profession is important to me", "I feel

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I share characteristics with other members of the profession” and “I find myself making excuses for belonging to this profession”. These have been designed to measure how well the students regard the profession, and how much they want to be associated with that profession. The scale does not address the developmental aspects of students learning to become a new practitioner in their respective professional communities.

In their study, Adams et al., (2006) reported that students in their study started their professional education with a relatively strong professional identity, with physiotherapy students having the strongest identity and social work students having the weakest professional identity. They indicated that further studies were required to find out if there was indeed a relationship between the strength of professional identity and the impact of professional learning on students’ beliefs and attitudes.

The PSIQ of Crossley and Vivakenanda-Schmidt (2009) consists of nine items and has also been developed for social and healthcare education. The scale is designed on the basis of activities connected to professional identity. An exploratory factor analysis shows that the scale consists of three factors: (1) professional specific tasks (conducting assessments, the use of records, confidence in dealing with emergencies and teaching about the profession); an example of an item is: “When I find myself in an emergency involving a patient or client I feel like a 1st day student doctor”; (2) generic attributes (cultural awareness, ethical awareness and reflection); an example of a survey item is: “When engaging with others in a culturally diverse health care environment I feel like a 1st day student doctor”; and (3) interpersonal tasks (teamwork and communication); an example of a survey item is: “When I am communicating with patients or clients I feel like a 1st day student doctor”. Crossley and Vivakenanda-Schmidt (2009) have tested the measure with medical students and indicated plans for extending the study to include other social and healthcare students. They have also planned to carry out a longitudinal study to find out the kinds of curricular and extra-curricular experiences that would have an impact on their students’ professional identity development. The usefulness of the scale in its current form is, however, limited to social and healthcare education. To extend to other types of professional education, the items need to be adapted, and the instrument to be validated again.

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The third measure, the TPIS, addresses only the different dimensions of the teaching practice and thus cannot be more widely applied in vocational and professional education (Cheung, 2008). The items are categorized in terms of teaching and learning, student development, school development, professional relationships and services, and personal growth and development. They are based on the Teacher Competencies Framework and the Continuing Professional Development of Teachers published by the Hong Kong Education and Manpower Bureau.

The fourth measure, the PSS, was developed for nursing education by Du Toit (1995). Its intention is to measure professional identity development as indicated by the degree of professional socialization. The scale consists of 23 items and these can be categorized into two dimensions, namely of (1) professional values, and (2) personality, that form the qualities of the “ideal nurse”. Examples of the items in the first dimension are: “To what extent do you view your client as your first consideration?”, and “How strongly do you identify with the nursing culture?”. Examples of the items in the second dimension are: “To what extent do you regard yourself as thorough?”, and “To what extent do you regard yourself as emotionally mature?” Similar to the second measure by Crossley and Vivakenanda-Schmidt (2009), the items have to be adapted for other types of professions.

The fifth measure, the PROI, was originally designed and validated by Bebeau, Born and Ozar in 1993 to assess the dentist’s perception of his or her role (Bebeau & Monson, 2012). The four factors in this Inventory are: Agency, Autonomy, Authority and Responsibility. Examples of items for the factor Agency are, “I feel free to practice my profession in my own style and according to my own preferences” and “Basically, in my practice I answer to no one other than myself.” Examples of items for the factor Autonomy are, “Regulations concerning use of support personnel are so restrictive they interfere with my ability to provide efficient care”, and “Insurance companies have too much influence over the way I practice physical therapy.” Examples of items for the factor Authority are, “My profession should be the sole custodian of its skills, knowledge, and practices” and “I believe third-party administrators should have no role in reviewing physical therapists’ treatment plans.”

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Finally, examples of items for the factor Responsibility are, “I believe the physical therapy profession should be more involved in providing physical therapy services for all those who need it”, and “A PT (Physical Therapist) who becomes aware of a patient’s positive HIV status should share that information with his/her staff, even if the patient objects.”

A variant created for the physical therapy profession, PROI-PT, has also been validated; however, the psychometric properties could be improved (Swisher, Beckstead, & Bebeau, 2004). From the confirmatory factor analysis of the PROI-PT, the best model fit excluded eight items from the original set, and with some of the remaining items shifted from the original dimension to another, e.g. from Authority to Responsibility. Even then, for the best model fit, the reliability as measured by Cronbach Alpha was not sufficient, with only one factor at .70 and the other three factors ranging from .50 to .64. The correlation between two factors Agency and Autonomy was also very high at .98.

Overall, the PROI is not an ideal instrument for our use. The PROI has to be adapted for each type of profession, and there is a need to validate each variant. Besides the psychometric properties to be improved, the basis of the PROI is not aligned with our five dimensions. The PROI serves the purpose of understanding professional identity development through the individual’s view of his or her role and responsibilities in terms of the four factors Autonomy, Authority, Agency and Responsibility. The factors are the basis of professionalized work and hence the scale items are dependent on how established and regulated the profession is.

In summary, we found the five existing professional identity scales to be limited for measuring students’ professional identity development. Not only did the existing scales focus on just a few professions, they were either not developmental in approach (Adams, et al., 2006; Swisher, et al., 2004), activity driven (Crossley & Vivekananda-Schmidt, 2009) or limited in dimensions (Du Toit, 1995). In addition, except for the PROI, the other four measures have only been analyzed using exploratory factor analyses and least squares regression analysis, and they have not been validated using structural equation modelling, a theory-driven approach that can test the stability of the factor structure.

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There is, therefore, a need for a new and more comprehensive instrument - comprehensive both in terms of the professions covered and the factors in professional education that address the developmental needs of students' professional identity. An instrument, in addition, that would be subjected to confirmatory factor analysis using structural equation modelling.

### **Research Questions**

An important way of considering the outcome of professional education is how students are transformed by their educational experiences to be ready to join their profession. Students need to make sense of the learning to develop a perspective different from the lay person, acquire knowledge and skills in using the resources in professional practice, and be able to conduct him or herself appropriately. This transformation produces a professional identity with which the students interacts with others in the role of the student professional and when they graduate, the new practitioner. In essence, professional identity is the self that has been developed with the commitment to perform competently and legitimately in the context of the profession, and its development can continue over the course of the individual's career.

The literature on professional identity development does not yet have an adequate professional identity measure that can be used for all types of professions, that is developmental in nature, and that can be widely used in professional education research. A more comprehensive measure and construct would be useful for understanding the complex development of professional identity, act as a guiding frame of reference for the design of professional education programmes, and facilitate the comparison of pedagogical approaches. There is thus a need to create a new professional identity development construct to enhance understanding of how professional education shapes students' professional identities.

Therefore, this thesis aims to:

- identify the key factors of professional identity development through the design of a statistically validated construct and

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instrument supported by the current research literature (Chapter 2);

- use the newly created instrument to understand the professional identity development of students being prepared for a wide range of professions (Chapter 3);
- gain insight from the students' perspective into the significant influences on professional identity development (Chapter 4); and
- gain insight from the educator-practitioners' perspective into approaches for helping students to develop their professional identity (Chapter 5). Educator-practitioners are academic staff who have practiced in the profession they are preparing students for.

This thesis will conclude with a summary of all the findings from the four studies (Chapter 2 to 5) and a discussion of their significance in Chapter 6.



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## Chapter 2: A Measure of Professional Identity Development<sup>1</sup>

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### Abstract

Two studies were carried out to create, and develop a scale to measure the professional identity development in students being prepared to become new practitioners. The items were designed on the basis of five factors, termed Knowledge about Professional Practices, Having the Professional as a Role Model, Experience with the Profession, Preference for a Particular Profession and Professional Self-efficacy. Using this survey instrument (named the Professional Identity Five Factor Scale (PIFFS)), data were collected from a polytechnic that prepares students in a wide range of professions. The construct was found valid using confirmatory factor analysis, and reliable based on the coefficient H indicator. It was also stable across independent samples from the same student population. To further validate the five factors in the construct, the sample was divided into two groups (high and low scores) based on the overall Professional Identity score. If each factor were to contribute to the strength of professional identity, there should be significant differences found in all five factors. In the first study, there were none found between the groups. The improved survey instrument in the second study had the stronger

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Professional Identity group scoring significantly higher than the other group in all five factors.

*Keywords:* professional identity scale, construct validity, construct reliability, professional education

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## **A Measure of Professional Identity Development for Professional Education**

Formal education that aims to help graduates qualify for, and enter into, specific careers must be effective in socializing them to develop their professional identity. In addition to acquiring pre-requisite knowledge and skills, the graduates need to have adequately integrated their learning and internalized the values and norms of practice (Buyx, et al., 2008; Monrouxe, 2010). Ideally, they no longer experience the profession as outsiders, or as lay persons, but frame their worldview and make decisions based on the technical conceptions, procedural knowledge, and sensibilities of professional practice (Day, Field, Campbell, & Reutter, 1995).

With more rapid creation and development of knowledge in the globalized world, specialized knowledge is no longer in the domains of very few established professions such as physicians, lawyers and engineers. Post-secondary and higher education now have a wider range of certificate, diploma and degree programmes to cater to the preparation of personnel in professions for emerging and growing industries such as gaming, finance, banking, healthcare and aerospace. In lieu of such developments, there are increasing numbers of professionals who are obliged legally, or by the governing authorities to provide a reasonable standard of service to their clients. This is because the clients are not likely to have the knowledge or information to evaluate their services, and thus need to be protected from “incompetence, carelessness and exploitation” (Eraut, 1994, p. 2). Services and products being introduced to the public include healthcare packages, insurance and financial products that are increasingly complex and not easily understood. These changes in society require the need for paying greater attention to the role of vocational and professional education in preparing students to perform competently and responsibly in professions of all types, extending beyond the established professions (Dall'Alba, 2009; Eraut, 1994b).

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Professional identity is construed as the self that has been developed with the commitment to perform competently and legitimately in the context of the profession, and its development can continue over the course of the individual's career. A measure of the development of professional identity would provide an indication of how an educational institution has socialized the students for their respective professions. It can highlight any particular areas that the institution can look into to strengthen the development of professional identity. Existing known professional identity scales cannot serve this purpose because they have been designed with other goals in mind. The goals can be about measuring how group (or profession) identification influences student learning in inter-professional education (Adams, et al., 2006), or for understanding the influence of specific curricular features on professional identity development in health care education (Crossley & Vivekananda-Schmidt, 2009). The existing instruments have also been designed for specific professions such as teachers (Cheung, 2008), nurses (Du Toit, 1995), dentists (Bebeau & Monson, 2012) and physical therapists (Swisher, et al., 2004) and would need to be adapted and validated for use in other types of professions.

The study reported here aimed at addressing the gap by creating a scale to measure professional identity development of students in professional education for all types of professions. This will enable the measure of the effects of curriculum in bringing about the change in professional identity: An instrument would allow the development to be measured, and used for tracking how the learning has, or hasn't transformed groups of students' through the programme. Comparisons can also be made between the effect of different curricula, and between groups of students each preparing for a different profession. The use of a validated measure like this may thus pave the way for developing generalizable ideas about professional identity formation and development.

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In addition, the construct can provide a “validated” framework for gaining insights about students’ and educators’ perspectives for how students can be effectively prepared for professional practice. Such findings can further contribute to the use of the construct as a meaningful guiding frame of reference for the design of professional education programmes.

### **Development of Professional Identity**

Identity provides a social and cultural role through which an individual relates to his or her world. Each one of us takes on more than one identity in our lifetime – for example as a son, parent, spouse, professional, teacher, or mentor. An identity is formed from a trace of past interactions with the people, language, artifacts, or elements associated with a particular culture. What were external regulations and values become personally accepted; the formed identity becomes the basis for his or her future interactions with the world (Holland, 1998; Ryan & Deci, 2003; Wenger, 1998).

Professional Identity is associated with the role of the self in a professional practice, embedded in profession-specific “cultural resources” such as the community of practitioners and the associated shared language, knowledge, skills and values. Membership and participation require acceptance by the respective community of practitioners as well as the larger community with which the individual interacts in the role of the practitioner (Wenger, 1998). In preparing the students for their role, all the learning experiences in vocational and professional education should contribute to acculturate them to become the bona fide new practitioners (Monrouxe, 2010).

The knowledge of the discipline that students gain and the technical terms they learn to use provide a start for them to identify with and be identified with the community of practitioners (Beagan, 2001). However, to prepare for the professional practice, the students need to not

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only acquire (1) domain knowledge, but also to (2) understand and adequately internalize values and the norms of practice, the rules and regulations determined by the relevant professional bodies and licensing authority, (3) achieve a reasonable idea of the roles they would be expected to perform, the responsibilities they would have to bear and the outcomes they would be accountable for (Buyx, et al., 2008; Cooke, et al., 2010; Dall'Alba, 2009; Monrouxe, 2010; Sheppard, et al., 2009; Sullivan, et al., 2007). *Knowledge about professional practicess* includes the extent of knowing important for students' development to become new practitioners. These will enable them to be able to make reasonable judgment about the appropriateness of decisions and actions in the professional role.

Having access to *role models* to look up to and learn from provide students with concrete and experiential ways of bridging learning in the classrooms and real world practice (Goldie, et al., 2007; Ottewill, 2002). Students observe from their role models ways to reason and deal with profession-related issues; what it means to be professional and to behave and dress appropriately for the role (Ajjawi & Higgs, 2008; Beckett & Gough, 2004; Timmerman, 2009). Teachers in the educational institutions who themselves have worked previously in the respective industries or are currently still practicing are the most obvious source of role models (Finn, Garner, & Sawdon, 2010; Fitzpatrick, et al., 1996; Hunter, et al., 2007), as are industry practitioners with whom students have opportunities to interact with in institution organized events and programs. Other role models are family members, relatives, or personal friends who are in the profession. In addition, key figures in the profession such as Steve Jobs whose philosophies, work ethics, and practices are often quoted and well-documented in the media, act as such.

Learning from role models is not a passive process, but an active one where students are engaged in learning to think, reason and act like the professional. The feedback and critique from the role models in their interactions help to shape their thinking and reasoning (Ajjawi & Higgs,

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2008; Beckett & Gough, 2004). Further, having more than one role model makes room for students to explore provisional selves, as they make choices about the kind of professional they want to become (Ibarra, 1999).

*Direct experiences in the field* should contribute to students' understanding of what it is like and how it feels to be the professional-in-practice. Experience is defined as authentic contact with clients in a professional context, that enables students to learn about the professional practice and the role of the professional (Dornan & Bundy, 2004). Given that students have not graduated, these direct experiences embedded in the real world context help them to understand what it means to act as a professional (Lave & Wenger, 1991). These experiences are useful as they provide opportunities for students to reconcile what they have learnt in the classroom. They can also use their learning strategies to organize their knowledge for practice (Beckett & Gough, 2004; Prince, et al., 2005); and pick up the necessary skills in organizing and prioritizing assignments and tasks (Fitzpatrick, et al., 1996).

Direct experiences are typically varied and ad hoc interactions facilitated by personal and school initiatives. There are three common scenarios. The first scenario is when practice education is a necessary requirement to qualify for practice such as clinical education in the case of the medical doctor. The second scenario of the group of individual students who have identified with the profession with such strong interest that they already work part-time in the field or have become a member of a related interest group. The third scenario is when the educational institution has chosen to include internship or industry engagement projects as an integral component of their curriculum to expose their students to real world practice (Hunter, et al., 2007). With adequate support, in particular when students receive guidance in reflecting on their experiences, students gain insights about what it means to be the professional-in-practice (Goldie, et al., 2007).

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Given that students have not graduated and are probably not yet accepted as “full participants” or full members in the profession, they would also not have experienced yet the responsibility and accountability of the professional role (Lave & Wenger, 1991). Hence, to describe their involvement in the particular profession, the experience *with* the profession would be more appropriate than experience *in* the profession. The description extends the scope of their experiences with the profession to include field trips, following news about major events and developments in the industry, and interactions with professionals in the industry in school-organized events.

The fourth element that may play a role in professional development is *professional self-efficacy*. Self-efficacy is “concerned with judgments of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122). Self-efficacy research in education has shown that these personal beliefs influence students’ decisions to put in effort and persevere longer to successfully complete tasks (Bandura & Schunk, 1981; Zimmerman & Kitsantas, 1999; Zimmerman & Ringle, 1981). If self-efficacy has an influence on their future work performance, students have to feel confident about being prepared to perform at work upon graduation. Ideally, in school, they should feel they are in the process of becoming the new practitioners who can make reasonable professional judgments, and adequately address each given professional situation with the relevant array of knowledge, skills, tools and resources.

Professional identity development is part of what Berger and Luckmann (1966) described as secondary socialization and is contingent on the primary self that has been formed during upbringing and education. The level of compatibility or contradiction between the primary and secondary self, or the relevance of the secondary to the primary self, influences the assimilation and integration of the secondary self (Berger & Luckmann, 1966). Indeed, studies in motivation have shown that when students personally identify with the importance of their learning — and



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hence experience greater autonomy in their learning — they are more likely to work harder, enjoy school more, and cope better with failures (Ryan & Connell, 1989; Ryan & Deci, 2003). Similar results have been found in studies involving students from the United States, the People's Republic of China, and Korea, suggesting that these observations are not culturally biased (Jang, et al., 2009; Vansteenkiste, et al., 2005). These findings imply that in general, having a strong *preference for a particular profession* is expected to facilitate students' focus and commitment in learning to become the professionals-in-practice, and as a result, contribute to the development of their respective professional identities.

In summary, it seems that the development of a professional identity is expected to take place in at least five dimensions, namely where (1) *knowledge about professional practices develops*, (2) *professionals are perceived and followed as role models*, (3) *students gain experience with the profession*, (4) *they develop professional self-efficacy*, and (5) *acquire a preference for a particular profession*.

### **A Professional Identity Scale**

There are five known attempts to measure the development of professional identity in professional education. They are the (1) Professional Identity Scale (PIS) (Adams, et al., 2006), (2) the Professional Self Identity Questionnaire (PSIQ) (Crossley & Vivekananda-Schmidt, 2009), (3) the Teacher Professional Identity Scale (TPIS) (Cheung, 2008), (4) the Professional Socialisation Scale (PSS) (Du Toit, 1995), and (5) the Professional Role Orientation Inventory (PROI)(Bebeau & Monson, 2012).

For creating the PIS, Adams et al (2006) adapted an existing group identification scale by Brown, Condor and Matthews (1986). The aim was to measure if, and how the professional identity of health and social care students influence their inter-professional learning, the consequence of which could have an effect on the interactions between different medical

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professionals the students graduate to become. Brown et al's original measure was an attempt to explain inter-group differentiation amongst factory workers (Brown et al, 1986). The basis for this original and adapted scale was the social identity theory which explained that the "attitudes and behaviours of members of one group towards another were governed by the strength and relevance of the members' social identity" (Adams, et al., 2006; Turner & Reynolds, 2001). Adams et al's nine-item measurement model included questions relating to how the students felt about being associated with the identification group, whether they felt they were part of the professional community or had strong ties with the members, and if they generally perceived themselves to have similar characteristics as the professional community members. Using data collected from a large sample size of 1,254 students who represented ten professions from health and social care, Adam et al carried out an exploratory factor analysis. They concluded the measure to be a one-factor model. Although group identification is a useful indicator of the strength of professional identity, the scale does not address the developmental aspects of students becoming new practitioners. The PIS also does not include the different dimensions discussed in the previous section on professional identity development.

The second known measure, the PSIQ, was created by Crossley & Vivekananda-Schmidt (2009) with the interest to understand the development of professional identity in health and social care students via the students' confidence in performing aspects of professional practice. The professional identity development was assumed to operate through these practice aspects. Their exploratory factor analysis turned up three factors – (1) interpersonal tasks which consisted of teamwork and communication, (2) generic attributes that included cultural awareness, ethical awareness and reflection, and finally, (3) profession specific elements such as conducting assessments, the use of records, "confidence in dealing with emergencies" and "teaching about the profession"(Crossley & Vivekananda-Schmidt, 2009).

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The third measure, the TPIS addresses only the different dimensions of the teaching practice and thus cannot be more widely applied in vocational and professional education (Cheung, 2008). The items are categorized in terms of teaching and learning, student development, school development, professional relationships and services, and personal growth and development. They are based on a teacher competencies framework and the continuing professional development of teachers published by the Hong Kong Education and Manpower Bureau.

Both the PSIQ and TPIS seem to concentrate largely on what we have previously called knowledge-about-professional-practices and professional self-efficacy; the measure does not include other factors that possibly influence the development of professional identity, such as experience with the profession, having professionals as role models, and preference for a particular profession. Further, the PSIQ and TPIS scales are not appropriate as measures for all types of professions given the necessary tailoring of aspects of professional practice for different professions, and the need to validate each measure.

A fourth measure, the PSS was developed for nursing education by Du Toit (1995). The intent is to measure professional identity development as indicated by the degree of professional socialization. The scale consists of 23 items and these can be categorized into two dimensions, namely of (1) professional values, and (2) personality, that form the qualities of the “ideal nurse”. Examples of the items in the first dimension are: “To what extent do you view your client as your first consideration?”, and “How strongly do you identify with the nursing culture?”. Examples of the items in the second dimension are: “To what extent do you regard yourself as thorough?”, and “To what extent do you regard yourself as emotionally mature?” Similar to the aforementioned two measures, the PSIQ and TPIS, the items in the PSS have to be adapted for other types of professions.

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The fifth measure, the PROI, was originally designed and validated by Bebeau, Born and Ozar in 1993 to assess the dentist's perception of his or her role (Bebeau & Monson, 2012). The four factors in this Inventory are: Agency, Autonomy, Authority and Responsibility. A variant created for the physical therapy profession, PROI-PT, has also been validated; however, the psychometric properties could be improved (Swisher, et al., 2004). From the confirmatory factor analysis of the PROI-PT, the best model fit excluded eight items from the original set, and with some of the remaining items shifted from the original dimension to another, e.g. from Authority to Responsibility. Even then, for the best model fit, the reliability as measured by Cronbach Alpha was not desirable, with only one factor at .70 and the other three factors ranging from .50 to .64. The correlation between two factors Agency and Autonomy was also very high at .98.

Examples of items for the factor Agency are, "I feel free to practice my profession in my own style and according to my own preferences" and "Basically, in my practice I answer to no one other than myself." Examples of items for the factor Autonomy are, "Regulations concerning use of support personnel are so restrictive they interfere with my ability to provide efficient care", and "Insurance companies have too much influence over the way I practice physical therapy." Examples of items for the factor Authority are, "My profession should be the sole custodian of its skills, knowledge, and practices" and "I believe third-party administrators should have no role in reviewing physical therapists' treatment plans." Finally, examples of items for the factor Responsibility are, "I believe the physical therapy profession should be more involved in providing physical therapy services for all those who need it", and "A PT (Physical Therapist) who becomes aware of a patient's positive HIV status should share that information with his/her staff, even if the patient objects."

Overall, the PROI is not an ideal instrument for our use. The PROI has to be adapted for each type of profession, and there is a need to

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validate each variant. Besides the psychometric properties to be improved, the basis of the PROI is not aligned with our five dimensions. The PROI serves the purpose of understanding professional identity development through the individual's view of his or her role and responsibilities in terms of the four factors Autonomy, Authority, Agency and Responsibility. The factors are the basis of professionalized work and hence the scale items are dependent on how established and regulated the profession is.

In summary, we have examined and found the five existing professional identity scales to be limited for measuring students' professional identity development over the course of a professional education. Not only do the existing scales focus on just a few professions, the dimensions covered seem to be rather narrow (Cheung, 2008; Crossley & Vivekananda-Schmidt, 2009; Du Toit, 1995), or not developmental in approach (Adams, et al., 2006). In addition, except for the PROI, the other four measures have not been validated using a theory-driven approach such as structural equation modelling that can test the stability of the factor structure. There seems, therefore, room for a more comprehensive instrument - comprehensive both in terms of the professions covered and the domains of development addressed. An instrument, in addition, that would be subjected to confirmatory factor analysis using structural equation modelling.

The two studies to be reported here aimed at doing just that: the development of a reliable and valid rating scale for professional identity development that could be used in a broad range of vocational and professional education programs. In the first study we developed this scale containing items that purported to measure the five dimensions discussed in this introduction. Although the new instrument turned out to be sufficiently reliable and valid, it had certain undesirable characteristics that forced us to conduct a second study with a slightly revised scale. The data for both studies were collected from the same polytechnic preparing students for a broad range of professions in Singapore.

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## Study 1

### Method

**Participants.** We obtained 2,930 complete datasets from students enrolled in various diplomas offered at the polytechnic by seven schools and a centre (School of Engineering, School of Applied Science, School of Health, Sports and Leisure, School of Hospitality, School of Technology for the Arts and the Centre for Culture & Communication). This translated to a response rate of 22.5% from a student population of 13,003. Forty-six per cent ( $n = 1,338$ ) of the respondents were males and 54% ( $n=1,592$ ) were females. The majority were first year students at 48% ( $n = 1,393$ ), followed by second year students at 35% ( $n = 1,039$ ) and third year students at 17% ( $n = 498$ ). The average ages were respectively 18.6 ( $SD = 1.94$ ), 19.3 ( $SD = 1.57$ ) and 20.2 ( $SD = 1.24$ ). The majority of the students were Singapore citizens at 87.7% ( $n = 2,570$ ), 12.0% from other parts of Asia ( $n = 352$ ) and 0.3% ( $n = 8$ ) from other countries.

**Instrument.** A measurement scale was created with 25 items for the five dimensions. The factor Knowledge about Professional Practices ( $n = 4$ ) consisted of items such as “I have some idea about the roles and responsibilities of different jobs in the profession I will be entering” and “I am aware of the impact of the decisions I make as a professional in the industry”. Experience with the Profession ( $n = 6$ ) included “I follow developments in the industry in newspapers and on television” and “I am working part-time or running a business relating to what I am studying”. In Having the Professional as a Role Model ( $n = 4$ ), two examples of items are “I admire most those teachers who are professionals in the area that I would like to enter” and “When working on problems in class, I imagine myself to be in the shoes of a professional in my future work environment”. The five-item Professional Self-efficacy factor consisted of items such as “I feel poorly prepared for a real job” and “I am sure I will have no problems dressing and behaving professionally in my industry”. The fifth and last factor, Preference for a Particular Profession consisted of

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six items, two examples being “Do you already know what kind of work or profession you prefer?” and “I am already pretty sure what kind of profession I will enter after completing the polytechnic or university education”.

All the items except one were on a five-point likert scale, with 1- Never True, 2-Not Really True, 3-Neutral, 4-Somewhat True and 5- Definitely True. The exception was the item, “Do you already know what kind of work or profession you prefer?” which required a “Yes” or “No” reply. In some of the questions which mentioned the name of the polytechnic, the Republic Polytechnic, the abbreviation RP was used. The complete list of questions administered to the students is provided in Annex A1.

Contributing to the total of 28 questions were three additional questions for identifying those who have experienced internship, and the groups of students with different motivations in completing their polytechnic studies i.e. “My future work is related to the diploma I am enrolled in” and “My polytechnic education is relevant and useful in preparing me for my future career”. These questions will be utilized for the analysis of students’ professional identity development at the polytechnic where the data was collected, and the results will be reported in another study.

**Procedure.** During the second semester of the academic year 2010/2011, all students were emailed an invitation to participate in the online Professional Identity survey as part of an extra-curricular activity at the polytechnic in Singapore they were enrolled in. The students were informed that their responses contributed to a research study related to their learning. The survey was available for participation for a week.

**Statistical analysis.** *Construct validity.* From the main sample (i.e. responses from all participants in the survey), an exploration sample

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and a cross-validation sample were drawn by random assignment using SPSS 18.0.

An analysis to ascertain the construct validity of the rating scale was carried out in three stages. The first stage was to specify and test the hypothesized five-factor model with the exploration sample in a confirmatory factor analysis. The second stage was to determine if the factorial structure of the scale was invariant across two independent samples (the exploration and cross-validation samples) from the same polytechnic. In these two stages, the statistical technique used was structural equation modeling in AMOS 18.0 (Arbuckle, 2009). The third stage involved the comparison of the student responses from the main sample categorized as low and high overall Professional Identity scores to ascertain if the expected differences were found in all five factors.

In the first stage, where the confirmatory factor analysis was run to test the model, we referred to three fit indices to determine the acceptability of the model fit: (1) the absolute index,  $\chi^2$  relative to the degrees of freedom, where a small  $\chi^2/df$  ratio of  $\leq 3$  and p-value  $> .05$  would be indicative of a reasonable model fit (Byrne, 2010), (2) the incremental comparative fit index (CFI) with  $\geq .95$  for a sufficient model fit (Bentler, 1990), and (3) root mean square error of approximation (RMSEA) with acceptable model fit at  $\leq .06$  (Hu & Bentler, 1999). RMSEA was particularly useful because it was sensitive to model specifications rather than sample size and was relatively uninfluenced by the estimation method. The correlation matrix and modification indices were referred to for necessary modification to the originally specified model (Byrne, 2010). In the event that the correlations between the latent means were found to be very high in the final model, e.g. average .80, a one-factor model would also be tested.

The specified model was subsequently tested in the second stage for measurement factorial invariance using both the exploration and cross-validation sample. The factor loadings were first constrained before the



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factor co-variances were also constrained. A  $p$ -value  $> .05$  for each of the test of invariance would provide the assurance that the proposed model was valid for the population from which the samples were drawn (Byrne, 2010).

In the third stage, the item scores were averaged for each student to obtain the mean for each factor, and also the mean overall Professional Identity score. The scores for the negatively phrased items were reversed for consistency in terms of the interpretation of scores - the higher the scores, the stronger the professional identity. With the computed means, the main sample was divided into two sub-groups: the Low Professional Identity group with scores from 1.42 to 3.10 ( $n = 1,506$ ) and the High Professional Identity group with scores from 3.12 to 4.60 ( $n = 1,424$ ). The average of the scores was 3.09,  $SD = .47$ . The two groups were compared using the independent  $t$ -test in SPSS 18.0 to find out if there were indeed expected differences across all five factors.

*Construct reliability.* The reliability of the measure was analyzed using the coefficient  $H$  test (Hancock & Mueller, 2001) with results greater than .7 for each factor being indicative of good reliability. Coefficient  $H$  was preferred for latent factorial systems as the reliability of each factor was never less than the reliability of the corresponding best single indicator; the latent factors would not then be unnecessarily rejected due to other problematic items. It did not assume the factor weights to be equal for all the indicators of a factor, nor be affected by a negatively loaded indicator.

The reliability analysis will be run for the exploration and cross-validation samples which together make up the main sample.

## **Results & Discussion**

The 25 items were first examined using the correlation matrix. Consequently, two items were removed based on weak correlations with

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other variables (no correlations that met minimum strength of .3) and the challenges they likely had posed for students to interpret. Next, the modification indices were reviewed. High modification indices (MI) of items or residual errors with other residual errors — MI of at least 40 with four or more residual errors — suggested the possibility of systematic errors that could have been better explained by additional item/s, or were already adequately explained by other current items. Four such items were identified and excluded.

The measurement model now consists of 19 items for the five factors: Knowledge about Professional Practices ( $n = 3$ ), Experience with the Profession ( $n = 6$ ), Having the Professional as a Role Model ( $n = 4$ ), Professional Self-efficacy ( $n = 4$ ) and Preference for a Particular Profession ( $n = 2$ ). We ran the confirmatory factor analysis using the exploration sample. Table 1 lists the standardized regression weights for each of the indicator that was related to the respective factors. The standardized regression weights ranged from .37 to .77,  $p < .01$ , demonstrating a reasonably explained set of relationships. The correlations between the latent factors were between .45 and .79 (see Table 2), suggesting that the five factors were distinct enough from one another. We found the dataset to adequately fit the five-factor model: the comparative fit index (CFI) was at .94 and root mean square error of approximation (RMSEA) at .04. Although the absolute fit index  $\chi^2/df$  did not indicate a fit at 3.3,  $p = .000$ , the measurement model need not be rejected as hypothesized models are expected to only approximate reality (Byrne, 2010). The test for reliability turned up reasonable results from .61 to .73 for the factors (see Table 3).

The measurement model was next tested for invariance of factorial structure using both the exploration sample and the cross-validation sample. Table 4 shows the results of the multi-group invariance in terms of (1) the hypothesized model, (2) the condition where the measurement weights or factor loadings were constrained equal, and (3) an even stricter condition where both the factor loadings and co-variances were

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constrained equal. The non-significant differences at  $p > .05$  under the constrained conditions proved the hypothesized five factor model to be highly stable for the population from which the samples were drawn.

Reliability analysis was run for the cross-validation sample and the results were reasonably good, with coefficient  $H$  ranging from .60 to .78 for all the factors.

In our final step for determining construct validity, independent  $t$ -test was used to compare the Low Professional Identity group and High Professional Identity group. No significant differences were found in all five factors at  $p < .05$ . See Table 5 for the descriptive statistics.

In this study, we created a measurement scale based on the five key dimensions of professional identity: (1) Knowledge about Professional Practices, (2) Experience With the Profession, (3) Having the Professional as a Role Model, (4) Professional Self-efficacy, and (5) Preference for a Profession, which we deduced from the existing literature (and based on common sense). The instrument will henceforth be referred to as the Professional Identity Five Factor Scale (PIFFS).

Using the scale, responses were collected from students at a polytechnic that offered a broad range of diploma programmes. The results from the subsequent statistical analysis – confirmatory factor analysis, reliability test and test for invariance of factorial structure - gave us the confidence that the specified 19-item measurement model was stable.

However, when the two groups of high and low overall Professional Identity scores were compared, no significant differences were found. As all five dimensions have been hypothesized to contribute to the strength of professional identity, we had expected significant differences between the two groups for all five factors.

Table 1  
*Standardized Regression Weights of the 19 Items in the Specified Model*

S/n	Factor	Items	Standardized Regression Weight	Variance explained
1.	Knowledge about Professional Practices (3 Items)	I have some idea about the roles and responsibilities of different jobs in the profession I will be entering.	.62	38%
		I know about the different types of professionals I will be working with in my future work environment.	.59	35%
		I am aware of the impact of the decisions I make as a professional in the industry.	.58	34%
2.	Experience with the Profession (6 Items)	I am working part-time or running a business relating to what I am studying.	.42	18%
		I am part of an interest group (inside or outside of RP) related to my profession.	.37	14%
		I know personally some people who work in my future profession.	.61	37%
		I follow developments in the industry in newspapers and on television.	.55	30%
		Before I entered RP, I already had some prior experience related to the profession.	.57	32%

S/n	Factor	Items	Standardized Regression Weight	Variance explained
		I have interacted and learned from professionals in the industry outside of school or through events organised in school.	.67	45%
3.	Having the Professional as a Role Model (4 Items)	When working on problems in class, I imagine myself to be in the shoes of a professional in my future work environment.	.54	29%
		I actively learn what I believe I would need to know and be able to do when I enter my future occupation.	.46	21%
		I believe I can already reason like a professional in a company.	.68	46%
		I admire most those teachers who are professionals in the area that I would like to enter.	.40	16%
4.	Professional Self-efficacy (4 Items)	I am sure I will have no problems dressing and behaving professionally in my industry.	.57	32%
		I am not sure if I can fit into the working environment of the profession. (Reversed)	.51	26%
		I feel poorly prepared for a real job. (Reversed)	.54	29%
		I believe that I will easily get along with my colleagues, get their cooperation, and have informal conversations with them.	.48	23%

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S/n	Factor	Items	Standardized Regression Weight	Variance explained
5.	Preference for a Particular Profession (2 Items)	Do you already know what kind of work or profession you prefer? (Y/N)	.56	31%
		I am already pretty sure what kind of profession I will enter after completing the polytechnic or university education.	.77	59%

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*Note.* All regression weights are significant at the .01 level.

Table 2  
*Correlations between the Five Latent Factors in the Specified Measurement Model*

Factor 1	Factor 2	Correlation
Knowledge about Professional Practices	Experience with the Profession	.68
Knowledge about Professional Practices	Having the Professional as a Role Model	.73
Knowledge about Professional Practices	Professional Self-efficacy	.63
Knowledge about Professional Practices	Preference for a Particular Profession	.79
Experience with the Profession	Having the Professional as a Role Model	.62
Experience with the Profession	Professional Self-efficacy	.45
Experience with the Profession	Preference for a Particular Profession	.56
Having the Professional as a Role Model	Professional Self-efficacy	.53
Having the Professional as a Role Model	Preference for a Particular Profession	.59
Professional Self-efficacy	Preference for a Particular Profession	.55

*Note.*  $p < .01$

Table 3  
*Results of Construct Reliability Analysis Using Coefficient H*

Type of Sample	(1) Knowledge about Professional Practices	(2) Experience with the Profession	(3) Having the Professional as a Role Model	(4) Professional Self-efficacy	(5) Preference for a Particular Profession
1.Exploration	.62	.73	.63	.61	.66
2.Cross-Validation	.60	.71	.60	.61	.78

Table 4  
*Results of Cross-validation Test for Invariant Factorial Structure*

Model Description	$\chi^2$	Df	$\chi^2_{diff}$	Df <sub>diff</sub>	Statistical Significance
Hypothesised five-factor model	943.95	278	-	-	-
Model with measurement weights constrained equal	964.18	292	20.23	14	NS*
Model with both measurement weights and structural co-variances constrained equal	975.47	307	31.52	29	NS*

*Note.* Not significant at the .05 level.



Table 5  
*Comparison of the Low and High Professional Identity Groups*

Factors	Low Professional Identity Group <i>n</i> = 1,441 <i>M</i> ( <i>SD</i> )	High Professional Identity Group <i>n</i> = 1,489 <i>M</i> ( <i>SD</i> )
Knowledge about Professional Practices	3.66 (.68)	3.67 (.65)
Experience with the Profession	2.68 (.75)	2.71 (.75)
Having the Professional as a Role Model	3.55 (.63)	3.56 (.63)
Professional Self- efficacy	3.48 (.66)	3.46 (.66)
Preference for a Particular Profession	2.02 (.66)	2.06 (.61)

*Note.* The *t*-test results showed no significance differences at  $p < .05$  between the two groups in all five factors.

These findings suggest that the questionnaire should be improved to capture meaningful differences between the high and low professional identity groups. In addition, the number of items for factors such as Knowledge about Professional Practices ( $n = 3$ ) and Professional Self-efficacy ( $n = 4$ ) seem to be rather low. The items may also be rephrased to better capture the difference that a formal, systematic and comprehensive polytechnic education could make in developing the students' respective

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professional identities to prepare them for their careers. For example, an item such as, “I have some idea about the roles and responsibilities of different jobs in the profession I will be entering” could better be rephrased to replace ”some idea” with “good idea” or “good understanding”.

## Study 2

In Study 2 we collected data from a revised version of the PIFFS with the same hypothesised five factors: (1) Knowledge about Professional Practices, (2) Experience With the Profession, (3) Having the Professional as a Role Model, (4) Professional Self-efficacy, and (5) Preference For a Particular Profession. The aim of this study was to achieve a measurement model that not only has an adequate model fit, good construct reliability and reasonable stability across independent samples from the same population, but also provide sufficient meaningful differences between strong and weak professional identities. To this end, the second data set of 1,295 responses was collected from students at the same polytechnic.

## Method

**Participants.** Participants were students enrolled in various diplomas offered by all the seven schools & center (School of Engineering, School of Applied Science, School of Health, Sports and Leisure, School of Hospitality, School of Technology for the Arts and the Centre for Culture & Communication). The data collected translated to a response rate of 9.3% from a student population of 13,927. 41.2% ( $n = 533$ ) of the respondents were males and 58.8% ( $n = 762$ ) were females. The majority were first year students – 40.8% ( $n = 528$ ), followed by second year students at 36.8% ( $n = 476$ ) and third year students at 22.5% ( $n = 291$ ). The average ages were respectively 18.1 ( $SD = 1.89$ ), 19.1 ( $SD = 1.59$ ) and 19.9 ( $SD = 1.39$ ). The majority of the students were Singapore citizens at 85.9% ( $n = 1,112$ ), 13.9% from other parts of Asia ( $n = 180$ ) and 0.2% ( $n = 3$ ) from other countries.

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**Instrument.** The full questionnaire consisted of 30 questions (see Annex A2). The abbreviation, RP, referred to the name of the polytechnic, the Republic Polytechnic. Similar to Study 1, it included the following three questions for obtaining additional information about the students: “My future work is related to the diploma I am enrolled in”, “My polytechnic education is relevant and useful in preparing me for my future career”, and “I have attended the internship programmer offered by RP”. These questions will be utilized for the analysis of students’ professional identity development at the polytechnic and the results will be reported in a next study. Of the remaining 27 questions, eight were newly introduced to the 19-item scale from Study 1. They were, (1) “I know the nature of the work I will do in my future profession”, (2) ”I know what kind of applications, tools and equipment I will handle in my future occupation”, (3) ”I have a good idea about the rules and regulations in the industry”, (4) ”I admire professionals who are already working in my future work environment”, (5) ”I’m confident that I can do an excellent job in the future”, (6) ”I have no doubt that I will master all the skills necessary to succeed in my future work”, (7) “I am not sure about the kind of challenges faced by the professional in the industry I will work in” and (8) “I am not sure how a professional in my industry makes decisions”.

In summary, the revised PIFFS was intended to measure the same five dimensions and consisted of an increased number of items as compared with the questionnaire tested in Study 1: Knowledge about Professional Practices ( $n = 6$ ), Experience with the Profession ( $n = 6$ ), Having a Professional to Model ( $n = 6$ ), Professional Self-efficacy ( $n = 7$ ) and Preference for a Profession ( $n = 2$ ).

**Procedure and Statistical Analysis.** The procedure and statistical analysis were carried out in a similar manner as with Study 1. The sample was also divided into two groups based on the averaged Professional Identity scores. The Low Professional Identity group consisted of respondents with mean scores ranging from 1.67 to 3.23 ( $n = 670$ ) and the High Professional Identity group was made up of respondents

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with mean scores ranging from 3.27 to 4.53 ( $n = 625$ ). The average Professional Identity score for the main sample was 3.23,  $SD = .44$ . This was relatively higher than the first sample mean of 3.09,  $SD = .47$ .

## Results & Discussion

Using the exploration sample, the 27-item revised PIFFS was first reviewed with reference to the correlation matrix and modification indices, and the specified model subsequently analyzed for model fit construct reliability. Two items were removed in the process. The revised measurement scale now consists of 25 items. Table 6 lists the standardized regression weight for all the items of the respective factors; the values were from .18 to .84 with the regression weights significant at  $p = .01$  level. Table 7 shows the correlations between the five factors ranging from .42 to .76, indicative of reasonable distinctiveness between them.

We proceeded to carry out the confirmatory factor analysis using the exploration sample and found a reasonable fit of the data for the five-factor model. The comparative fit index (CFI) was at .90 and root mean square error of approximation (RMSEA) at .05. Again, the  $\chi^2/df$  of 2.84,  $p = .000$  seems to suggest otherwise, but the reader should take into account that with very large samples, such as ours, even the slightest differences between the proposed model and the empirical data are picked up by the chi-square test. The results of the construct reliability analysis using coefficient  $H$  are shown in Table 8, for the two samples, cross-validation and main samples. The reliability has improved from a range of .60 to .78, to a range of .65 to .85.

The measurement model was next tested for invariance of factorial structure across two independent samples, i.e. the exploration and cross-validation samples drawn from the same population. Even under very strict conditions, with both the factor loadings and co-variances constrained equal, the measurement model was tested to be invariant with

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non-significant p-values. In other words, the model was highly stable. See Table 9 for the results of the test.

The present Study 2 was, in particular, an attempt to improve on the original instrument to be successful in measuring meaningful differences between weak and strong professional identities across a broad range of polytechnic education programs. The two groups of high and low mean Professional Identity scores were now found to be significantly different in all five factors. All the effect sizes were large, with Cohen's *d* ranging from 1.29 to 1.78 (see Table 10): Knowledge about Professional Practices at  $t(1,293) = 32.01, p = .000, \text{Cohen's } d = 1.78$ , Having the Professional as a Role Model at  $t(1,293) = 23.27, p = .000, \text{Cohen's } d = 1.29$ , Experience with the Profession at  $t(1,245.99) = 24.17, p = .000, \text{Cohen's } d = 1.37$ , Professional Self-efficacy at  $t(1,267.96) = 23.71, p = .000, \text{Cohen's } d = 1.33$ , and Preference for a Particular Profession at  $t(1,206.60) = 28.74, p = .000, \text{Cohen's } d = 1.65$ .

Table 6  
*Standardized Regression Weights of 25 Items in the Specified Model*

S/n	Factor	Items	Standardized Regression Weight	Variance explained
1.	Knowledge about Professional Practices (6 Items)	I know the nature of the work I will do in my future profession.	.69	48%
		In most work environments, professionals with different backgrounds work together. I know of the different types of professionals I will be collaborating with.	.53	28%
		I have a good idea about the roles and responsibilities of my future job.	.71	50%
		I know what kind of applications, tools and equipment I will handle in my future occupation.	.62	38%
		I am aware of the impact of the decisions I make as a professional in the industry.	.57	32%
		I have a good idea about the rules and regulations in the industry.	.64	41%
2.	Experience with the Profession (6 Items)	I work part-time in (or am running) a business related to what I am studying.	.46	21%
		I am part of an interest group (inside or outside of RP) related to my profession.	.54	29%

S/n	Factor	Items	Standardized Regression Weight	Variance explained
		I know personally some people who work in my future profession.	.62	38%
		I follow developments in my future industry in newspapers and on television.	.58	34%
		Before I entered RP, I already had some prior work experience related to in the profession of my choice	.52	27%
		I have interacted with professionals in the industry outside of RP or through events organized in RP.	.65	42%
3.	Having the Professional as a Role Model (5 Items)	When working on problems in class, I imagine myself to be in the shoes of a professional in my future work environment.	.48	23%
		I concentrate in my studies on what I believe I would need to know and be able to do when I enter my future occupation.	.52	27%
		I believe I can already think and reason like a professional in a company or organization.	.68	46%
		I admire most those teachers who are professionals in the area that I would like to enter.	.36	13%
		I admire professionals who are already working in my	.42	18%

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S/n	Factor	Items	Standardized Regression Weight	Variance explained
		future work environment.		
4.	Professional Self-efficacy (6 items)	I am sure I will have no problems dressing and behaving professionally in my industry.	.48	23%
		I feel poorly prepared for a real job. (Reversed)	.29	8%
		I believe that I will easily get along with my future colleagues, get their cooperation, and have informal conversations with them.	.60	36%
		I'm confident that I can do an excellent job in the future.	.84	71%
		I have no doubt that I will master all the skills necessary to succeed in my future work.	.75	56%
		I am not sure about the kind of challenges faced by the professional in the industry I will work in. (Reversed)	.18	3%
5.	Preference for a Particular Profession (2 Items)	Do you already know what kind of work or profession you prefer? (Y/N)	.49	24%
		I am already pretty sure what kind of profession I will enter after completing the polytechnic or university education	.79	62%

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*Note.* All regression weights are significant at the .01 level



Table 7  
*Correlations between the Five Latent Factors in the Specified Measurement Model*

Factor 1	Factor 2	Correlation
Knowledge about Professional Practices	Experience with the Profession	.64
Knowledge about Professional Practices	Having the Professional as a Role Model	.76
Knowledge about Professional Practices	Professional Self-efficacy	.69
Knowledge about Professional Practices	Preference for a Particular Profession	.76
Experience with the Profession	Having the Professional as a Role Model	.49
Experience with the Profession	Professional Self-efficacy	.42
Experience with the Profession	Preference for a Particular Profession	.61
Having the Professional as a Role Model	Professional Self-efficacy	.64
Having the Professional as a Role Model	Preference for a Particular Profession	.52
Professional Self-efficacy	Preference for a Particular Profession	.60

*Note.*  $p < .01$ .

Table 8  
*Results of Construct Reliability Analysis Using Coefficient H*

Type of Sample	(1) Knowledge about Professional Practices	(2) Experience with the Profession	(3) Having the Professional as a Role Model	(4) Professional Self-efficacy	(5) Preference for a Particular Profession
Exploration	.80	.74	.65	.82	.67
Cross-Validation	.80	.75	.65	.85	.74

Table 9  
*Results of Cross-validation Test for Invariant Factorial Structure*

Model Description	$\chi^2$	<i>Df</i>	$\chi^2_{diff}$	<i>Df_{diff}</i>	Statistical Significance
Hypothesised five-factor model	1,549.72	514	-	-	-
Model with measurement weights constrained equal	1,573.36	534	23.64	20	NS*
Model with both measurement weights and structural co-variances constrained equal	1,589.87	549	40.15	35	NS*

*Note.* Not significant at the .05 level.

Table 10  
*Comparison of the Low and High Professional Identity Groups*

Factors	Low Professional Identity Group <i>n</i> = 670 <i>M</i> ( <i>SD</i> )	High Professional Identity Group <i>n</i> = 625 <i>M</i> ( <i>SD</i> )
Knowledge about Professional Practices	3.31 (.44)	4.08 (.42)
Experience with the Profession	2.41 (.61)	3.29 (.70)
Having the Professional as a Role Model	3.34 (.42)	3.86 (.39)
Professional Self- efficacy	3.14 (.45)	3.75 (.48)
Preference for a Particular Profession	2.26 (.55)	3.01 (.39)

*Note.* The *t*-test results showed significance differences at  $p = .000$  between the two groups in all five factors.

### General Discussion

We attempted to develop a new scale for measuring the development of professional identity over the course of a professional education, and for a diverse range of professions. Currently in the literature, there is not an equivalent instrument to meet this purpose. The five existing measures (Adams, et al., 2006; Bebeau & Monson, 2008, 2012; Cheung, 2008; Crossley & Vivekananda-Schmidt, 2009; Du Toit, 1995; Swisher, et al., 2004) were not developmental in approach, or were designed with a limited number of factors and for specific types of professions.

The survey instrument was created with items for five factors identified from the literature. The five factor construct was validated using

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confirmatory factor analysis and found reliable based on coefficient H. The structure was also stable across independent samples from the same student population. However, in the first study, when a further step was taken to validate the robustness of the five factor structure, we found that the instrument needed to be revised to improve the meaningfulness of the measure. What we did was to group the overall Professional Identity scores into a high, and a low scores group. The two groups were compared for significant differences in all five factors and, it was found that they were not significantly different. The instrument was thus subsequently revised and applied with the same method of analysis. Data was collected from the same polytechnic. This time, the two groups (high and low professional identity scores) were found to be significantly different in each of the five factors.

We now have a new Professional Identity Five Factor Scale (PIFFS) that can be used to analyze the professional development of students in the course of their education. In general, the instrument provides a way of measuring the success of curriculum in bringing about these changes, and in determining the stages of the curriculum at which significant changes occur. The instrument can show which factor(s) have contributed more to the growth of the students, and suggest how specific activities may have stimulated their development through these factor(s). For groups of students who may not have shown much development, it can act as a diagnostic instrument to identify the factor(s) for generating growth.

The effects of different curricula or pedagogical approaches such as the conventional lecture-tutorial systems, PBL, or apprenticeship schemes can be compared using PIFFS. Some of these types of curricula such as PBL and apprenticeship are strategies for socializing students into the profession, and hence are expected to significantly contribute to the transformation from lay persons to new practitioners. The study of developmental changes in students in the respective curricula may also

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lead to the identification of stages where significant changes in professional identity development are observed in each type.

Are there differences in the professional identity development across professions in formal education, and what led to these differences? Are there particular curricula that are more appropriate for specific professions? Can the same constructs be useful for studying the professional development of practicing professionals? What is the impact of their professional identity on their performance in practice? The PIFFS is an instrument that can be used as an attempt to respond to these questions. By adapting the items in the construct, it can be used to find out if the same five factors apply for professionals-in-practice.

The main limitation of the instrument is related to the nature of self-report measures. There exist gaps to be calibrated between what the students believe to be true, and reality; between “perceived and demonstrated levels of understanding, capability, competence or preparedness” (Alexander, 2013, p.1). Students need to be clear about what is expected of them, and self-assess if they are able to meet the expectations, and if not, how far they are from being able to do so. However, when used for analyzing relatively large groups of students in cross-sectional and longitudinal analyses, and for making comparisons between different curricula, self-report measures can be used for discerning differences or track changes over time.

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## Chapter 3: Understanding Professional Identity Development<sup>2</sup>

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### Abstract

The aim of this study was to examine the professional identity development of students who were preparing for a wide range of professions, with the use of a validated and comprehensive instrument, the Professional Identity Five-Factor Scale (PIFFS). This scale measures: Knowledge about Professional Practices, Having the Professional as a Role Model, Experience with the Profession, Professional Self-efficacy and Preference for a Particular Profession. The participants were students in Year 1, 2 and 3 who had enrolled at a polytechnic in Singapore. Analysis of variance and *t*-tests were used to compare these students in their different year of study, and with different educational backgrounds. We expected the PIFFS to be able to distinguish between Year 1 students with prior vocational education and those without prior vocational education. We also expected the polytechnic education to have contributed to student learning such that the professional identity scores would be highest for the Year 3 students, followed by the Year 2 students and then the Year 1 students. Indeed, Year 1 students with prior vocational education did display higher scores on all five factors than those Year 1 students without prior vocational education. Significant differences were

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<sup>2</sup> Presented at: Tan, C.P. & Schmidt, H. G. (2013). *Influence of Motivation on Professional Identity Development and Achievement in Polytechnic Education*. Paper presented at the 2013 Joint SELF Biennial International Conference and Educational Research Association of Singapore (ERAS) Conference, Singapore.

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found in Knowledge about Professional Practices, Experience with the Profession, and Preference for a Particular Profession.

Contrary to our expectation, the results of the cross-sectional analyses of Year 1, 2 and 3 for the entire sample, and for students without prior vocational education, showed a decline in Having the Professional as a Role Model. For those with prior vocational education, no significant differences were found. However, when the students were categorized in terms of their perceived relevance of the diplomas to their future work — relevant (Rel), not relevant (NRel) and unsure of relevance (URel) — the cross-sectional analyses showed different results. For Rel students, significant increases were found in three factors: Knowledge about Professional Practices, Professional Self-efficacy and Preference for a Particular Profession. For NRel students, there were no significant differences. For the URel students, there was a decline in the factor, Having the Professional as Role Model. When the three groups of Rel, NRel and URel students were compared, URel students showed the lowest scores on the measure of professional identity. Taken together, the results of the cross-sectional analyses and comparison between the different groups highlight the relevance of the learning to their future as the basis for students' professional identity development. There was also evidence that suggested the effect of relevance on students' academic achievement. The PIFFS factors have been hypothesized to contribute to the development of a person committed to perform competently. As such, we expected a significant relationship between the factors and students' study outcomes in terms of grades. The results suggested a weak link between Having the Professional as a Role Model and test scores. No other significant differences were found in the other four factors, and also when the analysis was carried out for each of the relevance groups. The implications of the results for professional education, and the polytechnic where the study was conducted, are discussed.

*Keywords:* professional identity development, relevance of diploma to future work, polytechnic education

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## Understanding Professional Identity Development

In preparing students for their professional roles, professional education should necessarily acculturate them to become the new and bona fide practitioners in their respective fields. The developed professional identity forms the basis for their future interactions in the professional role (Holland, 1998; Ryan & Deci, 2003; Wenger, 1998). Apart from the formal recognitions of qualifications such as education and licensing, the graduates would be distinguishable by the specialized body of knowledge they possess and the kinds of decisions they are able to make. They may also stand out in terms of the reasoning, methods, procedures or equipment used when performing their role. They may even have a dress code that sets them apart, such as the doctor's coat. They observe a code of ethics that requires the professional role to be performed responsibly, and in the manner that is reflective of the values held to be important to the profession, for example, compassion in the medical field.

Professional identity is defined as the self that has been developed with the commitment to perform competently and legitimately in the context of the profession, and its development can continue over the course of the individual's career. With more rapid creation and development of knowledge in the globalized world, specialized knowledge is no longer associated only with established professions such as physicians, lawyers and engineers. Post-secondary and higher education now have wider ranges of certificates, diplomas and degree programmes to cater to the preparation of personnel in professions for emerging and growing industries such as gaming, finance, banking, healthcare and aerospace. In lieu of such developments, there are increasing numbers of professionals who are obliged legally, or by the governing authorities to provide a reasonable standard of service to their clients. This is because the clients are not likely to have the knowledge or information to evaluate their services, and thus need to be protected from "incompetence, carelessness and exploitation" (Eraut, 1994, p. 2). Services and products



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being introduced to the public include healthcare packages, insurance and financial products that are increasingly complex and not easily understood.

These changes in society require the need for paying greater attention to the role of vocational and professional education in preparing students to perform competently and responsibly in professions of all types, extending beyond the established professions (Dall'Alba, 2009; Eraut, 1994). The development of a professional identity aligned with the desired attributes of the professional-in-practice has to become a priority. The overall effectiveness of formal education in preparing students for particular professions thus needs to be considered in terms of how well socialized the student population is to develop the professional identity for interacting with the community (both the professional community and the larger community within which they operate) in professional practice.

In this study we make use of the professional identity five factor scale (PIFFS) (Tan, in preparation; Tan & Schmidt, 2012) to understand the professional identity development of students at a polytechnic in Singapore that prepares students for a wide range of professions. The PIFFS has been developed because of the lack of such an instrument in the professional education literature. The five factors are (1) Knowledge about Professional Practices, (2) Having the Professional as a Role Model, (3) Experience with the Profession, (4) Professional Self-efficacy, and (5) Preference for a Particular Profession.

### **The Professional Identity Five Factor Scale (PIFFS)**

In this section we describe the five factors of the PIFFS: 1) Knowledge about Professional Practices, 2) Having the Professional as a Role Model, 3) Experience with the Profession, 4) Professional Self-efficacy and 5) Preference for a Particular Profession.

**Knowledge about Professional Practices.** The educated professionals should be distinguishable from lay persons not only by the

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body of knowledge and understanding about the discipline, but also by the capacity to achieve the standards and comply with the regulations determined by the professional bodies and government licensing authorities. They would have a good idea of the typical roles and responsibilities in the profession, and what the professional is accountable for (Goldie, et al., 2007; Monrouxe, 2010). Their professional conduct should reflect the values and ethics of the profession. These will enable them to be able to make reasonable judgments about the appropriateness of decisions and actions in the professional role. In general, students need to be equipped with adequate Knowledge about the Profession Practice, or knowledge ready for use in practice, before they enter the profession.

**Having the Professional as a Role Model.** The second factor addresses the need for students to have role models who demonstrate in concrete ways how theory and practice are linked. In particular, students have to become familiar with the way professionals in practice reason and deal with profession related issues (Ajjawi & Higgs, 2008; Goldie, et al., 2007; Ottewill, 2002; Timmerman, 2009). This may also include the way the role models are dressed. For instance in the hospitality industry, being well-groomed is part of the industry service standards to project a professional image. In the classroom, the feedback and critique from the role models help to shape students' thinking and reasoning (Beckett & Gough, 2004; Diemers, et al., 2008). Learning from role models is not a passive process, but an active one, where students are engaged in learning to think, reason and act like the professional. Further, having more than one role model makes room for students to explore provisional selves, as they make choices about the kind of professional they want to become (Ibarra, 1999).

**Experience with the Profession.** The third dimension is experience with the profession. Experience is defined as authentic contact with clients in a professional context that enables students to learn about the professional practice and the role of the professional (Dornan & Bundy, 2004). Experiences in the field contribute to students'

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understanding of what it means to act as a professional-in-practice (Lave & Wenger, 1991). These experiences are useful as they provide opportunities for students to reconcile what they have learnt in the classroom. They can also use their learning strategies to organize their knowledge for practice (Beckett & Gough, 2004; Prince, Boshuizen, Van der Vleuten, & Scherpbier, 2005), and pick up the necessary skills for organizing and prioritizing assignments and tasks at the workplace (Fitzpatrick, While, & Roberts, 1996).

**Professional Self-Efficacy.** Self-efficacy is “concerned with judgments of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122). Studies have shown that it contributes to students’ choice of activities, investment of effort, level of persistence and achievement (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011; Zimmerman & Cleary, 2006). As such, we expect professional self-efficacy to contribute to a student’s propensity to perform and deliver competent professional service.

**Preference for a Particular Profession.** This fifth factor measures the strength of professional identity. It consists of the individual’s focus to direct his or her attention, energy and commitment to become a practitioner in a particular field, and subsequently to engage in continual professional development for developing more and more expertise (“I really want to be a competent and specialized doctor”) (Ryan & Deci, 2003).

In summary, the five factors of the PIFFS are here considered as the key factors for professional identity development of students in vocational and professional education.

### **Educational Context of this Study**

This study was carried out at the Republic Polytechnic (RP) in Singapore where, as of Academic Year 2011/ 2012, a student population

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of about 14,000 students was prepared for a wide range of professions. RP consists of six schools and one centre that offer diploma programmes (i.e. (1) School of Engineering, (2) School of Applied Science, (3) School of Health, Sports and Leisure, (4) School of Hospitality, (5) School of Info-communications Technology, (6) School of Technology for the Arts, and (7) the Centre for Enterprise and Communication). Altogether, RP was preparing students for 38 different diplomas.

The polytechnic leveraged on problem-based learning (PBL), a pedagogical strategy for socializing students for professional practice, to prepare their students for professional practice in knowledge-driven and dynamic work environments (Yew & O'Grady, 2012). The following section presents an overview of PBL, its relevance to professional education and professional identity development, and how it has been implemented at the polytechnic.

### **Problem-based Learning (PBL)**

The main educational approach that has been chosen at RP is problem-based learning (PBL). PBL was first introduced in medical education at McMaster University in Hamilton, Canada to better equip students for their transition from the pre-clinical to clinical phases of their education, and to prepare them more effectively for professional practice (Barrows & Tamblyn, 1980; Boud & Feletti, 1998). PBL has since been introduced to medical education in other universities such as Maastricht University in the Netherlands, University of Manchester in the United Kingdom and Queensland University in Australia, and other areas of professional education such as business administration, chemical engineering, engineering studies, law schools, leadership education, nursing, social work and teacher education (Hung, et al., 2008).

The aim of the PBL approach is to facilitate students to learn in ways that mirror the professional practice (Barrows & Tamblyn, 1980). In PBL, the feature is the use of problem triggers placed in a context, e.g. a

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medical phenomenon within a professional practice situation, such as an emergency ward. Small groups of students work on the problem together: they analyse the problem, identify learning issues that are helpful for developing an adequate explanation for the phenomenon, investigate literature related to their learning issues and prepare their explanations. These explanations have to be presented by them during a next session. When required, they also determine the course of treatment, action or solution that best addresses the phenomenon.

The role of the tutor in PBL is to provide guidance for the students' learning process of constructing and acquiring knowledge: the activation of prior knowledge, search and processing of relevant information, thinking and reasoning the best response to the given problem (Hmelo-Silver, 2004; Norman & Schmidt, 1992). PBL tutors scaffold the learning using both hard and soft scaffolds (Choo, et al., 2011). Hard scaffolds are material supports such as worksheets that are made available for the students to use. Soft scaffolds are provided by the tutor based on their observations of learner needs, such as asking questions to prompt thinking and managing team dynamics to promote more productive learning (Saye & Brush, 2002). Tutors who demonstrate, guide and provide explicit feedback have been found to be influential in medical and healthcare students' clinical reasoning (Ajjawi & Higgs, 2008; Beckett & Gough, 2004; Diemers, Dolmans, Verwijnen, Heineman, & Scherpbier, 2008).

The "reversed" learning approach in PBL and the facilitative style of teaching allows students to acquire practical reasoning skills, such as clinical reasoning; they also enable students to transfer their learning with greater ease as they would have had exposure to a number of the professional practice contexts in the problems (Schmidt, 1983; Barrows & Tamblyn, 1980). PBL also promotes flexible thinking and lifelong learning. Compared to the traditional lecture-tutorial approach, students take greater ownership and responsibility for their learning to actively work on the problems, and learn relevant knowledge (Hmelo-Silver, 2004;

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Schmidt, Loyens, Van Gog, & Paas, 2007). Students are also given time for self-directed learning. As such, when they become more adept at the PBL process and the use of learning strategies, they are expected to be more ready to learn at the workplace. Through actively exploring and understanding the various aspects of professional practice in their regular encounters with problems, students are expected to develop a more realistic sense of what it means to be a professional.

**PBL Implemented at RP.** The PBL structure implemented at the research site is a one day, one problem approach. Students actively engage in gaining knowledge and skills through collaboratively solving a problem within the course of a day (Yew & O’Grady, 2012). Each class consists of twenty-five students. The lessons for each module take place once a week over a fifteen-week semester. Both formative and summative assessments for the learning process (problem solving approach and skills, self-directedness in learning) and acquisition of knowledge are put in place at the polytechnic to provide adequate feedback for student learning. The main exceptions to the use of the PBL approach at the polytechnic are practical skills modules which require the demonstration and safe use of equipment (e.g. use of lighting equipment in theatre management), and practicum modules where students learn in a simulated work environment that serves real clients (e.g. the restaurant service and culinary skills for students preparing for the hospitality industry).

**Professional Identity Development through PBL.** As a pedagogical strategy for socializing students for professional practice, PBL is expected to have an influence on students’ understanding of what it means to work in their chosen profession, and thereby contribute to students’ professional identity development. Empirical studies have linked PBL with increased self-efficacy in the role of the profession (Dunlap, 2005); increased Knowledge about Professional Practices such as norms, role obligations and responsibilities of specific roles in the professional team (Jones, et al., 2010); and positive change in attitude and behavior (Elcin, et al., 2006). There have also been studies about how PBL can be

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improved or extended to internships to help students learn professionalism that contributes to their professional identity development. Examples are the use of formal wiki space for collaborative learning (Varga-Atkins, et al., 2010), and the use of PBL to support student learning in clinical education (Dornan et al., 2007) and student teacher internships (Mulcahy, 2006).

However, all these studies were conducted using qualitative methods and course evaluation feedback by students and staff. In general, there is limited research concerning the question how PBL contributes to professional identity development. The use of the PIFFS can provide more empirical information about how PBL contributes to professional identity development.

### **Aims and hypotheses**

The main aim of this study was to investigate professional identity development in students at a polytechnic. To realize this aim we used the PIFFS.

**Hypothesis 1.** We expected significant increase across the three different cohort levels (Year 1 to Year 2 to Year 3) on all the five factors of the PIFFS, and on the overall professional identity score. This hypothesis was based on the expectation that professional education progressively contributes to students' preparation for professional practice.

**Hypothesis 2.** Students may have had prior vocational education when they entered the polytechnic. Those with prior vocational education experience are expected to have higher scores than those without prior vocational education, for all five factors and the overall professional identity score.

**Hypothesis 3.** We also expected to find significant differences in professional identity development between the groups of students who

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were enrolled in diploma programmes related to their future work (Rel), students who were enrolled in diploma programmes not related to their future work (NRel) and students who were still unsure about the relevance of their diploma programme (URel). We expected that the Rel group would have the highest professional identity scores and NRel the lowest.

**Hypothesis 4.** Finally, we were also interested in knowing if professional identity development has a significant relationship with student achievement in terms of their grades. Our hypothesis was that professional identity would be related to the achievements of the students (Dall’Alba & Barnacle, 2007) at the polytechnic. We tested this hypothesis for each of the five factors of the PIFFS.

## Method

### Participants

All together 1.295 students were involved in this study. They participated in an online extra-curricular activity related to learning at the polytechnic. The activity required them to complete the PIFFS survey and to submit reflections about their learning to become the new practitioners. The students were informed about the aim of the study. Table 1 shows the diplomas offered by the schools at RP to prepare students for various types of professions. The six schools and the centre have been mentioned in an earlier section (p.66). The students in this survey were enrolled in 36 out of a total of 38 diploma programmes that were offered in the Academic Year 2011/ 2012.

Based on the total student population ( $N = 13,927$ ), the number of respondents formed a sample size of 9.3%; 41.2% ( $n = 533$ ) were males and 58.8% ( $n = 762$ ) were females. The majority were first year students, 40.8% ( $n = 528$ ), followed by second year students, 36.8% ( $n = 476$ ) and third year students, 22.5% ( $n = 291$ ). The average ages were respectively 18.1 ( $SD = 1.89$ ) for Year 1, 19.1 ( $SD = 1.59$ ) for Year 2, and 19.9 ( $SD =$



1.39) for Year 3. The majority of the students ( $n = 1,112$ ; 85.9%) were Singapore citizens, and 13.9% were from Asia ( $n = 180$ ) and 0.2% ( $n = 3$ ) from other countries.

In comparison, the total population of students at RP had a more balanced gender ratio (48% males and 52% females) and spread of the three cohort levels, Year 1 (36.9%), Year 2 (31.3%) and Year 3 (31.8%). The citizenship representation was, however, similar to the sample representation, with 86.5% Singaporeans, 13.2% Asians and 0.3% of other types of citizenship.

Table 1  
*Examples of the Diplomas and the Corresponding Types of Professions Students were Prepared For*

School	Diplomas	Types of Professions
Centre for Culture & Communication	Diploma in Communication and Information Design	Journalists, Copy Editors, Public Relations Executives, Junior Advertising Executives
School of Applied Sciences	Diploma in Pharmaceutical Sciences	Pharmaceutical Technicians & Assistants.
	Diploma in Biomedical Sciences	Biomedical Sales & Marketing, Marketing specialists, Sales & Marketing executives. Laboratory Technicians, Medical Technologist / Laboratory Technologist, Junior Technologists.
School of	Diploma in Supply Chain	Officers or Executives in

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School	Diplomas	Types of Professions
Engineering	Management	Logistics, Transportation, Planning, Purchasing, or Inventory Management.
	Diploma in Aerospace Avionics	Aircraft Engine Inspectors, Quality Engineers/ Auditors, Senior Technicians, Quality Assurance Inspectors.
School of Sports, Health & Leisure	Diploma in Outdoor & Adventure Learning	Outdoor Adventure Specialists
	Diploma in Sports & Exercise Sciences	Health Promotion Specialists, Physical Activity & Fitness Leaders, Patient Health Educators, Public Health Executives, Health Research Assistants.
School of Information-communication	Diploma in Business Applications	Web Developers, Junior Business Consultants/ Analysts, Customer Service Executives, Application Support Analysts, Software Engineers.
	Diploma in Information Technology	Network Engineers & Administrators, Wireless Engineers & Application Developers, IT Security Administrators & Specialists.
School of	Diploma in Customer	Account & Relationship

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School	Diplomas	Types of Professions
Hospitality	Relationship and Service Management	Executives, Sale & Marketing Executives, Customer Service Executives, Contact Centre Service Executives.
	Diploma in Hotel and Hospitality Management	Business Development Officers, Tourism Service Officers.  Junior Executives in Hospitality, Hotel, Clubs & Resorts, Restaurants & Entertainment Spots, Theme Parks & Attractions, Events Management.
School of Technology for the Arts	Diploma in New Media	Designers, Producers in Advertising, Marketing & Public Relations, Web Design & Development.
	Diploma in Game Design	Game Designers, Game Level Designers, Associate Producers, Games Quality Assurance Testers.

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*Note.* Content extracted from Republic Polytechnic Diplomas Brochures 2010.

### **Instrument**

The professional identity development of the students was measured using the 25-item PIFFS (see Annex A2). This instrument consists of five factors, namely (1) Knowledge about Professional

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Practices (6 items), (2) Having the Professional as a Role Model (5 items), (3) Experience with the Profession (6 items), (4) Professional Self-efficacy (6 items) and (5) Preference for a Particular Profession (2 items). For all the items the students respond using a five-point Likert scale: 1 (*never true*), 2 (*not really true*), 3 (*neutral*), 4 (*somewhat true*), and 5 (*definitely true*). The exception is one item for Preference for a Particular Profession that requires only a *yes* or *no* response.

Examples of the items for the factor, Knowledge about Professional Practices are “*I have some idea about the roles and responsibilities of different jobs in the profession I will be entering*”, and “*I am aware of the impact of the decisions I make as a professional in the industry*”; examples of the items for the factor Having the Professional as a Role Model are “*I admire most those teachers who are professionals in the area that I would like to enter*”, and “*When working on problems in class, I imagine myself to be in the shoes of a professional in my future work environment*”. The third factor Experience with the Profession is measured using items such as “*I follow developments in the industry in newspapers and on television*”, and “*I am working part-time or running a business relating to what I am studying*”. The fourth factor Professional Self-efficacy is considered in terms of items such as “*I am sure I will have no problems dressing and behaving professionally in my industry*” and “*I feel poorly prepared for a real job*”. For the fifth factor, Preference for a Particular Profession, it consists of two items, namely: “*Do you already know what kind of work or profession you prefer?*” (requires only a *yes* or *no* response), and “*I am already pretty sure what kind of profession I will enter after completing the polytechnic or university education*” (five point Likert scale similar to all the other questions). For each of the five subscales, the sum scores of the item scores are averaged for the relevant subgroups.

Confirmatory factor analysis and factorial invariance analysis have already been carried out for this instrument and with results of a reasonably good fit (CFI at .90, RMSEA at .05) and stability across two

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independent groups. The measure has also been found to have good reliability with coefficient  $H$  ranging from .65 to .85 (Tan, in preparation; Tan & Schmidt, 2012).

### **Procedure**

Each academic year consists of two 15-week semesters. In the Academic Year 2011/2012, nearing the end of the first semester in Week 13, all students were emailed an invitation to participate in the online Professional Identity survey. It was part of an extra-curricular activity related to learning at the polytechnic and which they could choose to take part in. At the polytechnic, students were expected to participate in a minimum number of extra-curricular activities during the course of their education, and the fulfillment of this was recorded. The students were informed that their responses to the survey would also contribute to a research study related to their learning at the polytechnic. The internet survey was available for one week.

### **Statistical Analysis**

**Factor scores.** For each student, average scores were computed for each factor. As the Likert scale was a five-point scale, the maximum average score for each factor was 5, and the minimum score was 1. The exception to this rule was the fifth factor, Preference for a Particular Profession. As mentioned above, it consisted of two items, the first one of which required a “Yes” or “No” response. A score of 1 was ascribed to a *no* response, and a score of 2 was ascribed to a *yes* response. The second item was based on the five-point Likert scale similar to the rest of the survey items. Therefore, the maximum score for the factor was 3.5. We averaged the scores for all five factors to arrive at the overall Professional Identity score for each respondent. The maximum score for the overall Professional Identity was 4.7.

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**Relevance categories.** We used two Likert scale questions that we asked the students in the same survey (in addition to the PIFFS items) to categorise the student responses into three groups. The questions were: 1) My future work is related to the diploma (programme) I am enrolled in, and 2) My polytechnic education is relevant and useful in preparing me for my future. We noted that students may not have perceived their diploma to have direct relevance to their future profession, but if it provided them with the minimum qualification for taking the subsequent steps in achieving their career goals, it still had relevance or value to their future work. The maximum averaged score for the two questions was five. Averaged ratings that were less than 2.5 were categorized as meaning that the diploma was not considered to be relevant for the future job (NRel), those that were higher than 3.5 were categorized as meaning that the diploma was indeed considered relevant for the future job (Rel). The averaged ratings that were within the range of 2.5 and 3.5 (both numbers inclusive) were grouped as unsure about the relevance of their diploma to their future work (URel).

**Student achievements.** The student achievements were measured in terms of grade points. At the institution, students were given a grade and accompanying feedback each time they completed their cycle of learning in class for the day. These were named daily grades (DG) and they took into account the quality of the students' process of learning, i.e. how they went about it, as well as the outcomes of the learning. The DGs were complemented by understanding tests which assessed them on their knowledge and practical skills. There were on average three understanding tests (UT) for every module in each semester. Both the daily grades and understanding test grades contributed to the overall module grade point (MG). The module grade points for all the modules taken in the semester contributed to a cumulative grade point average (GPA) for each student.

The achievement measures used in this study were the averaged DG, averaged UT and MG scores for each student in the semester the survey was completed, and their GPA one year later.

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**Comparisons between groups.** We used MANOVA (SPSS 18.0) to make comparisons between the scores of groups on the overall Professional Identity score and on the five factors of the PIFFS. Where Pillai's trace indicated significant differences, we conducted one-way ANOVA. When there was homogeneity of variances between the groups, we carried out the post-hoc analysis using the Least Significant Difference (LSD). When the variances between the groups were significantly different, the Games-Howell post hoc test was used. To minimize risk capitalization, Bonferroni's correction needed to be applied. We used the  $p$ -value .010 to account for the five dependent variables i.e. the five factors. However, as doing so increases the risk of Type II error, we applied the Bonferroni's correction cautiously: where clear patterns were shown such as the differences in the cross-sectional analysis in each of the Rel, URel and NRel groups, we have chosen to report the differences despite the  $p$ -value being more than .010. From the post-hoc tests, we identified the paired variables to run  $t$ -tests and compute the effect sizes. For these, the  $p$ -value may be less than .010, and hence the significant differences taken into account even though the ANOVA, LSD or Games-Howell post-hoc tests may have  $p$ -values slightly more than .010.

First, the three cohorts consisting of Year 1, 2, and 3 students were compared. Next, students with and without prior vocational education were compared. Finally the Rel, URel and NRel groups were examined for significant differences in the five factors and overall Professional Identity score.

The MANOVA tests were also used for determining if there were significant relationships between the factors and achievement measures. The groups for each factor were formed by ordering them in ascending order and dividing them into four equal groups. In general, the analysis of variance tests are most robust for samples with equal size (Field, 2009).

### **Ethical considerations**

This research study was approved by the Institutional Review Board at the polytechnic where the research was conducted, for having satisfied the ethical considerations. The accepted research protocol included informed consent by the survey participants, controlled storage and access of data and de-identified reporting of verbatim responses.

## Results

The main aim of this study was to gain insight into the professional identity development of students in vocational and professional education. The professional identity five-factor scale (PIFFS) was used for this purpose, because it was the most comprehensive in terms of the factors, and also for the range of professions it could be used for. The research site was a polytechnic in Singapore which offered diploma programmes for preparing students for a diverse and wide range of professions. The baseline pedagogy at the polytechnic was PBL, a pedagogy that was relatively more practice oriented than the conventional lecture-tutorial approach; as such, it was expected that there would be significant increases across the cohorts.

### Testing Hypothesis 1: Comparisons between scores of students in Year 1, 2 and 3

The mean factor scores and overall professional identity score for students in Year 1, 2 and 3 are shown in Table 2.

Table 2  
*Means(M) and Standard Deviations(SD) of Professional Identity Factor Scores & Overall Score For All Students in Year 1, 2 & 3*

	<i>Year 1</i> ( <i>n = 528</i> )		<i>Year 2</i> ( <i>n = 476</i> )		<i>Year 3</i> ( <i>n = 291</i> )	
Professional Identity	3.24	0.45	3.23	0.45	3.21	.41



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	<i>Year 1</i> ( <i>n</i> = 528)		<i>Year 2</i> ( <i>n</i> = 476)		<i>Year 3</i> ( <i>n</i> = 291)	
Knowledge about Professional Practices	3.66	0.59	3.71	0.57	3.67	.58
*Having the Professional as a Role Model	3.62	0.44	3.60	0.50	3.52	.50
Experience With the Profession	2.87	0.85	2.84	0.78	2.77	.69
Professional Self-Efficacy	3.44	0.55	3.41	0.55	3.47	.57
Preference for a Particular Profession	2.62	0.61	2.61	0.61	2.65	.59

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*Note.* \*Significant differences at  $p < .05$  were only found between the three cohorts in Having the Professional as a Role Model: Welch  $F(2, 723.48) = 4.35$ ,  $p = .013$ ,  $\omega^2 = .01$ . Post-hoc: Year 1 > Year 3,  $p = .011$ ;  $t(535.4) = 2.90$ ,  $p = .002$ , Cohen's  $d = .25$ .

Using Pillai's trace, there was a significant effect found in the cross-sectional analysis:  $V = .023$ ,  $F(10, 2578) = 2.97$ ,  $p = .011$ . The ANOVA that followed found the significant difference in the factor, Professional as a Role Model, and it was a decline: Welch  $F(2, 723.48) = 4.35$ ,  $p = .013$ ,  $\omega^2 = .01$ . Post-hoc: Year 1 > Year 3,  $p = .011$ ;  $t(535.4) = 2.90$ ,  $p = .002$ , Cohen's  $d = .25$ .

It can be concluded from these mean scores in Year 1, 2 and 3 that, contrary to our expectation, there is no gain in the scores on the five factors during the three years. We noted, that students began their professional education in the first semester of a three year diploma programme already with above neutral scores (> 3 out of a total of 5) for four factors, namely, Knowledge about Professional Practices, Having the

Professional as Role Model and Professional Self-efficacy, and ( $> 2.5$  out of a total of 3.5) for the factor Preference for a Particular Profession. Not surprisingly, where the fifth factor, Experience with the Profession was concerned, students started with lower scores at less than the *neutral* 3.0. The standard deviations for Year 1, 2 and 3 students were the highest for this factor (ranging from .69 to .85) compared to the standard deviations for the other four factors. We can infer that the responses to items related to this factor formed a wider range than those in other factors.

### Testing Hypothesis 2: Comparisons between scores of students with and without prior vocational education

Table 3 shows the comparison between the Year 1 students with and without prior vocational education.

Table 3  
*Means (M) and Standard Deviations (SD) of Professional Identity Factor Scores and Overall Score For Year 1 Students With and Without Prior Vocational Education*

Year 1 Students ( <i>N</i> = 528)	<i>With Prior Vocational Education (n = 63)</i>		<i>Without Prior Vocational Education (n = 465)</i>		<i>T-test values, Cohen's d's</i>
Professional Identity	3.43	0.42	3.22	0.45	$t(526) = 3.50, p = .000, \text{Cohen's } d = .31$
Knowledge about Professional Practices	3.86	0.58	3.64	0.59	$t(526) = 2.85, p = .002, \text{Cohen's } d = .25$
Having the Professional as a Role Model	3.67	0.44	3.61	0.44	Ns
Experience with the Profession	3.25	0.68	2.81	0.86	$t(526) = 3.90, p = .000, \text{Cohen's } d = .34$

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Year 1 Students ( <i>N</i> = 528)	<i>With Prior Vocational Education</i> ( <i>n</i> = 63)		<i>Without Prior Vocational Education</i> ( <i>n</i> = 465)		<i>T-test values, Cohen's d's</i>
Professional Self- efficacy	3.56	0.56	3.43	0.55	Ns
Preference for a Particular Profession	2.79	0.57	2.60	0.61	$t(526) = 2.40, p = .009, \text{Cohen's } d = .21$

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*Note.*  $p < .05$ .

Using Pillai's trace, there was a significant effect of prior vocational education on their professional identity as measured by PIFFS:  $V = .032, F(5, 522) = 3.49, p = .032$ .

The students with prior vocational education scored higher on all five factors than the students without prior vocational education, and these scores were statistically significantly higher for three factors: (a) Knowledge about Professional Practices ( $t(526) = 2.85, p = .004$ ; Cohen's  $d = .25$ ), (b) Experience with the Profession ( $t(526) = 3.90, p = .000$ , Cohen's  $d = .34$ ), and (c) Preference for a Particular Profession ( $t(526) = 2.40, p = .008$ , Cohen's  $d = .21$ ). The overall Professional Identity score was also statistically significantly higher for the students with prior vocational education than for students without that. ( $t(526) = 3.50, p = .000$ , Cohen's  $d = .31$ )

For Experience with the Profession, students with prior vocational education had a mean score higher than neutral:  $M = 3.25$  ( $SD = .68$ ), while the students without prior vocational education had a mean score of less than *neutral*:  $M = 2.81$  ( $SD = .86$ ). For the remaining two factors, Having the Professional as a Role Model and Professional Self-efficacy, there were no significant differences between these two groups of students.

We carried out cross-sectional analyses for the groups of students with and without prior vocational education (see Tables 4 and 5 for the descriptive statistics).

Table 4  
*Means (M) and Standard Deviations (SD) of Professional Identity Factor Scores and Overall Scores For Year 1, 2 & 3 Students Without Prior Vocational Education*

Students Without Prior Vocational Education ( <i>N</i> = 1,131)	<i>Year 1</i> ( <i>n</i> = 465)		<i>Year 2</i> ( <i>n</i> = 395)		<i>Year 3</i> ( <i>n</i> = 271)	
Professional Identity	3.22	0.45	3.22	0.45	3.22	.41
Knowledge about Professional Practices	3.64	0.59	3.69	0.56	3.67	.58
*Having the Professional as a Role Model	3.61	0.44	3.61	0.50	3.52	.50
Experience with the Profession	2.81	0.86	2.79	0.77	2.78	.69
Professional Self-efficacy	3.43	0.55	3.39	0.55	3.48	.58
Preference for a Particular Profession	2.60	0.61	2.60	0.62	2.66	.58

*Note.* \*Significant differences at  $p < .05$  found between the three cohorts only in Having the Professional as Role Model: Welch  $F(2, 651.04) = 3.61$ ,  $p = .028$ ,  $\omega^2 = .01$ . Post-hoc: Year 1 > Year 3,  $p = .029$ ;  $t(504.5) = 2.56$ ,  $p = .006$ , Cohen's  $d = .23$ .

Table 5  
*Means(M) & Standard Deviations (SD) of Professional Identity Factor Scores and Overall Scores For Year 1, 2 & 3 Students With Prior Vocational Education*

Students With Prior Vocational Education ( <i>N</i> = 164)	<i>Year 1</i> ( <i>n</i> = 63)		<i>Year 2</i> ( <i>n</i> = 81)		<i>Year 3</i> ( <i>n</i> = 20)	
Professional Identity	3.43	0.42	3.32	0.45	3.13	.38
Knowledge about Professional Practices	3.86	0.58	3.78	0.62	3.63	.62
Having the Professional as a Role Model	3.67	0.44	3.59	0.50	3.51	.47
Experience with the Profession	3.25	0.68	3.07	0.79	2.59	.71
Professional Self-efficacy	3.56	0.56	3.48	0.55	3.38	.47
Preference for a Particular Profession	2.79	0.57	2.67	0.58	2.53	.62

*Note.* No significant differences at  $p < .05$ .

The cross-sectional analyses made it clear that both groups of students did not grow in their professional identity development during their polytechnic education. Using Pillai's trace, no significant differences were found in cross sectional analyses of students with prior vocational education. A significant difference was found in the group of students without prior vocational education: ( $n = 1,131$ ),  $V = .027$ ,  $F(10, 2250) = 3.04$ ,  $p = .001$ ; and in only one factor. It reflected a decline across the cohorts in the factor, Having the Professional as a Role Model: Welch  $F(2, 651.04) = 3.61$ ,  $p = .028$ ,  $\omega^2 = .01$ ; post-hoc: Year 1 > Year 3,  $p = .029$ ;  $t(504.5) = 2.56$ ,  $p = .006$ , Cohen's  $d = .23$ .

### **Testing Hypothesis 3: Comparisons between students with different Relevance levels**

The entire sample was grouped in terms of students' perceived relevance of the diploma programme to their future work: students who were sure it was relevant (Rel), were unsure of the relevance (URel) or were sure that the diploma programme was not relevant (NRel) (see Table 6 for the descriptive statistics).

The cross-sectional analysis results showed that professional identity development was more positive for the Rel group of students compared with the other two groups of students (see Tables 7, 8 & 9). Using Pillai's trace, there was no cross-sectional increase in professional identity development in the NRel group (Table 8). There were, however, significant differences found in the URel (Table 9) and Rel (Table 7) groups:  $V = .043$ ,  $F(10, 910) = 1.99$ ,  $p = .031$ ; and  $V = .030$ ,  $F(10, 1406) = 2.15$ ,  $p = .018$  respectively.

In the Rel group, there were significant increases across the 3 Year cohorts in three factors: Knowledge about Professional Practices, Professional Self-efficacy and Preference for a Particular Profession (Table 7); and in the URel group, a statistically significant decline was found in one factor, Having the Professional as a Role Model (Table 9).

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Table 10 and 11 show the comparisons of the Relevance groups in Year 1 and Year 3 respectively. Amongst the Year 1 students, for the overall Professional Identity score, the URel group mean score ( $M = 3.10$ ) was significantly lower than the mean score of the Rel group ( $M = 3.33$ ), with a moderate effect size (Cohen's  $d = .52$ ) (see Table 10). The NRel group ( $M = 3.24$ ) did not score significantly lower than either of the other two groups. In the graduating cohort of Year 3, both the URel ( $M = 3.04$ ) and NRel ( $M = 3.16$ ) group means for the overall Professional Identity score were significantly lower than the Rel group mean ( $M = 3.42$ ) (see Table 11). For the Year 3 group, the effect size for the difference between URel and Rel was larger (Cohen's  $d = 1.12$ ) than that between the URel and Rel students in Year 1 (Cohen's  $d = .53$ ). The gap widened.

It can be inferred from the comparisons between the relevance groups, that being uncertain about the perceived relevance (URel) of the learning to one's future work can be more disadvantageous to the students' learning in professional education, as compared with a perceived lack of relevance (NRel).

Table 6

*One-way ANOVA and Post-hoc Analysis of Entire Sample Categorized Based on Relevance of the Diploma to Students' Future Work*

	<u>All</u> ( <i>N</i> = 1,295)		<u>Not Relevant</u> ( <i>NRel</i> ) ( <i>n</i> = 125)		<u>Unsure</u> ( <i>URel</i> ) ( <i>n</i> = 461)		<u>Relevant</u> ( <i>Rel</i> ) ( <i>n</i> = 709)		<i>F</i> -Statistic	<i>Post-hoc</i>
*Professional Identity	3.23	.44	3.21	.48	3.06	.42	3.35	.41	Welch <i>F</i> (2, 329.29) = 67.38,  <i>p</i> = .000, $\omega^2$ = .29	Rel > URel, <i>p</i> = .000; <i>t</i> (1168) = 11.70, <i>p</i> = .000, Cohen's <i>d</i> = .68  Rel > NRel, <i>p</i> = .007; <i>t</i> (157.1) = 3.17, <i>p</i> = .001, Cohen's <i>d</i> = .50  NRel > URel, <i>p</i> = .005; <i>t</i> (180.2) = 3.08, <i>p</i> = .001, Cohen's <i>d</i> = .46
*Knowledge about Professional Practices	3.68	.58	3.73	.70	3.45	.54	3.82	.53	Welch <i>F</i> (2, 322.91) = 63.48,  <i>p</i> = .000, $\omega^2$ = .28	Rel > URel, <i>p</i> = .000; <i>t</i> (1168) = 11.28, <i>p</i> = .000, Cohen's <i>d</i> = -.69  NRel > URel, <i>p</i> = .000; <i>t</i> (167.2) = 4.17, <i>p</i> = .000, Cohen's <i>d</i> = .65



	<u>All</u> ( <i>N</i> = 1,295)		<u>Not Relevant</u> ( <i>NRel</i> ) ( <i>n</i> = 125)		<u>Unsure</u> ( <i>URel</i> ) ( <i>n</i> = 461)		<u>Relevant</u> ( <i>Rel</i> ) ( <i>n</i> = 709)		<i>F</i> -Statistic	<i>Post-hoc</i>
*Having the Professional as a Role Model	3.59	.48	3.33	.52	3.41	.46	3.75	.42	Welch <i>F</i> (2, 325.93) = 102.65, <i>p</i> = .000, $\omega^2 = .39$	Rel > URel, <i>p</i> = .000; <i>t</i> (924.9) = 12.91, <i>p</i> = .000, Cohen's <i>d</i> = .85 Rel > NRel, <i>p</i> = .000; <i>t</i> (154.1) = 8.62, <i>p</i> = .000, Cohen's <i>d</i> = 1.39
*Experience with the Profession	2.83	.79	2.73	.80	2.74	.73	2.92	.82	Welch <i>F</i> (2, 343.90) = 8.45, <i>p</i> = .000, $\omega^2 = .05$	Rel > URel, <i>p</i> = .000; <i>t</i> (1062.4) = 3.88, <i>p</i> = .000, Cohen's <i>d</i> = .24
*Professional Self-efficacy	3.44	.55	3.56	.60	3.31	.54	3.50	.54	<i>F</i> (2, 1,292) = 20.84, <i>p</i> = .000, $\eta^2 = .03$	Rel > URel, <i>p</i> = .000; <i>t</i> (1168) = 5.95, <i>p</i> = .000, Cohen's <i>d</i> = .35 NRel > URel, <i>p</i> = .000, <i>t</i> (180.8) = 4.27, <i>p</i> = .001, Cohen's <i>d</i> = .64

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	<u>All</u> ( <i>N</i> = 1,295)		<u>Not Relevant</u> ( <i>NRel</i> ) ( <i>n</i> = 125)		<u>Unsure</u> ( <i>URel</i> ) ( <i>n</i> = 461)		<u>Relevant</u> ( <i>Rel</i> ) ( <i>n</i> = 709)		<i>F</i> -Statistic	<i>Post-hoc</i>
*Preference for a Particular Profession	2.62	.60	2.69	.61	2.39	.65	2.76	.53	Welch <i>F</i> (2, 329.27) = 53.19, <i>p</i> = .000, $\omega^2 = .24$	Rel > URel, <i>p</i> = .000; <i>t</i> (838.2) = 10.30, <i>p</i> = .000, Cohen's <i>d</i> = .71 NRel > URel, <i>p</i> = .000, <i>t</i> (584) = 4.61, <i>p</i> = .001, Cohen's <i>d</i> = .38

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*Note.* \*Significant differences between the three groups at  $p < .05$ .

Table 7  
*Cross-sectional Analysis of Students considering their Diploma Relevant to their Future Work (Rel)*

Total <i>N</i> = 709	Year 1 ( <i>n</i> = 310)		Year 2 ( <i>n</i> = 283)		Year 3 ( <i>n</i> = 116)		<i>F</i> Statistic	<i>Post-hoc</i>
Professional Identity	3.33	0.43	3.34	0.40	3.42	.34	Ns	Ns
*Knowledge about Professional Practices	3.76	0.56	3.84	0.52	3.90	.47	Welch's <i>F</i> (2, 335.11) = 3.54, <i>p</i> = .03, $\omega^2 = .02$	Year 3 > Year 1, <i>p</i> = .033, <i>t</i> (244.0) = 2.52, <i>p</i> = .006, Cohen's <i>d</i> = .32
Having the Professional as a Role Model	3.71	0.43	3.77	0.42	3.81	.40	Ns	Ns
Experience With the Profession	2.94	0.86	2.89	0.81	2.92	.75	Ns	Ns
*Professional Self-Efficacy	3.49	0.54	3.46	0.53	3.62	.56	<i>F</i> (2,706) = 3.78, <i>p</i> = .023, $\eta^2 = .01$	Year 3 > Year 1, <i>p</i> = .029, <i>t</i> (424) = 2.16, <i>p</i> = .015, Cohen's <i>d</i> = .21 Year 3 > Year 2, <i>p</i> = .006; <i>t</i> (397) = 2.74, <i>p</i> = .003, Cohen's <i>d</i> = .28

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Total $N = 709$	<i>Year 1</i> ( $n = 310$ )		<i>Year 2</i> ( $n = 283$ )		<i>Year 3</i> ( $n = 116$ )		<i>F Statistic</i>	<i>Post-hoc</i>
*Preference for a Particular Profession	2.74	0.55	2.75	0.54	2.86	.43	Welch's $F(2, 349.47) = 3.53, p = .03, \omega^2 = .02$	Year 3 > Year 1, $p = .036$ ; $t(262.9) = 2.49, p = .006$ , Cohen's $d = .31$

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*Note.* \*Significant differences between the three cohorts at  $p < .05$ .

Table 8  
*Cross-sectional Analysis of Students Not Enrolled in Diploma Programmes Relevant to their Future Work (NRel)*

Total N = 125	<i>Year 1</i> (n = 35)		<i>Year 2</i> (n = 36)		<i>Year 3</i> (n = 54)	
Professional Identity	3.24	0.51	3.26	0.44	3.16	.48
Knowledge about Professional Practices	3.79	0.68	3.82	0.62	3.64	.75
Having the Professional as a Role Model	3.41	0.41	3.35	0.58	3.27	.54
Experience with the Profession	2.77	0.97	2.80	0.72	2.67	.73
Professional Self-efficacy	3.56	0.67	3.58	0.54	3.55	.61
Preference for a Particular Profession	2.64	0.71	2.78	0.53	2.66	.60

*Note.* No significant differences at  $p < .05$  found between the three cohorts.

Table 9  
*Cross-sectional Analysis of Students Unsure if their Diploma Programmes are Relevant to their Future Work (URel)*

Total N = 461	Year 1 (n = 183)		Year 2 (n = 157)		Year 3 (n = 121)	
Professional Identity	3.10	0.44	3.03	0.46	3.04	.35
Knowledge about Professional Practices	3.47	0.57	3.43	0.55	3.47	.50
*Having the Professional as a Role Model	3.49	0.42	3.36	0.50	3.34	.43
Experience with the Profession	2.77	0.81	2.76	0.73	2.66	.59
Professional Self-efficacy	3.34	0.53	3.28	0.56	3.29	.52
Preference for a Particular Profession	2.42	0.65	2.32	0.65	2.43	.64

*Note.*\*Significant differences at  $p < .05$  between the three cohorts in the factor Having the Professional as Role Model,  $F(2, 458) = 5.31$ ,  $p = .005$ ,  $\eta^2 = .02$ . Post hoc: Year 1 > Year 3,  $p = .50$ ;  $t(302) = 3.03$ ,  $p = .002$ , Cohen's  $d = .35$ .

Table 10

*One-way ANOVA and Post-hoc Analysis of the Year 1 Subgroups Categorized Based on Relevance of the Diploma to Students' Future Work*

	<u>All</u> ( <i>N</i> = 528)		<u>Not Relevant</u> ( <i>NRel</i> ) ( <i>n</i> = 35)		<u>Unsure</u> ( <i>URel</i> ) ( <i>n</i> = 183)		<u>Relevant</u> ( <i>Rel</i> ) ( <i>n</i> = 310)		<i>F</i> -Statistic	<i>Post-hoc</i>
*Professional Identity	3.24	.45	3.24	.51	3.10	.44	3.33	.43	$F(2, 525) = 16.08, p = .000, \eta^2 = .06$	Rel > URel, $p = .000$ ; $t(491) = 5.75, p = .001$ , Cohen's $d = .52$
*Knowledge about Professional Practices	3.66	.59	3.79	.68	3.47	.57	3.76	.56	$F(2, 525) = 16.10, p = .000, \eta^2 = .06$	Rel > URel, $p = .000$ ; $t(491) = 5.59, p = .001$ , Cohen's $d = .50$  NRel > URel, $p = .002$ ; $t(216) = 2.98, p = .002$ , Cohen's $d = .41$
*Having the Professional as a Role Model	3.62	.44	3.41	.41	3.49	.42	3.71	.43	$F(2, 525) = 19.84, p = .000, \eta^2 = .07$	Rel > URel, $p = .000$ ; $t(491) = 5.54, p = .000$ , Cohen's $d = .50$  Rel > NRel, $p =$

	<u>All</u> ( <i>N</i> = 528)		<u>Not Relevant</u> ( <i>NRel</i> ) ( <i>n</i> = 35)		<u>Unsure</u> ( <i>URel</i> ) ( <i>n</i> = 183)		<u>Relevant</u> ( <i>Rel</i> ) ( <i>n</i> = 310)		<i>F</i> -Statistic	<i>Post-hoc</i>
										.000; <i>t</i> (343) = 3.99, <i>p</i> = .001, Cohen's <i>d</i> = .43
Experience with the Profession	2.87	.85	2.77	.97	2.77	.81	2.94	.86	Ns	Ns
*Professional Self-efficacy	3.44	.55	3.56	.67	3.34	.53	3.49	.54	<i>F</i> (2, 525) = 5.33, <i>p</i> = .005, $\eta^2 = .02$	Rel > URel, <i>p</i> = .003; <i>t</i> (491) = 3.04, <i>p</i> = .002, Cohen's <i>d</i> = .27
*Preference for a Particular Profession	2.62	.61	2.64	.71	2.42	.65	2.74	.55	Welch <i>F</i> (2, 88.79) = 15.24, <i>p</i> = .000, $\omega^2 = .26$	Rel > URel, <i>p</i> = .000; <i>t</i> (331.4) = 5.54, <i>p</i> = .000, Cohen's <i>d</i> = .61

*Note.* \*Significant differences between the three groups at  $p < .05$ .



Table 11

*One-way ANOVA and Post-hoc Analysis of the Year 3 Sub-groups Categorized Based on Relevance of the Diploma to Students' Future Work*

	<u>All</u> ( <i>N</i> = 291)		<u>Not Relevant</u> ( <i>NRel</i> ) ( <i>n</i> = 54)		<u>Unsure</u> ( <i>URel</i> ) ( <i>n</i> = 121)		<u>Relevant</u> ( <i>Rel</i> ) ( <i>n</i> = 116)		<i>F</i> -Statistic	<i>Post-hoc</i>
*Professional Identity	3.21	.41	3.16	.48	3.04	.35	3.42	.34	Welch <i>F</i> (2, 131.13) = 36.99, <i>p</i> = .000, $\omega^2$ = .36	Rel > URel, <i>p</i> = .000; <i>t</i> (235) = 8.55, <i>p</i> = .000, Cohen's <i>d</i> = 1.12 Rel > NRel, <i>p</i> = .001; <i>t</i> (78.7) = 3.66, <i>p</i> = .000, Cohen's <i>d</i> = .83
*Knowledge about Professional Practices	3.67	.58	3.64	.75	3.47	.50	3.90	.47	Welch <i>F</i> (2, 128.37) = 23.47, <i>p</i> = .000, $\omega^2$ = .27	Rel > URel, <i>p</i> = .000; <i>t</i> (235) = 6.85, <i>p</i> = .000, Cohen's <i>d</i> = .89
*Having the Professional as a Role Model	3.52	.50	3.27	.54	3.34	.43	3.81	.40	Welch <i>F</i> (2, 133.36) = 46.31, <i>p</i> = .000, $\omega^2$ = .41	Rel > URel, <i>p</i> = .000; <i>t</i> (235) = 8.70, <i>p</i> = .000, Cohen's <i>d</i> = 1.14 Rel > NRel, <i>p</i> = .000; <i>t</i> (81.1) = 6.64, <i>p</i> = .000, Cohen's <i>d</i> = 1.47

	<u>All</u> ( <i>N</i> = 291)		<u>Not Relevant</u> ( <i>NRel</i> ) ( <i>n</i> = 54)		<u>Unsure</u> ( <i>URel</i> ) ( <i>n</i> = 121)		<u>Relevant</u> ( <i>Rel</i> ) ( <i>n</i> = 116)		<i>F</i> -Statistic	<i>Post-hoc</i>
*Experience with the Profession	2.77	.69	2.67	.73	2.66	.59	2.92	.75	Welch <i>F</i> (2, 137.37) = 4.70, <i>p</i> = .011, $\omega^2$ = .06	Rel > URel, <i>p</i> = .010; <i>t</i> (217.1) = 2.96, <i>p</i> = .002, Cohen's <i>d</i> = .40
*Professional Self-efficacy	3.47	.57	3.55	.61	3.29	.52	3.62	.56	<i>F</i> (2, 288) = 10.98, <i>p</i> = .000, $\eta^2$ = .07	Rel > URel, <i>p</i> = .000; <i>t</i> (235) = 4.66, <i>p</i> = .000, Cohen's <i>d</i> = .61 NRel > URel, <i>p</i> = .005; <i>t</i> (173) = 2.83, <i>p</i> = .003, Cohen's <i>d</i> = .43
*Preference for a Particular Profession	2.65	.59	2.66	.60	2.43	.64	2.86	.43	Welch <i>F</i> (2, 134.18) = 18.81, <i>p</i> = .000, $\omega^2$ = .22	Rel > URel, <i>p</i> = .000; <i>t</i> (209.8) = 6.10, <i>p</i> = .000, Cohen's <i>d</i> = .84

*Note.* \*Significant differences at  $p \leq .05$  found between the three groups.

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#### **Hypothesis 4: Relationship between Professional Identity and Academic Achievement Outcomes**

Our fourth hypothesis was that stronger professional identity would engender a stronger sense of commitment to study outcomes, which may result in better grades in the vocational or professional education programme. Therefore, we expected a significant positive relationship between both the overall professional identity score and the four achievement scores, as well as between each of the five factors with the same achievement scores.

Table 12

*Means (M) & Standard Deviations (SD) of Achievement Scores for each NRel, URel and Rel group*

Total $N = 1,292$	<i>NRel</i> ( $n = 125$ )		<i>URel</i> ( $n = 459$ )		<i>Rel</i> ( $n = 708$ )		<i>Significant differences</i>	
Daily grade point	2.35	.66	2.56	0.63	2.62	0.59	Rel> NRel	$t(823) = 4.62$ , $p = .000$ , Cohen's $d = .32$
Module grade point	2.19	.70	2.37	0.72	2.46	0.69	Rel> NRel	$t(823) = 3.94$ , $p = .000$ , Cohen's $d = .27$
Understanding test score	1.93	.63	1.97	0.72	2.05	0.65	Ns	
Grade Point Average (1 year later)	2.31	.60	2.44	0.61	2.53	0.61	Rel> NRel;	$t(831) = 3.69$ , $p = .000$ , Cohen's $d = .26$
							Rel> URel	$t(1165) = 2.68$ , $p = .004$ , Cohen's $d = .16$

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*Note.* Of the 1,295 students who completed the survey, three deferred their studies and hence their grades were not included in the analysis. Except for the GPA which reflected their cumulative achievement a year after the survey was completed, the other achievement data were what they had achieved during the semester that they had completed the survey.

The results of the MANOVA conducted for the factors and achievement scores indicated a significant relationship between the factor, Having the Professional as a Role Model, and the achievement scores, GPA, MG and UT. The test statistic was  $V = .015$ ,  $F(8, 2552) = 2.420$ ,  $p < .05$ . The one-way ANOVA was subsequently conducted between this factor and these achievement scores, with the Bonferroni correction applied. The results showed nominal effect sizes for UT:  $\omega^2 = .02$ ,  $F(3, 1277) = 5.04$ ,  $p = .002$ .

A further analysis was carried out with the different relevance groups. The mean achievement scores are the highest for the Rel group, followed by the URel, and then the NRel. Using Pillai's trace, there was a significant effect of relevance on the DG, MG and GPA:  $V = .015$ ,  $F(8, 2552) = 2.420$ ,  $p < .05$ . Students in the Rel group did better than the NRel students in all three achievement types, and although they also did better than the URel students in the GPA, they did not score significantly higher than them in the DG and MG for the semester data was collected.

When the effects of the factors on the achievement outcome was analysed for each of the relevance groups, none was found.

### **Discussion**

To investigate the professional identity development in students at a polytechnic, we tested four hypotheses using the PIFFS: (1) polytechnic education contributes to the development over the course of the three-year diploma programmes; (2) students with prior vocational education enter the polytechnic with stronger professional identity than those without; (3) students who were enrolled in diploma programmes relevant to their future careers have the strongest professional identity compared with those who

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were unsure about the relevance, or were enrolled in programmes unrelated to their future careers; (4) professional identity is linked to achievement outcomes measured in terms of grades.

The results showed that at the institutional level, there was no evidence for professional identity development. In fact, there was a decline in the factor, Having the Professional as a Role Model. Students with prior vocational education did enter the polytechnic with stronger professional identity than those without, in particular in three factors: Knowledge about Professional Practices, Experience with the Profession and Preference for a Particular Profession.

Further analysis provided insights into the differences in development in students grouped in terms of the perceived relevance of the diploma programmes to their future work. Professional identity development is more likely to be achieved when students perceive the relevance of their learning to their future work. For this subgroup there were significant increases in the factors Knowledge about Professional Practices, Professional Self-efficacy and Preference for a Particular Profession across the Year 1, 2 and 3 students. Professional identity development was least likely to be achieved when there was no perceived relevance in the subgroup of students. No significant differences were found in the cross-sectional analysis for this group in all five factors. A decline in the factor Having the Professional as a Role Model was observed in the group of students who were unsure about the relevance of the diploma programme to their future work.

The finding regarding differences in development between these different groups of students partially explain the lack of evidence reported in this study for professional identity development across the polytechnic. A review of the sample profile showed that the combined proportion of NRel and URel students amongst the first year students was 41%, and amongst the third year students was 60%. Another contributing reason is that students began their professional education in Year 1 with relatively

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high scores. The mean scores were above neutral scores for four factors: Knowledge about Professional Practices, Having the Professional as Role Model and Professional Self-efficacy, and Preference for a Particular Profession. Experience with the Profession was the only factor where the mean scores were below *neutral* 3.0.

The results suggest that the contribution of polytechnic education benefits mainly students enrolled in diploma programmes related to their future work. When the proportion of such students is small, the polytechnic's use of resources is thus likely to produce less than desirable student outcomes in terms of professional identity development, and even grades. The students who were enrolled in diploma programmes related to their future work scored higher on all four achievement scores compared with the other two groups of students. There is, however, the plausible explanation that these students were already academically stronger students in Year 1, when they started to study. It was because of their better pre-qualifying grades that they were given priority for their preferred choice. When we analysed the data to verify this explanation, we found that amongst the Year 1 students, there were no significant differences between the three groups in terms of their grades. Amongst the Year 3 students, significant differences between the groups were found in the GPA. There is thus some evidence to suggest the influence of relevance on achievement outcome.

A subsequent analysis between the professional identity factors and achievement outcomes suggested a weak effect of Having the Professional as a Role Model on test scores. No effects were found from the other factors on grades, even when the analysis was carried out for each of the relevance groups.

In the cross-sectional analysis of the Rel students, significant increases were found in three factors: Knowledge about Professional Practices, Professional Self-efficacy and Preference for a Particular Profession. This suggests that the PBL implemented at this polytechnic

contributes more to these three factors than Experience with the Profession and Having the Professional as a Role Model. Further studies will be required to understand how this may have occurred and how the polytechnic's approach to PBL, and other pedagogies can be enhanced and improved.

This study is the first that reports an analysis of professional identity development at an institution wide level, and for a broad range of professions. This has been made possible with the use of a recently developed measure, the PIFFS. The extent of the usefulness of PIFFS, and the knowledge that can be gained with its use, can only be known with wider application to study professional identity development of students in different educational institutions, and experiencing different pedagogical approaches.

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## Chapter 4: Influence of Polytechnic Education on Students' Perspectives of What It Means to be the Professional

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### Abstract

This study applied a comprehensive professional identity development framework, the professional identity five factor scale (PIFFS) to understand how polytechnic education contributed to the students' development. Data was collected by surveying students at a polytechnic in Singapore for their descriptions of the significant events or incidents that helped them understand what it meant to work in their chosen profession. The data was first coded for the sources of influence for their understanding, in order to compare between contributions of the polytechnic, prior school, work and personal experiences. Next, the significant events or incidents contributed by the polytechnic were further analysed to understand how they contributed to each or more of the five dimensions of PIFFS: *Knowledge about professional practices*, *Having the professional as a role model*, *Experience with the profession*, *Professional self-efficacy*, and *Preference for a particular profession*. Given that the polytechnic education was the main gateway for their first formal introduction to the profession and the industry, the students were expected to mention their education experiences as sources of knowledge about the profession, rather than their personal and work experiences. Contrary to expectation, the category mentioned most often in the student responses was personal experience. More analysis was carried out by grouping the student responses based on the extent to which they saw



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relevance of their education to their future work: whether it was relevant (Rel), not relevant (NRel) or they were unsure of the relevance (URel). It was found that for the Rel group, the percentage of those whose significant experiences were gained from their current polytechnic education increased across cohorts, from Year 1 to Year 3. This observation was not found in the other two groups. Half of the students in the NRel group drew their significant experiences from personal experiences. The implications for polytechnic education are discussed.

*Keywords:* students' perspective, sources of influences, polytechnic education, professional identity development, professional identity five-factor scale (PIFFS)

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## **Influence of Polytechnic Education on Students' Perspectives of What It Means to Be the Professional**

To enable new practitioners embarking to carry out their work competently, their formal professional educational experiences need to result in the development of perspectives and approaches akin to the experienced practitioner in the field (Barnett & Coate, 2004; Dall'Alba, 1994; Dall'Alba & Barnacle, 2007). In carrying out their work, new practitioners have to be able to think and act in their professional roles, meet the expectations of customers, be effective in providing services, and be discerning in making judgments about ethical issues. The transformation from lay person to new practitioner produces a professional identity. Professional identity is the self that has been developed with the commitment to perform competently and legitimately in the context of a profession, and its development may continue over the course of the individual's career.

For most students who have completed their secondary education, polytechnic education is a first formal and comprehensive introduction to the profession. Most students tend to have very little idea about how it is to work in their profession of choice. In a study by Jones, Peiffer, Lambros and Eldridge (2010), biomedical graduate students did not understand the various roles of a research team in the laboratory (e.g. principal investigator, post-doctoral fellow and technician). In studies by Dall'Alba and her colleagues, students' understanding of the professional practice influenced how they related to the professional role, and how they carried out the tasks during clinical placement and at the workplace (Dall'Alba & Barnacle, 2007; Dall'Alba & Sandberg, 2006).

Professional education plays a potentially significant role in transforming the students into new practitioners. The question then is, in what ways does it support students' professional identity development? There were two goals for the study reported here. The first was to identify sources of information about a future profession that students used, and in

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particular, how polytechnic education compared with other potential sources such as prior school activities, work experiences and other personal experiences. The second goal was to gain insight into the ways by which polytechnic education contributes to students' professional identity development. To that end we asked students to indicate significant events of incidents that helped them learn what will be expected from them in their future profession. These qualitative data were analyzed using a theoretical framework derived from the professional identity five factor scale (PIFFS), a questionnaire constructed to measure professional identity development (Tan & Schmidt, 2012). But before we embark on a description of method and results, we will introduce considerations behind professional identity as construed by the PIFFS. In addition, we will describe the educational context in which the study took place.

### **Professional Identity Construct as Measured by the PIFFS**

Professional identity is part of the self that is developed with a commitment to perform competently and legitimately in the context of a profession. The development of such professional identity is of course not confined to the educational phase in one's life but may continue over the course of the individual's career. The PIFFS was developed based on five key dimensions found in the literature that are considered to contribute to the formation and development of a professional identity, and has been validated in two previous studies (Tan, in preparation; Tan & Schmidt, 2012). These factors are (1) *knowledge about professional practices*, (2) *having the professional as a role model*, (3) *actual experience with the profession*, (4) *professional self-efficacy*, and (5) *preference for a particular profession*. The PIFFS for professional education is more comprehensive than other questionnaires in terms of the number of factors. In addition, it was constructed such that it would be usable for all types of professions. This distinguishes the PIFFS from questionnaires that focus on a particular profession (Adams, et al., 2006; Bebeau & Monson, 2012;

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Cheung, 2008; Crossley & Vivekananda-Schmidt, 2009; Du Toit, 1995; Swisher, et al., 2004).

The first dimension, *Knowledge about professional practices*, refers to knowledge student have about their future profession. Of course, to prepare for the professional practice, the students need to not only acquire domain knowledge, but also to understand and adequately internalize values and the norms of practice, rules and regulations determined by the relevant professional bodies and other licensing authorities. They should have a reasonable idea of the roles they would be expected to perform, the responsibilities they would have to bear, and the outcomes they would be accountable for (Buyx, et al., 2008; Cooke, et al., 2010; Dall'Alba, 2009; Monrouxe, 2010; Sheppard, et al., 2009; Sullivan, et al., 2007). These will enable them to be able to make reasonable judgment about the appropriateness of decisions and actions in professional roles.

The second dimension, *Having the professional as a role model*, refers to the extent to which students have access to professionals as role models to look up to, and learn from. (Ajjawi & Higgs, 2008; Beckett & Gough, 2004; Timmerman, 2009). It is assumed that the feedback and critique from role models in their interactions with students help to shape students' thinking and reasoning (Ajjawi & Higgs, 2008; Beckett & Gough, 2004). This feedback provides students with concrete ways to bridge learning in the classrooms and real world practice (Goldie, et al., 2007; Ottewill, 2002). Learning from role models is not a passive process, but an active one where students are engaged in learning to think, reason and act like the professional. Further, having more than one role model makes room for students to explore provisional selves, as they make choices about the kind of professional they want to become (Ibarra, 1999).

The third dimension is actual *Experience with the profession*. Experience is defined as authentic contact with clients in a professional context that enables students to learn about the professional practice and

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the role of the professional (Dornan & Bundy, 2004). Experiences in the field contribute to students' understanding of what it means to act as a professional-in-practice (Lave & Wenger, 1991). These experiences are useful as they provide opportunities for students to reconcile what they have learnt in the classroom. They can also use their learning strategies to organize their knowledge for practice (Beckett & Gough, 2004; Prince, Boshuizen, Van der Vleuten, & Scherpbier, 2005), and pick up the necessary skills for organizing and prioritizing assignments and tasks at the workplace (Fitzpatrick, While, & Roberts, 1996). Given students have not graduated and not likely to be accepted as "full participants" or full members in the profession, they also will not have experienced yet the responsibility and accountability of the professional role (Lave & Wenger, 1991). Hence, to describe their involvement in the particular profession, the factor *experience with the profession* would be more appropriate than *experience in the profession*

The fourth dimension is *Professional self-efficacy*. This refers to an individual's beliefs that he or she can really succeed in the profession. Perceived self-efficacy was defined by Bandura (1982) to be "judgments of how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982, p. 122). Self-efficacy research in education has suggested that such personal beliefs influence students' decisions to put in effort to successfully complete their tasks. Students with higher self-efficacy show more perseverance to fulfill their tasks (Bandura & Schunk, 1981; Multon, Brown, & Lent, 1991).

The fifth factor is *Preference for a particular profession*. Studies in motivation have shown that when American students personally identify with what they learn — and thence experience greater autonomy in their learning — they are more likely to work harder, enjoy school more, and cope better with failures (Ryan & Connell, 1989; Ryan & Deci, 2003). Similar results have been found in studies involving students from the People's Republic of China and Korea, suggesting that these observations

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are not culturally biased (Jang, et al., 2009; Vansteenkiste, et al., 2005). Having a strong *preference for a particular profession* would thus be expected to facilitate the focus and commitment in learning, and as a result contribute to the development of their respective professional identities.

In summary, the above five key dimensions of professional identity development, namely (1) *Knowledge about professional practices*, (2) *Having the professional as a role model*, (3) *Experience with the profession*, (4) *Professional self-efficacy*, and (5) *Preference for a particular profession* are ways through which vocational and professional education can contribute to the professional identity development of students, to prepare them to become the new practitioners.

### **Educational Context**

At the polytechnic that is the focus of our study, students are not necessarily enrolled in diploma programmes of their choice. Every year, students who have completed their secondary school education or vocational education compete for places at the five polytechnics in Singapore and for particular diploma programmes. It is quite common that students do not enroll in the programme of choice. This research was carried out at the polytechnic in Singapore where, a student population of about 14,000 students is being prepared for a wide range of professions via 38 diplomas. The schools that provide this wide variety of diploma courses are a School of Engineering, a School of Applied Science, a School of Health, a School of Sports and Leisure, a School of Hospitality, a School of Info-communications Technology, a School of Technology for the Arts, and a Centre for Enterprise and Communication. Thus, this research site, in principle, could provide for a fairly rich base for understanding how professional identity develops in students with different levels of motivations and across different types of professions.

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The particular polytechnic leverages on problem-based learning (PBL) to prepare their students for professional practice (Yew & O’Grady, 2012).

**Problem-based Learning (PBL).** PBL was first introduced in medical education at McMaster University in Hamilton, Canada to better equip students for their transition from the pre-clinical to clinical phases of their education, and in so doing prepare them more effectively for professional practice (Barrows & Tamblyn, 1980; Boud & Feletti, 1998). PBL has since been introduced to medical education in other universities, and other areas of professional education such as business administration, chemical engineering, engineering studies, law schools, leadership education, nursing, social work and teacher education (Hung, et al., 2008).

The aim of PBL is to facilitate students to learn in ways that mirror the professional practice (Barrows & Tamblyn, 1980). In PBL, the feature is the use of problem triggers placed in a context e.g. medical phenomenon and professional practice situations. Small groups of students work on the problem together: they analyse the problem, identify learning issues that are helpful for developing an adequate explanation for the phenomenon, follow up to research and prepare their explanations. When required, they would also determine the course of treatment, action or solution that best addresses the phenomenon. So instead of the conventional method of learning the theory followed by solving a given problem, students are first presented the problem to be “diagnosed” and then solved. Content is thereby learnt in a relevant, situated manner.

The role of the tutor is to provide guidance for the students’ learning process of constructing and acquiring knowledge: the activation of prior knowledge, search and processing of relevant information, thinking and reasoning the best response to the given problem (Hmelo-Silver, 2004; Norman & Schmidt, 1992). Through actively exploring and understanding the various aspects of professional practice in the regular

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encounters with problems, students are expected to develop a more realistic sense of what it means to be the professional.

**PBL Implemented at the Polytechnic.** The PBL structure implemented at the research site is a one day, one problem approach. Students actively engage in gaining knowledge and skills through collaboratively solving a problem within the course of a day (Yew & O’Grady, 2012). Each class consists of twenty-five students. The lessons for each module take place once a week over a fifteen-week semester. Both formative and summative assessments for the learning process (problem solving approach and skills, self-directedness in learning) and acquisition of knowledge are put in place at the polytechnic to provide adequate feedback for student learning. The main exceptions to the use of the PBL approach at the polytechnic are practical skills modules which require the demonstration and safe use of equipment (e.g. use of lighting equipment in theatre management), and practicum modules where students learn in a simulated work environment that serves real clients (e.g. the restaurant service and culinary skills for students preparing for the hospitality industry).

**Professional Identity Development through PBL.** As a pedagogical approach for socializing students for professional practice, PBL is expected to have an influence on students’ understanding of what it means to work in their chosen profession, and thereby contribute to students’ professional identity development. Empirical studies have linked PBL with increased self-efficacy in the role of the profession (Dunlap, 2005); increased *Knowledge about professional practices* such as norms, role obligations and responsibilities of specific roles in the professional team (Jones, et al., 2010); and positive change in attitude and behavior (Elcin, et al., 2006). There have also been studies about how PBL can be enhanced, or extended to internships to help students learn professionalism. Examples are the use of formal wiki space for collaborative learning (Varga-Atkins, et al., 2010), and the use of PBL in



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clinical education (Tim Dornan, et al., 2007) and student teacher internships (Mulcahy, 2006).

There has been, however, no specific framework used to systematically analyse how PBL can contribute to professional identity development, and to compare with other pedagogical approaches.

## **Method**

### **Ethical considerations**

This research study was approved by the Institutional Review Board at the polytechnic where the research was conducted, for having satisfactorily fulfilled the ethical requirements. The accepted research protocol included (1) informed consent by the survey participants, (2) controlled storage and access of data, and (3) de-identified reporting of verbatim responses.

### **Participants**

We obtained responses from 1,295 students enrolled in various diplomas offered by all six schools and a centre at a polytechnic in Singapore. Table 1 shows examples of the diplomas offered by the respective schools, and the corresponding types of professions they prepared students for. The respondents in this study were enrolled in 36 out of a total of 38 diploma programmes offered in the Academic Year 2011.

The sample for this study represented 9.3% of the student enrollment of 13,927 in the Academic Year 2011. The average ages for the respondents in each of the three curriculum years were 18.1 (SD= 1.89), 19.1 (SD= 1.59) and 19.9 (SD= 1.39) respectively. The representation of males as compared to females, at 41% (n = 533) males and 59% (n = 762) females deviated somewhat from the more equal mix of 48% males and

52% females for the entire student population. Most respondents were Singapore citizens: 85.9% (n = 1,112). Students from Asia made up 13.9% (n = 180) and those from other countries made up 0.2% (n = 3). This distribution was very similar to the institutional representation of 86.5% Singaporeans, 13.2% Asians and 0.3% of other types of citizenship. Most respondents were first year students, 40.8% (n= 528). The second-year students made up 36.8% (n= 476), and rest were third year students, 22.5% (n=291). (The distribution of the first, second and third year cohorts for the entire student population is somewhat more evenly spread at 37%, 31% and 32% respectively.) However, this should not present a significant problem, because even the smallest cohort, the third year students, consisted of 291 participants. In addition, we planned to use only non-parametric methods in the statistical analysis of the coded data.

Table 1  
*Examples of the Diplomas and the Corresponding Types of Professions Students Were Being Prepared For*

School	Diplomas	Types of Professions
Centre for Culture & Communication	Diploma in Communication and Information Design	Journalists, Copy Editors, Public Relations Executives, Junior Advertising Executives
School of Applied Sciences	Diploma in Pharmaceutical Sciences	Pharmaceutical Technicians & Assistants.
	Diploma in Biomedical Sciences	Biomedical Sales & Marketing, Marketing specialists, Sales & Marketing executives. Laboratory Technicians, Medical Technologist / Laboratory Technologist,

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School	Diplomas	Types of Professions
		Junior Technologists.
School of Engineering	Diploma in Supply Chain Management	Officers or Executives in Logistics, Transportation, Planning, Purchasing, or Inventory Management.
	Diploma in Aerospace Avionics	Aircraft Engine Inspectors, Quality Engineers/ Auditors, Senior Technicians, Quality Assurance Inspectors.
School of Sports, Health & Leisure	Diploma in Outdoor & Adventure Learning	Outdoor Adventure Specialists
	Diploma in Sports & Exercise Sciences	Health Promotion Specialists, Physical Activity & Fitness Leaders, Patient Health Educators, Public Health Executives, Health Research Assistants.
School of Information-communication	Diploma in Business Applications	Web Developers, Junior Business Consultants/ Analysts, Customer Service Executives, Application Support Analysts, Software Engineers.
	Diploma in Information	Network Engineers & Administrators, Wireless

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School	Diplomas	Types of Professions
	Technology	Engineers & Application Developers, IT Security Administrators & Specialists.
School of Hospitality	Diploma in Customer Relationship and Service Management	Account & Relationship Executives, Sale & Marketing Executives, Customer Service Executives, Contact Centre Service Executives.
	Diploma in Hotel and Hospitality Management	Business Development Officers, Tourism Service Officers.  Junior Executives in Hospitality, Hotel, Clubs & Resorts, Restaurants & Entertainment Spots, Theme Parks & Attractions, Events Management.
School of Technology for the Arts	Diploma in New Media	Designers, Producers in Advertising, Marketing & Public Relations, Web Design & Development.
	Diploma in Game Design	Game Designers, Game Level Designers, Associate Producers, Games Quality Assurance Testers.

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*Note.* Content extracted from Republic Polytechnic Diplomas Brochures 2010.

## **Procedure**

Each academic year consists of two 15-week semesters. In the Academic Year 2011, nearing the end of the first semester in Week 13, all students were emailed an invitation to participate in the online Professional Identity survey. It was presented as an extra-curricular activity that prompted students' reflections on their learning, and which contributed to the polytechnic's understanding of how students were learning at the institution. At the polytechnic, students were expected to participate in a minimum number of extra-curricular activities during the course of their education, and the fulfillment of this would be indicated in their transcripts. The survey was available for voluntary participation for a week.

The data used for this study were the students' responses to an open-ended question. The quantitative data, collected at the same time, have been reported elsewhere (Tan, in preparation; Tan & Schmidt, 2012).

## **Material**

The students were asked to respond to this question in the Professional Identity online survey: "What were the significant events, or incidents, that helped you to really get an idea, of what it means to work in your chosen profession?" Students were encouraged to elaborate enough to meet a minimum required number of words for their response to be counted towards completed participation in the extracurricular activity. The activity was opened for participation for a week.

Two additional Likert scale questions were included for the data analysis in this study: (1) My future work is related to the diploma I am enrolled, and (2) My polytechnic education is relevant and useful in preparing me for my future. The average score from these two questions

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for each student was used to group them in terms of the relevance of the diploma to their future work.

### **Analysis**

In a previous study, the quantitative data was collected using the PIFFS questionnaire from the same group of students in this study. From the analysis, it was found that grouping the students based on the relevance of the diplomas to their future work provided more differences as compared with analyzing the entire sample as a whole (Tan, in preparation). In the cross-sectional analysis of Year 1, 2 and 3 students, those who were enrolled in diplomas related to their future work had a significant “increase” in *Knowledge about professional practices*, *Professional self-efficacy* and *Preference for a particular profession*; those who were unsure showed a “decrease” in the factor, *Having the professional as a role model*; and for the students who were sure their diploma was *not* related to their future work, no significant differences were found in all five factors. When analyzing the sample as a whole, there was a significant “decline” found in the factor, *Having the professional as a role model*.

To gain further insights into the sources of the significant influences on students’ understanding about working in the chosen profession, the responses in this study have been categorized based on the perceived relevance of the diplomas to their future work. Two Likert scale questions, in addition to the open-ended question were included to give us an idea of the perceived relevance and value of their education at the polytechnic. The questions were: (1) My future work is related to the diploma I am enrolled, and (2) My polytechnic education is relevant and useful in preparing me for my future. Students may not have perceived their diploma to have direct relevance to their future profession and industry, but if it provided them with the minimum qualification for taking the subsequent steps to achieve their career goals, it still had relevance or value to their future work. The maximum averaged score for the two

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questions was five. Averaged ratings that were less than 2.5 were categorized as not relevant (NRel), those that were more than 3.5 were categorized as relevant (Rel). The averaged ratings that were within the range of 2.5 and 3.5 (both numbers inclusive) were grouped as unsure about the relevance of their diploma to their future work (URel).

We dealt with the content analysis of the written responses in three steps. First, the written comments were scanned for nil, irrelevant and vague brief responses; second, the categories were identified which would allow for all the mentioned events or incidents to be coded exhaustively and exclusively (Glaser & Strauss in Merriam, 2009, Merriam, 2009); and third, the frequency of each coded response was counted to identify patterns across the different cohorts of students (Year 1, 2, and 3), and between the three groups of students who were in the Rel, URel and NRel groups. If a response included events or incidents that fell into two or more categories, the category that was mentioned first would be coded. This was based on the assumption that the most significant event would be mentioned first. Chi-square statistics were generated using SPSS 18.0 to determine if there were statistical differences between the nominal categories in the comparisons.

The material was, in addition, coded in a second way. The five dimensions of the PIFFS were used to characterize the nature of the experiences, or events, that students saw as pivotal to their professional development.

**Coding.** In the first step, the amount of nil, irrelevant and vague responses were noted, and filtered out. The irrelevant responses were likely to be from students who did not experience any significant event or incident, or did not comprehend the question but wanted to meet the minimum word count for the extra-curricular activity.

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In the second step, the data were coded for the domains of influence. As our interest was to know the contribution of school, as compared with other domains, school was the first category for coding the data. Two other domains, work and personal experiences were further identified. All the three codes were checked to be exhaustive and exclusive: 1) school, 2) work and 3) personal experiences.

“School” was coded for responses that directly referred to events that took place at the polytechnic, or their previous school. “School” was also coded for industry-related activities, industry attachment or internship programmes arranged by the polytechnic, or the previous school. The written comments coded for “School” were further grouped to distinguish influences from the polytechnic education and prior school experiences. Coded “Work” were responses related to employment the students had sought and engaged in out of their own personal accord, and not as part of a requirement by school. The employment could be on a part-time basis when students were not having classes, or as temporary work during school vacation. It could be freelance work with flexible working hours, ad hoc work opportunities such as event management, or even a business set up and run by the students, such as a blogshop. The category of “Personal experiences” included everything else in the students’ personal life in their home environments, and environments other than work and school. Examples of responses coded as personal experiences are the influence of family members who worked in their chosen profession, and reality media programmes that depicted the nature of activities and celebrities in the chosen profession.

**Inter-rater reliability.** A colleague of the researchers who was not part of the team coded twenty percent of the responses for the sources of influence (school, work and personal); 96% of the coding matched with what the first author coded and the rest were resolved through discussion. The responses were also coded according to the PIFFS dimensions. There were no disagreements between the coders here.



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**Reporting the results.** The representative quotes from the student responses in the results and discussion sections have been edited to improve readability.

## Results

### Sources of influences

In this study, we examined the influences on students' notion of what it meant to work in their future profession. Data was collected from a polytechnic that prepared students in a broad range of professions. The results of the coding were as follows: 29.3% of the responses indicated school-related incidents or events as the important influence, 8.2% of the responses attributed the influence to work-related experiences, and 35.8% referred to personal experiences. Nil, irrelevant and vague responses made up the remaining 26.7% of the total count of 1,295 responses.

When the 1,295 students were grouped into three categories based on the perceived relevance of the diploma programme to the students' future work, the spread was: (1) relevant ( $n = 709$ ), (2) unsure of relevance ( $n = 461$ ), and (3) not relevant ( $n = 125$ ). Table 2 contains the frequencies of the different types of influences (school, work, or personal) for each category. Tables 3 to 5 do the same for Year 1, Year 2 and Year 3 student responses respectively. The chi square test results for all the tables indicated a significant association between perceived relevance of the polytechnic education, and the sources of influence on their notion of what to expect when working in their future profession.

The results of the chi-square test for the entire sample was at  $\chi^2(6) = 41.77$ ,  $p = .000$ , with an effect size of Cramer's  $V$  at .13. The results for each cohort level were: Year 1 at  $\chi^2(6) = 12.47$ ,  $p = .05$ , with an effect size of Cramer's  $V$  at .11; Year 2 at  $\chi^2(6) = 19.95$ ,  $p = .003$ , with an effect size of Cramer's  $V$  at .15; and Year 3 at  $\chi^2(6) = 29.04$ ,  $p = .000$ , with an

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effect size with Cramer's V at .22. Cross-sectionally, from Year 1 to Year 3 students, there was an "increase" in effect sizes from .11, to .15 and .22.

Further observations were discerned about differences in the sources of influence for the Rel, URel and NRel groups. First, when responses were filtered out (i.e. nil, irrelevant or vague responses to the question asking for significant event or incidents), the highest percentage at 34% came from the URel group, as compared with 21% and 23% for the NRel and Rel groups respectively. Second, the NRel group attributed 50% of their influences from personal experiences. For the Rel and URel groups, the proportions of such responses were lower at 35% and 33% respectively. Third, the NRel group had the highest proportion of students who reported influences from work, at 11% compared with 8% for the other two groups. In addition, for this group of students, there was a year-to-year increase in the percentage who reported the influence from work (5.7% of Year 1 respondents, 11.1% of Year 2 respondents and 14.8% of Year 3 respondents). Work experience is the alternative to school for these NRel students to learn about their chosen profession.

The Rel group, however, had the highest proportion of students (34%) who reported influences from school. In comparison, 17% of NRel and 25% of URel responses were coded "school". The percentage of such responses from Rel students "increased" proportionately from Year 1 (27.4%), to Year 2 (37.8%) and Year 3 (44.0%). The results thus far showed that the Rel students — that is: the students who are in their programme of choice and are sure that their education is relevant to their profession — benefitted more from their polytechnic education than the other groups of students.

More analysis was carried out for the Rel group to discern if there might be a significant association between the cohort levels and influence of prior and current school experiences. The results of the chi square test showed positive significant associations, with  $\chi^2(6) = 39.22$ ,  $p = .000$ , and an effect size of Cramer's V at .40. See Tables 6 and 7. The proportion of

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students that experienced a significant event or incident in their current polytechnic education “increased” from Year 1 to Year 3 students, i.e. 33.3% of Year 1 respondents, 75.5% of Year 2 respondents and 86.0% of Year 3 respondents. The test statistic was  $\chi^2(2) = 12.26$ ,  $p = .002$ , and an effect size of Cramer’s V at .18. The reverse trend was observed for the students who reported a significant event or incident experienced while in secondary school or at a vocational institution prior to joining the polytechnic.

Table 2  
*For All Respondents: Percentage of Responses in Each Relevance Category*

Relevance of diploma to future work	Nil/Irrelevant responses (%)	School (%)	Work (%)	Personal (%)	Grand Total (%)
Not relevant	20.8	16.8	11.2	51.2	100.0
Unsure of relevance	34.1	24.9	8.2	32.8	100.0
Relevant	22.8	34.3	7.6	35.3	100.0
Grand Total	26.6	29.3	8.2	35.9	100.0

*Note.* School refers to both prior school experiences and polytechnic education.

Table 3  
*For Year One Students: Percentage of Responses in Each Relevance Category*

Relevance of diploma to future work	Nil/Irrelevant responses (%)	School (%)	Work (%)	Personal (%)	Grand Total (%)
Not relevant	11.4	22.9	5.7	60.0	100.0
Unsure of relevance	30.6	19.7	11.5	38.3	100.0
Relevant	25.8	27.4	10.0	36.8	100.0
Grand Total	26.5	24.4	10.2	38.8	100.0

*Note.* School refers to both prior school experiences and polytechnic education.

Table 4  
*For Year Two Students: Percentage of Responses in Each Relevance Category*

Relevance of diploma to future work	Nil/Irrelevant responses (%)	School (%)	Work (%)	Personal (%)	Grand Total (%)
Not relevant	25.0	13.9	11.1	50.0	100.0
Unsure of relevance	33.8	33.1	5.7	27.4	100.0
Relevant	20.1	37.8	5.3	36.7	100.0
Grand Total	25.00	34.5	5.9	34.7	100.0

*Note.* School refers to both prior school experiences and polytechnic education.

Table 5  
*For Year Three Students: Percentage of Responses in Each Relevance Category*

Relevance of diploma to future work	Nil/Irrelevant responses (%)	School (%)	Work (%)	Personal (%)	Grand Total (%)
Not relevant	24.1	14.8	14.8	46.3	100.0
Unsure of relevance	39.7	22.3	6.6	31.4	100.0
Relevant	21.6	44.0	6.9	27.6	100.0
Grand Total	29.6	29.6	8.2	32.6	100.0

Table 6  
*Relationship Between Relevance Categories and Influences  
 From Prior School Experience and Polytechnic Education*

Relevance of diploma to future work (n = 370)	Prior School Experience (%)	Polytechnic Education (%)	Grand Total (%)
Not relevant (n = 21)	71.4	28.6	100.0
Unsure of relevance (n = 109)	45.0	55.0	100.0
Relevant (n = 240)	35.0	65.0	100.0
Grand Total	40.0	60.0	100.0

*Note.* Nine vague responses have been excluded.

Table 7  
*Relationship Between Students in Year 1, 2 and 3 Enrolled in Diplomas Related to Their Future Work and Influences From Prior School Experience and Polytechnic Education*

Students enrolled in diplomas related to their future work (n = 240)	Prior School Experiences (%)	Polytechnic Education (%)	Grand Total (%)
Year 1 (n = 84)	60.7	39.3	100.0
Year 2 (n = 106)	24.5	75.5	100.0
Year 3 (n = 50)	14.0	86.0	100.0
Grand Total	35.0	65.0	100.0

*Note.* Three vague responses have been excluded.

### **Types & Nature of influences**

This section describes the significant events and incidents that helped students develop through each of the five dimensions in the PIFFS: (1) *Knowledge about professional practices*, (2) *Having the professional as a role model*, (3) *Experience with the profession*, (4) *Professional self-efficacy*, and (5) *Preference for a particular profession*. The nature of influences in each dimension is summarized here. The italicized descriptions closely match those in Tables 8 to 12, where corresponding examples of verbatim responses are displayed. In the tables, responses that specifically refer to PBL are highlighted in grey.

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*Knowledge about professional practices.* Students indicated that these learning experiences helped them to understand the application of theories in practice. Their responses referred to particular modules that equipped them with the *terms, knowledge of systems, and use of the tools of the trade*. These modules may also have provided for practical experiences in *simulated work environments*, and showed how the different dimensions of knowledge were put together into *aspects of professional practice*. Students reported *collaborative learning experiences* when they worked in teams with each member taking on a different professional role, to simulate how a team of professionals could work together. Their performance in their assignments, practical activities and practical tests were graded.

The baseline pedagogy at the polytechnic, PBL, present the range of scenarios students may encounter in their professional life, thus giving them some ideas of the *scope and nature of the work* they can engage in. The students learned about the types of risks, responsibilities and, hence, consequences of the decisions and actions taken in the profession. Some students received learning tasks involving research into their future profession. These tasks helped them to appreciate their future work environment, and, in particular, helped them to become aware of the challenges faced in the industry and how difficulties had been overcome. Their polytechnic facilitators also shared information and experiences about their work, and conducted talks about what they could work on to become industry-ready.

*Having the professional as a role model.* Learning from role models is not a passive process, but an active one where students are engaged in learning to reason and act like a professional. The baseline PBL pedagogy provides students with the regular practice of *learning to be the practitioners*, to solve problems and respond to assignments *required of them in professional practice*. As they had to provide a solution by the end of the day, some students reported getting a sense of what it took to deliver work by given deadlines. The *regular feedback* they



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obtained from the facilitators and their peers gave them the experience of handling critiques to improve the quality of their work and their contribution to the teamwork. There were also students who have had the opportunities to make field trips and *observe exemplary professional behaviours*. Through these, students could develop an idea of expectations of their performance in the future.

*Experience with the profession.* Experience is defined as authentic contact with clients in a professional context that enables students to learn about the professional practice, and the particular role of the professional (Dornan & Bundy, 2004). The experiences the students shared could either be direct, or indirect. In the former, they were in the role of budding practitioners delivering work for real clients through practicum modules, coursework assignments, final year projects, and internship programmes. Indirect experiences included opportunities to learn from *professionals in the industry* through talks, and field trips that focused on (1) the jobs, (2) the work environment, and (3) the challenges faced in the profession.

As a result of these direct and indirect experiences, students gained knowledge of what their future *work environments* could be like and a *broader perspective of the scope and nature of their future work*. They appreciated better what their polytechnic facilitators stressed in class. They gained practical experiences of what it meant to *behave professionally*, how to be *responsible for delivering quality work* on time. They also began to appreciate the importance of *planning and organizing schedules, good time management, and teamwork*. Their knowledge about the *significant players in the field* and key products had also expanded.

*Professional self-efficacy.* The baseline PBL pedagogy provides students with opportunities to learn how to *approach problems* from real life scenario, work on them *like a professional* would, and *learn from their mistakes to make better professional decisions*. The regularity of engaging

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in these activities using the one-day one-problem approach at the polytechnic helped them to feel more prepared for work. They learn to become more *familiar and efficient with the daily routines and basic knowledge* dealt with in their future work. For students who struggled more with being a good team player, or who were shy, learning opportunities were presented in the *collaborative learning environments in PBL*. Student involvement in events organized by the polytechnic contributed to them becoming *more confident at interacting with customers*.

*Preference for a particular profession.* The *profession-specific modules* were opportunities for students to actively explore their interest for a particular profession. As a result, they discover if they *enjoyed solving problems related to that profession*, felt inclined towards the scope and nature of the work, and were interested in the *role they simulated* in class and in *practicum sessions*. The *specialization modules* helped them to think through the potential tracks they could pursue when they graduated. The *elective modules* enabled them to discover their interests and make more informed decisions about their career paths.

Table 8

*Descriptions of the Responses Related to Knowledge about professional practices*

Description	Examples of Verbatim Responses (highlighted in grey are PBL specific)
1. Terms & systems used in the industry	<i>“Modules taught in school now give us a basic of what we will get to touch on when it comes to being in the society next time. We know the terms that are used in the aviation industry, we know which systems are used in the Airport.” [Student 487]</i>
2. “Tools of the trade”	<i>“GameMaker lessons held for all Diploma in Game Design students. It is a software that we are all supposed to get used to.” [Student 525]</i>
3. Different types of knowledge	<i>“There is such a wide variety in Aviation industry we can comprehend on, from management to mechanical.” [Student 487]</i>  <i>“The modules are very closely connected. For example, I want to be a media practitioner, in the future. And I take the diploma in communications and information design. Modules such as effective presentation skills, ethics and IP (intellectual property) media and visual communication, are closely connected to provide holistic information about what to expect in the future.” [Student 433]</i>
4. Simulated work environment	<i>“When our course had visits to the I-SAIL lab(Integrated Supply Chain Lab) to see how a warehouse and its systems work, and what you had to do, for example, for stock taking, handling of goods, etc.” [Student 765]</i>
5. Aspects of the professional practice	<i>“I have seen some aircraft repair works during my lesson in class. It is to repair aircraft to the specific standards required.” [Student 659]</i>

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*One incident would be the module that I took in one of the semesters. It taught us the different aspects which the professional would have to do in the field of work. [Student 727]*

*“In one of the modules, I learnt to work with IT systems. In different problems, we were asked to go through the system, use and explore the system and see how the system can benefit companies that use it. We can add in different criteria for different type of person, job, etc. It could be that when I start work in my chosen profession in the future, I might be working with an IT system too or maybe a consultant for the system. [Student 103]*

*“We have laboratory sessions in which we actually go through what people in the Sports and Exercise Science industry go through. We take this module Exercise Programming and all the lessons are held in the science labs. And we are given scenarios in which we have to act like we are attending to the clients. And we have to teach them the basics when interacting with them. We need to know how to talk to them and make sure they truly understand. There are certain steps and procedures which we have to go through with our client even for gym workouts. When my client does one exercise, we have to explain many things. Primary muscles worked in the exercise, safety procedures, breathing techniques and etc. Even for our assessment tests, we were tested in this manner which actually made me realise that this would be how we should do so in real life. This particular module gave me a rough idea of what it means to work in my profession or in the Sports and Exercise Science*

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	<p><i>industry. It is fun during this module and we must be very careful when handling different kind of clients! [Student 406]</i></p> <p><i>“The day I started building my portfolio. I spent a lot of time and effort on my designs and I began to understand that a designer needed to have a distinct style and play around with other themes to have a variety of work.” [Student 22]</i></p>
6. Collaboration with other professionals	<p><i>“It was one of my modules this semester when I needed to interact, collaborate and work in a team. Each member in my team had a role, ranging from directing, lighting, use of mic to editing. I finally know what it means to actually work in my chosen profession. Each member has their own skills and abilities in a certain area, and we can actually use them to maximize the result that we can come out with.” [Student 20]</i></p>
7. Scope & nature of the work of the professional	<p><i>“Problems that were given to us at every of my module lessons helps me to have a better understanding of a job scope of a Public Relations Officer. Thus, getting insights from there.” [Student 237]</i></p> <p><i>“Personally, I have never worked in the IT industry and have no clue how things work in the industry. But the daily problem statement provides us with possible scenarios we may face in the future. For instance, in the latest problem in my database module, we actually learnt about the possible consequences of losing thousands of dollars every hour if we do not perform our tasks correctly and properly.” [Student 442]</i></p>

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*“The Marketing module taught gave me an overview on Marketing principles as well as the rough job scope of a Marketing Executive. Through this module, my interest in Marketing was aroused which caused me to be keen in working towards Marketing as my chosen profession. In addition, as I had also excelled in my Marketing module during the semester, I am more motivated me in choosing this profession in the future.” [Student 563]*

*“My learning environment now in RP has taught me a lot about the profession I have chosen. From financing, managing an event, managing the artist and knowing what kind of arts sector Singapore is providing and also what Singaporeans want from the art scene. All of these have given me a rough idea of how and what I am going to do in the. I have also made relevant research about my chosen profession as an arts manager and have found out about the job environment that I would be engaging in, what kind of people I would be working with, the pay I am going to receive and also a little information on what kind of companies would hire me. These have given me determination and also excitement about working in that kind of environment. Other research like the qualities an Arts Manager should possess also gave me a rough idea on how I am supposed to change so that I could fit into the working environment well and complete the work I have been given properly and without much problem.” [Student 521]*

*After gaining a lot of knowledge related to my chosen profession from the modules that I have/going to complete in my 3 years in RP, my interest has increased. Before this I was very doubtful and curious of what an Air traffic controller's job is like;*

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*job-scope, stress-level etc. The modules are very related and also applicable for my future. [Student 278]*

*Basically, before I learnt about the course I roughly knew that this chosen profession has shift work. After I learnt more about the course then I know the how and what the work is like. [Student 624]*

*“Aviation Human Factor has thought me alot about the risks and responsibility I carry if I want to work in the aviation industry.” [Student 278]*

*“When I attended the workshop about the flight stimulator I realise that a great responsibility is in our hands when we are controlling the aircraft or monitoring the aircraft”. [Student 394]*

*“My first semester in the second year helped me get an overall idea of what it will be like to work in my chosen profession. I was exposed to alot of outdoor activities such as abseiling and high elements. Apart from doing the activities, we learned how to facilitate them.” [Student 719]*

*“Doing the professional profiling report helped me to really get an idea of what it means to work in my chosen profession. My report was related to the pharmacy industry and to my course, pharmaceutical science. I have found out a number of things which are very useful to my future work performance. For example, I understood about the difference between the role of doctor and the role of*

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*pharmacists, the difficulties faced by the pharmacy industry and the precautions we should take note of before we work in pharmacy industry. These information enhanced my knowledge about my chosen profession.” [Student 690]*

*“I would say the talks provided by RP facilitators helped me understand what it means to work in my chosen profession. The talks enabled me understand how games were created, why they were created, who the game designers were in the global world. The talk also taught us how games were created from the past to the modern time. Also, what we can do to become a better employee or employer in the profession. To really thrive well in our future profession, we need to do well in our course and to also focus on game experiences, talks and practical hands on.” [Student 928]*

*“Also, because some of my facilitators had experience working in my chosen profession, they were able to tell us their experiences and also the difficulties that they faced and how they overcame them.” [Student 500]*

*“I got ideas on the working environment and the job scope mostly from my facilitators and the media. They would explain what the industry was about and the requirement needed. The facilitators also shared their experiences working in the profession, telling us the ups and downs. I learnt that clients can be demanding sometimes and quality work should be given at all times. It is a hard job requiring hours of designing and editing and the end result may not be approved so they are usually followed with more hours improving on the designs. The profession may*

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*sound glamorous but there are lots of hours spent on just a piece of work. As it would be a team work, meetings must be done and tensions may arise after a long day or because of a clash of ideas. My facilitator also showed me videos of him in China for a shoot for one of the clients. It showed me that being a graphic designer, one may have to travel sometimes if the clients are overseas. I should be able to sacrifice a little of my time with my family and friends for work that may be for days or months till the project is finished. [Student 163]*

*“The main significant events always happened in class. Being in a Public Relations (PR) related course, some of my facilitators used to work in the media industry. Some even worked in PR related jobs. When they told us more about their previous jobs, it really piqued my interest and I decided to take the PR route instead of the journalism route. They made it sound challenging and enriching. I was already interested in PR and these sharing made me decide to work in the PR industry in the future.” [Student 741]*

*“A conversation with my Drawing module facilitator about our future jobs. That really sparked me to want to go into the design industry because initially I really didn't know what job my diploma could get me.” [Student 480]*

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Note: Highlighted sections are responses that specifically refer to PBL.

Table 9

*Descriptions of the Responses related to Having the Professional as a Role Model*

Description	Examples of Verbatim Responses (highlighted in grey are PBL specific)
1. Acting like the professional to meet expectations	<p data-bbox="470 840 1445 1108"><i>“Since now I am already in my second year, I am already taking the modules chosen for us that were tailored to meet the needs of our diploma and the industry that we would possibly be working in. The problems given every week for every lesson is based on what might or have already happen in real life when we go out to work. Thus, they are all very realistic and also need to approach and solve it while pretending that we are doing this for real. These drills definitely helped me in knowing more about what is expected of me and what am I to do when faced with such situations when I go out to work in the real world.” [Student 525]</i></p> <p data-bbox="470 1131 1445 1198"><i>“C105, introduction to programming module where I learnt how hectic it can be sometimes to write codes and test them.” [Student 799]</i></p> <p data-bbox="470 1220 1445 1332"><i>And we have assignments like object-oriented programming where we actually need to design and create a program, giving us an idea of how it is like to work outside as a programmer to help a company.” [Student 442]</i></p>
2. Feedback and critique from facilitator and team mates	<p data-bbox="470 1332 1445 1525"><i>“There was one incident where I got feedback from my facilitator about my team mates’ evaluation of my performance. I was disappointed that they gave me such bad remarks because I couldn’t get my idea and thoughts across to them when we discussed the day’s given problem statement. And throughout the day, I was a liability to my team because I couldn’t communicate properly and I was lost. This made me realise that in the future IF there is a probability that I may have to work</i></p>

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*on a project with a team, I have to improve myself and be a better team player even if I do not like working with some people. Working in a team helps me to be prepared for future team work etc.” [Student 882]*

*One of the modules also taught me about designing quality work. It taught me design principles, and to accept critique gracefully. In the working environment, people would have different ideas and they could be harsh about not liking something and having my classmates to critique my work would in a way prepare me to take on critiques and not let them affect me personally. I know that the critiques in the work place regarding my work would be more intense and different from those given in class. This would mentally prepare me to accept them and improve on my work.” [Student 163]*

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| 3. Observations of exemplary professional behaviours | <i>“Other events would be when going to field trip to Marina Bay Sands and able to observe the staffs there doing their job. Observing their grooming standards, the way they deal with guest and their attitude while they are working even when guest are not around.” [Student 516]</i> |
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*Note:* Highlighted sections are responses that specifically refer to PBL.

Table 10  
*Descriptions of the Responses Related to Experience with the profession*

Description	Examples of Verbatim Responses (none are PBL specific)
1. Work environment	<p><i>“The Macbeth play, we get to see the sets, the costume, the venue of the play held etc. [Student 748]</i></p> <p><i>“My class had an outing to a wellness and fitness spa to experience how it was like inside a professional spa. It definitely helped us learn a lot about the spa industry. [Student 531]</i></p> <p><i>“One of the significant events would be the excursion trips that the school organised for us because we were able to observe and understand as the facilitator explained and there were professionals who shared their experiences with us and responded immediately to our queries. Moreover they allowed us to explore the hotels, knowing how they operate.” [Student 476]</i></p> <p><i>“I did not understand some of the things that the school required the students to do. For example, I did not really understand why my school stressed so much about a student's grooming. However, at the Marina Bay Sands resort I realised how professional they looked. It suddenly struck me that an employee's grooming actually acted as part of a hotel's image”. [Student 687]</i></p> <p><i>“I am currently attached to the changi airport group for my fyp {final year project}. We need to help them find solutions to daily operational problems at the airport. We</i></p>

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*work closely with our changi airport supervisors so that we can get the correct information and data. They bring us along with them almost everywhere they go. They give us the exposure through bringing us almost everywhere they go. I think this has given me a first-hand understanding of what to expect if I were to work in this profession, the problems faced, the working environment and how professional they try to be even when faced with crisis.” [Student 260]*

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2. Broader view of the scope and nature of the work

*“I had the privilege to know what they were doing in the company, the roles and work involved before the product was officially launched, to ensure that the product will make it in the market. These include user research, surveys, interviews, anthropological studies, user experience, usability testing etc. it was then that I knew that there were various ways to strive as an designer. and that I didn't have to be able to draw to become a designer. Everybody is born unique and have creative ideas in a way or another.” [Student 30]*

*“Recently I have been going on field trip to the industries that are related to my diploma and it has been quite interesting as there were quite a number of job scopes available in the industry. Furthermore, some of these jobs are not commonly heard of as few people are in this industry. That's why I would like to try something new and gain knowledge of this industry especially when it is still maturing.” [Student 221]*

*“Some of the significant events that I have attended which have made me better aware of my chosen profession will be health screening at RP which was organised*

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*by my Interest Group. We conducted a health screening exercise to help people in RP check their BMI, fats contents, blood pressure etc.” [Student 574]*

*“Also, since I have joined an interest group, the Pharmaceutical IG which is related to my course of study, I have been to many events which have exposed me to what will it be like to work in this line. I have learned both the advantages and disadvantages of this job.” [Student 74]*

*FYP {final year project} project where I took on the role of the journalist and scouted for an angle to write about a big event taking place in RP called the IGNITE MUSIC FESTIVAL 2011. I had to find out more about the event and spend time to create and write as many articles as possible under a deadline. It really helped me to get an idea of what it is to work in my chosen profession. I had also to take photographs and interview subjects to get quotes from them for the articles. [Student 243]*

*“The most significant event would be my involvement in RP's Industry Immersion Programme (IIP). I have experienced working in a professional environment and I have to say I enjoy it. I now understand the role and responsibility of being a Sound Designer in a Game Development Company. I was not really faced with game-changing decisions but I've got a clear picture of how vital it is to collaborate and get involved in the whole development process.” [Student 199]*

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3. Professionalism  
and responsibility

*“There were times when some of us dropped a glass or plate while carrying or attempting to serve a guest and all of us actually acted professional without making that person feel awkward and uncomfortable. We helped the person clean up and serve his or her guest instead while he or she cleans up. In this way we actually were able to help one another and learn things together. We were able to interact with the guests in the right manner as well so that they have better experiences. We learned to break the “nervous” barrier and have candid conversations with the guests. The practicum also enabled us to know how the guests felt and thought about the entire process and experience. Such information were helpful for us to improve to become better in areas which we lack professionalism.*

*I was finally able to appreciate the service staff in both restaurants and hotels, as compared to before as I now know the pain and the process they all go through just to make sure the guests were satisfied with everything and all were up to their expectations. They were responsible for so many things.” [Student 750]*

*“I am currently attached to the changi airport group for my fyp {final year project}. We need to help them find solutions to daily operational problems at the airport. We work closely with our changi airport supervisors so that we can get the correct information and data. They bring us along with them almost everywhere they go. They give us the exposure through bringing us almost everywhere they go. I think this has given me a first-hand understanding of what to expect if I were to work in this profession, the problems faced, the working environment and how professional they try to be even when faced with crisis.” [Student 260]*

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4. Planning and organizing for a project

*“One of the major events that helped me to build my understanding with regards to what it means to work as a curator would be my participation in the “City colours project”. This event made me realise the importance and the imperatives in the art installation process. I learnt that art installation involved both the management team as well as the artist. Possessing the ability to break down the intention of the project was an essential aspect of the project because individuals will be able to identify their goals and vision with regards to the project. Ideally, those involved in making the project a success are well equipped and can work towards fulfilling their goals.*

*I worked to ensure that the art installation process went smoothly by 1) paying attention to the delivery of the artistic content, and 2) taking note of issues addressed by the management team. I learnt that logistics, briefing and the different phases of art installation were primary parts of the pre planning process, installation and the post installation process. The pre planning stage taught me to list down the essential materials we required for carrying out the artistic works we drafted. Time was also a crucial factor. I understood the importance of proper time management. This was given the fact that we were racing for time because we received our materials at the eleventh hour. Upon receiving our materials, I had to work fast to organize a schedule by listing down the goals for the day. By doing so, I was better organized as there was more clarity and direction towards making the installation process a success. Ultimately, we managed to meet the deadline and all the art installation pieces were well installed. We also had to make a trip once a*

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	<i>week to the original site of the installation just to ensure that the installations were still intact by painting them and restoring them. All this efforts were quite synonymous to a work of a curator. These were some of the learning points that I manage to capture through the “City colours project”. [Student 694]</i>
5. Importance of teamwork & time management for meeting deadlines	<i>“Some significant events will be doing the FYP {final year project} because I get to meet clients and understand how the process will be next time when I go out to work. It helped me to get an idea of the things that can happen in the future for my chosen profession. I may need to work in a team next time so I must learn how to able to cooperate well with people and try not to create disruptions. I also understand now that time is very important when we are working next time in my profession as the deadline is set by your client so it is really important for us to organise our time and use it wisely.” [Student 229]</i>
6. Knowledge about the significant figures and products in the industry	<i>Through the games night, I had learned about famous game designers and games designed by them. The games are great and I can learn a lot from them. In the profession, it is very competitive hence we should upgrade and learn some skills so that we can have some an advantage over others who do not know the skills yet. It will make us stand out more for the employers to choose from. [Student 1287]</i>
7. Sharing of experiences by industry professionals	<i>Receiving a talk from Jetstar Asia. I learnt about the job scope. [Student 256]</i>  <i>Talks organized by my faculty - Center for Culture and Communication are useful in providing talks from professionals in the relevant fields. CE Talks from other</i>

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*schools, for example School of Technology and Arts, provide fundamentals on the design process as well. [Student #33]*

*“But, just a month ago or so, I attended this MediaCorp (tv station) talk, and the speakers shared with us about the kind of situations or things to expect if we work in their field. So, through that I have a basic idea of what to really expect but maybe not in detail as to what my duty will be and how I should go about doing it to satisfy my boss.” [Student 1044]*

*“Recently I attended an Outward Bound Singapore (OBS) talk conducted at RP. The talk was very meaningful to me. I learned that the adventure education has changed throughout the years. In the talk they showed the activities conducted in the past which included mudwalk, kayaking and rafting using tires. But now we can see challenging high elements, challenge rope courses and rock climbing. These are activities that make the adventure camp a memorable event and enjoyable for many students. Adventure education brings together people, create new friendships and bring out the potential in people. In the past it might have been just be a leisure activity but now it is a platform for achievement and success. Many people have become successful and earning good money in the industry. With effort in expanding to a new place at East Coast beyond Pulau Ubin, the industry is making an effort to promote Adventure Education. The talk has taught me that being an instructor can change lives. I am motivated to do my best to accomplish my dream of becoming a great leader in adventure education. I know that realising my dream in OBS needs hard work. What matters most is that you enjoy it and you look*

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*forward to it every day. I can make a difference in one's life and also my career.” [Student 1114]*

*“Having attended many talks given by different professionals working in the hotel industry. They gave really insightful talks and these talks include how working in the hotel industry is like. Also, they shared with us their own working experiences, the difficulties that they met during their working life and how they overcome these difficulties. From these I can prepare myself to face different kind of challenges and to meet people from all walks of life. It is also helpful for helping me decide if I really want to work in this profession in future.” [Student 572]*

*“The significant events that helped me to get an idea what it means to be working in my chosen profession are the different talks hosted by the professionals in the industry. They shared their experiences with us and also told us about the possible problems that we might face and also the ones that they faced which gave us an idea of what it is like to be in their shoes. They also told us the scope of their job. Like what they were required to do on a daily basis.” [Student 500]*

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*Note:* Highlighted sections are responses that specifically refer to PBL.

Table 11  
*Descriptions of the Responses Related to Professional self-efficacy*

Description	Examples of Verbatim Responses (highlighted in grey are PBL specific)
1. PBL: knowing how to approach problems	<i>“The modules also taught me how to approach potential problems in the future, so that I’ll be better prepared.” [Student 433]</i>
2. PBL: practice acting like the professional	<i>“Since now I am already in my second year, I am already taking the modules chosen for us that were tailored to meet the needs of our diploma and the industry that we would possibly be working in. The problems given every week for every lesson is based on what might or have already happen in real life when we go out to work. Thus, they are all very realistic and also need to approach and solve it while pretending that we are doing this for real. These drills definitely helped me in knowing more about what is expected of me and what am I to do when faced with such situations when I go out to work in the real world.” [Student 525]</i>
3. Learning from mistakes to make more professional decisions	<i>“Some events that made me have an idea of what it means to work in my chosen profession are the mistakes we make in class. Through these mistakes we learn to make more professional decisions and this prepares us for work.” [Student 573]</i>
4. Familiarity with	<i>Last but not the least, practicing the lab rules and regulations, knowing what</i>

the basic or routine Knowledge about professional practices in order to be efficient	<i>measurements should be taken using which equipment, knowing how to make use of the different equipment in the laboratories as well as the environment. These need to be familiarised with really well in order to be efficient. In future it is going to be part of the daily work and my career.” [Student 523]</i>
5. PBL: Collaborative learning	<i>This made me realise that in the future IF there is a probability that I may have to work on a project with a team, I have to improve myself and be a better team player even if I do not like working with some people. Working in a team helps me to be prepared for future team work etc.” [Student 882]</i>
6. Confidence in dealing with customers	<i>At the three day Hong Kong &amp; Shanghai Banking Corporation (HSBC) women's run event, I was required to interact with customers and register their names. During that time, I got to meet different types of people from different countries and I learned to be braver in handling customers and their inquiries. I benefitted from that learning experience as I have never had a job before. [Student 589]</i>

*Note.* PBL refers to problem-based learning. Highlighted sections are responses that specifically refer to PBL.

Table 12

*Descriptions of the Responses Related to Preference for a particular profession*

Description	Examples of Verbatim Responses (highlighted in grey are PBL specific)
1. Enjoyed learning from solving problems related to the industry	<i>“Definitely the modules that I took, which is Digital Audio &amp; Video, as well as Digital Illustrations. After going through these 2 modules, I realised that I actually enjoy doing the daily problems, and would hope to be able to work in a related field.” [Student 225]</i>
2. Enjoyed a profession specific module	<i>“The Marketing module taught gave me an overview on Marketing principles as well as the rough job scope of a Marketing Executive. Through this module, my interest in Marketing was aroused which caused me to be keen in working towards Marketing as my chosen profession. In addition, as I had also excelled in my Marketing module during the semester, I am more motivated me in choosing this profession in the future.” [Student 563]</i>
3. Acted in the role of a professional	<i>“It was during a particular lesson of media writing module whereby we had to act. One had to act as the PR manager of an artist. I found it interesting and would like to learn more about.” [Student 740]</i>
4. Found practicum modules interesting	<i>“Incidents such as getting a chance to do practicum, learning from on real life scenarios and hands on activities make me more interested to experience the learning for myself.” [Student 710].</i>

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*“The modules I take are the ones that helped me to really get an idea of what it means to work in my chosen profession. I may not have a specific idea of what is my chosen profession but I do want to be in the hospitality industry as I find it very interesting. For example, through one of the modules I took, I learnt what the situation can be like in an F&B and some ways to deal with guest or when problems occur. Since every week we have a different role in the restaurant, it is fun experiencing the different roles such as bartender, server and etc. Outsiders may think that it's easy doing the job but the person experiencing it knows best the challenges they face.”[Student 516]*

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5. Thinking about future career from the use of simulators & equipment

*“The aircraft simulator in republic polytechnic really inspired me a lot and I believe I had developed a strong enthusiasm on aircraft systems after having experienced it. I definitely want to work in the aircraft industry now. Besides the simulator, this course had also enabled me to experience a wind tunnel. I could actually see how the wind affected the airfoil to produce a lift for an airplane to fly.” [Student 507]*

*“I feel that apart from the laboratory environment, the equipment being used also makes me think about the career. In secondary school days, the equipment we use in the labs was different. It was much easier working with them and getting the measurements done. Now we use more complicated equipment in the science laboratories, for example, to carry*

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*out the testing of DNA. At my first Lab session, we were only given the protocol and it led us to learn many ways to look at the situation and to work and to use the equipment in the labs. [Student 523]*

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6. Interest developed from specialisation modules *“When I first graduated from secondary school, I wanted to become a designer, I got into the Diploma in Design for Interactivity in RP and when I took the specialisation modules, I found myself becoming more interested in the image editing with photoshop and filming with all the angles and shots I can try to do. From then on I have decided I will follow one of the paths related to these and confirm my decision after my national service.” [Student 230]*

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7. Exploration of career possibilities from experiencing elective modules *“RP has given me many opportunities to explore and let me figure out what I really want in the future so that I can choose wisely what I want to pursue when I graduate. For example, even though I am in the Environmental Science diploma programme I get to study and learn modules from other schools such as marketing and financial accounting in my next semester” [Student 219]*
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*Note:* Highlighted sections are responses that specifically refer to PBL.



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## Discussion

There were two goals for this study. The first was to identify the students' sources of influences in their notion of what being the professional meant, and how the polytechnic education compared with other sources such as work and personal experiences. The second goal was to understand how polytechnic education, through influencing students' understanding of the profession, contributed to students' professional identity development. The PIFFS, a five-factor instrument, aimed at measuring professional identity development in professional education, was used as the theoretical framework for analyzing the qualitative data collected from students at a polytechnic in Singapore. The institution prepared students for a broad range of professions.

In addressing the first goal, the study found that educational experiences were less important than personal experiences and work that students personally chose to engage in. For students *not* enrolled in diplomas related to their future work, personal experiences were the most significant source of influence, and accounted for 50% of the responses. For those who were unsure about the relevance of the diploma to their future work, personal experiences (33%) were also the most significant source amongst the three domains, but the proportion of nil, vague and irrelevant responses (34%) was also the highest for this group of students. Finally, it was found that the influence from school for students enrolled in diplomas related to the future work was similar to personal experiences.

Only for the Rel students, we have observations indicative of their learning about the profession as they progressed through the polytechnic education. The proportion of students that experienced a significant event or incident in their current polytechnic education "increased" from Year 1 to Year 3 students. The same was not observed for the NRel and URel groups.

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The above findings were contrary to our expectations that the responses coded “school” would be the highest percentage, and should even form the majority of the responses for the whole sample. This is given that the polytechnic education was the first formal introduction to the profession for most of the students (87%). The percentage of respondents with vocational education prior to entering the polytechnic was 13%, and amongst these are students who are enrolled in a diploma programme for a profession different from their earlier education.

If polytechnic education is to continue to position itself as the main gateway to prepare students for the workforce, the implications of these findings are clear. First, polytechnic education should ensure that more students are able to enroll in diplomas relevant to their future work. Second, they should help students who are unsure about their future career goals to actively explore, identify with, and commit themselves to goals; and understand how the diploma can help them achieve these goals. In an earlier quantitative study with the PIFFS, the cross-sectional analysis of responses from students unsure about the relevance of their diplomas showed a statistically significant decline in the factor Having the Professional as a Role Model (Tan, in preparation). Observing role models, simulating the roles and acting like the professional, getting feedback and critique about their performance; all these contribute to students’ development of the professional identity. As a result, students can better understand the expectations to be met, and the standards of practice to be achieved. Without real-life examples, their understanding about the profession can only be based on their limited exposure and their own projection of what it would be like.

### **Role of PBL in Providing Support for Professional Identity Development**

The development of professional identity cannot be expected merely from learning in disparate compartments or subjects in silos. Otherwise, the students have to process the information across the subjects

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without the explicit, formalized support from the faculty through both curricular design and teaching delivery (Dall’Alba & Sandberg, 2006). Instead, the students need to be supported to develop the ability to interpret issues from the perspective of the profession. This requires them to have made sense of their regular lessons in relation to the profession they are preparing to enter, and even their areas of specialization (Dall’Alba, 1994). Davis encapsulated the transition in terms of two main milestones - role simulation and eventually role internalization (Day, et al., 1995). Wenger (1998) described succinctly the complex process of learning to become the professional. He states that: “Things have to be done, relationships worked on, processes invented, situation interpreted, artefacts produced, conflicts resolved. We may have different enterprises, which give our practices different characters. Nevertheless, pursuing them always involved the same kind of embodied, delicate, active, social, negotiated, complex process of participation” (Wenger, 1998, p.49).

Problem-based learning is a pedagogical approach geared towards helping students learn about working in their chosen profession. As such, this approach seems to fit the dimensions that make up professional identity development, and indeed the students’ responses in this study made specific reference to PBL. By coding the student responses in terms of the PIFFS, we arrived at an overview of how the baseline PBL and other curricula at the polytechnic contributed to students’ professional identity development. The following paragraphs describe our finding.

A key feature of PBL is the use of real world problems to provide the stimulant for learning relevant knowledge and skills related to professional practice (*Knowledge about professional practices*). The problems require students to think and reason out a good solution by applying the new learning (*Having the professional as a role model*). Discussions with peers in collaborative learning enable students to test their ideas and thoughts. Through the process, they get feedback to improve their problem resolution approaches and understanding of concepts. These characteristics of PBL provide a simulation of

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experiences that are closer to real life practice, than the traditional lecture-tutorial system.

Ideally when students become more skillful at the problem solving process, they gain attributes of the lifelong learner who is able to learn on the job. Tutors guide students in the learning process so that students can, over time, become less dependent on them. The tutors provide timely scaffolds and closure for the students' learning. As a result of their involvement in the students' learning process, tutors can shape the way students learn new knowledge and skills in professional practice.

Regular practice with the problem solving process, with the support of facilitators and peers, can help students gain confidence in the approaches to deal with professional situations (*Professional self-efficacy*). Performance-based assessment also directs the student learning to be more practice oriented. When real clients or authentic contact with the industry professionals are involved (*Experience with the profession*), it is easier for reality to hit home to students that they are preparing for real world practice. The contact with industry partners and clients inject a greater sense of urgency in them, and an awareness of what it takes to become competent.

Finally, the active exploration of the nature, scope and approaches of the professional through the regular encounters with problem scenarios can enable students to make more informed decisions about their future careers and specialisations. Such learning experiences can deepen their interest and commitment to the profession (*Preference for a particular profession*), or enable them to know more clearly why the pursuit of a career in the profession may not be ideal for them.

### **Enhancement to PBL**

In a previous study, quantitative data collected using PIFFS from the same group of students were analysed. The results suggest that the

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PBL implemented at this polytechnic contributes significantly to some factors, and not the rest. In *Experience with the profession* and *Having the professional as a role model*, there were no significant differences found in the cross-sectional analysis. In this study, it was observed that none of the responses related to the factor *Experience with the profession* made specific mention to PBL. An enhancement to PBL is thus to have *Experience with the profession* built into the lessons. This could encourage students to be more active in simulating the role of the professional and thereby contributing to student development through the factor, *Having the professional as a role model*.

In summary, student learning at the polytechnic could be supported for more authentic experiences with clients and industry professionals, and for learning to think, reason and act like the professional. As a construct, the PIFFS dimensions, (1) *Knowledge about professional practices*, (2) *Having the professional as a role model*, (3) *Experience with the profession*, (4) *Professional self-efficacy*, and (5) *Preference for a particular profession* provide a guiding frame of reference for planning and evaluating how students' learning and development of professional identity are supported in vocational and professional education.

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## **Chapter 5: The Educator-Practitioner's Perspective of the Role of Professional Education in the Development of Students' Professional Identity**

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### **Abstract**

The teaching practices of educators in professional education have inevitably been influenced by their own learning experiences in their respective professions. In this study, six educators from a polytechnic in Singapore were interviewed about the approaches they used to prepare their students for professional practice. In this study, they were referred to as educator –practitioners as they had practiced in the field they were preparing their students for. They had joined the polytechnic from diverse professional fields such as theatre studies and aerospace engineering, and had been in service as full-time educators ranging from three months to three years. In order to understand how their approaches could contribute to the transformation of students from laypersons to new practitioners, the interview data were analysed using a framework based on the professional identity five-factor scale (PIFFS). These five dimensions are: (1) *Knowledge about professional practices*, (2) *Experience with the profession*, (3) *Having the professional as a role model*, (4) *Professional self-efficacy*, and (5) *Preference for a particular profession*. From the analysis, we derived the educator-practitioners' perspective of the role of professional education in students' development of professional identity: To introduce and familiarize students with profession-in-practice use of language, resources and work environments; enable them to experience the impact of interacting with clients and other stakeholders; allow them to actively learn the role and responsibilities of the professional; and explore

the different aspects of the profession to be more certain of their interest. To prepare the students to become self-efficacious in their practice, they emphasised deliberate practice, and helping students learn to think on their feet to respond appropriately. The challenges faced by the educator-practitioners are also discussed.

*Keywords:* professional education, educator-practitioner's perspective, professional identity development

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## **The Educator-Practitioner's Perspective of the Role of Professional Education in the Development of Students' Professional Identity**

If the purpose of professional education is to enable students to become new practitioners committed to perform competently, it has to enrich their educational experiences beyond the learning of a body of knowledge and skills. The professional education has to shape how the individual relates to the profession. The students begin to interpret issues from the perspective of the field; interact in a professionally appropriate manner with patients, clients, colleagues and other stakeholders; and keep updated on industry developments (Beagan, 2001; Dall'Alba, 2009; Hurst, 2010; Sheppard, et al., 2009; Sullivan, et al., 2007). Such a transformation of the students from layperson to the new practitioner produces a professional identity characteristic of their profession.

Educators play a key role in the delivery of the professional education experiences. Their perspectives of what it takes for students to be sufficiently initiated into the profession, and how professional education can contribute to students' professional identity development are the focus of this study. Of particular interest is the perspective of educators who have practiced in the professional field they are preparing their students for. In this study, we refer to these educators as educator-practitioners. Some of them may still be maintaining some form of professional practice or engagement even as they worked full-time in professional education. There are hardly any studies that have sought to understand the influence of these educator-practitioners' personal professional learning journeys on their teaching practice. That is, the teaching approaches they use as a result of these experiences gained through formal professional education when they were students, and professional development when they started their practice.

There are two studies that have research questions related to our study here. The first was Ajjawi and Higg's (2008) that examined the question of how experienced physiotherapists (clinical educators) had



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learned to reason in health professional education and in professional practice. The second was Timmerman's (2009) study that looked at the impact of teacher educator's own role models on their teaching views and practices. Through studying the educator-practitioners' experiences in their professional learning journey, these two studies aimed to understand how formal education could be improved in preparing students for professional practice (Ajjawi & Higgs, 2008; Timmerman, 2009).

In Ajjawi and Higg's research, clinical educators were interviewed about the challenges they faced in helping their students develop clinical reasoning skills. They were also asked to share their observations of new physiotherapists reasoning in practice. The participants in the study were twelve physiotherapists with a minimum two years of experience in clinical supervision, and from across different specialisations at a large teaching hospital in Sydney. The data were collected through written reflections and interviews. The researchers also spent a day observing the work environment.

The study found that the physiotherapists had mainly learnt clinical reasoning at the workplace instead of their formal education. This because the latter either, (1) provided simple case studies that did not include dimensions like personal history, family issues and nursing care needed for clinical reasoning; or (2) focused on the application of science and formulae, and the learning of techniques, without realistic clinical contexts. They reflected that knowledge gained from professional practice contributed to the development of their clinical reasoning. In addition, discussions with colleagues, peers and students provided them with the relevant information, and critique or feedback that shaped their reasoning. They may have had the experience of being guided by the mentors through the reasoning process. Participants reported "modelling their reasoning on that of others, usually seniors, mentors or role models with whom they were working" (Ajjawi & Higgs, 2008, p.144), and would think about how these role models would have responded in their circumstance.

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The physiotherapists did not consider clinical reasoning as a separate set of skills but as part of getting the work done in practice, and being reflective about the impact on client outcomes. A significant impetus for them to improve their clinical reasoning, was when there was a culture of learning in the work environment.

Overall, the finding in Ajjawi and Higgs' (2008) study is that "a significant challenge for educators is to design classroom learning and teaching activities that help students learn to reason in context and to maximise learning from unplanned and opportunistic activities in the clinical setting" (Ajjawi & Higgs, 2008, p.146). Students need to play or simulate the role of the practitioner in their discussions and other learning activities, reflect on their experiences, and gain contextualised knowledge, skills, practice and experiences to grow into the new practitioner.

Timmerman's (2009) study, on the other hand, focused on socialisation prior to, and during formal professional education of language teacher-educators. Open interviews were conducted with individual language teacher-educators to construct their life histories. Relevant to this current research were accounts of their experiences with their role models and the significant influences on their conceptions of teaching.

Unlike other professions, the teaching profession provides years of opportunities for many young people, especially aspiring teachers to interact with members of the profession. Timmerman (2009) found that most, with the exception of one participant, could readily recollect strong impressions of teachers from their secondary education. In contrast, none of them could identify any teacher-educator(s) they encountered in their teacher education who were role models for them; instead half of the participants were critical of their experiences with the teacher-educators and their approaches. The secondary school teachers who impressed them were: (1) good storytellers who contextualized the learning of the language in the form of compelling stories with the backdrop of people,

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culture and history associated with the language, (2) teachers who took a genuine interest in their students' learning, relating to them as individuals and being personable in their teaching approach, (3) teachers who were knowledgeable, conducted engaging lessons and had their own personal style of teaching, (4) and those who displayed a "playful" and more lighted approach in motivating students to learn, through the use of games, toys, food and drinks.

Some participants in the study made attempts to imitate their role models. They learned to do so through experience, using trial and error. Some felt they were more successful in modelling after their ideal teachers when teaching adult students rather than secondary school students. Some others realized that they could not apply the teacher ideal in just any classroom situation or culture. Then there were those who felt that the ideal teacher developed their own style and they encouraged their student teachers to do so. Overall the findings indicated that the ideal teachers provided a reference for the teacher-educators to develop, or discover their teaching approaches and styles.

### **This Study**

The purpose of this study is to gain insights into the influence of educator-practitioners' professional learning and development journey on their teaching practice, and how their preferred approaches contribute to prepare students for work. Ajjawi and Higg (2008) analysed physiotherapy clinical educators' learning experiences to understand how the development in clinical reasoning took place, and thus how this could be enabled in the classrooms. Their focus was on a specific profession (i.e. physiotherapists) and at the workplace (teaching hospital). The study also reported that participants (clinical educators) did not distinguish between the development of clinical reasoning and process of becoming the professional (for the students), or performing the work of the profession (for the new practitioners).

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This current study will expand on Ajjawi and Higgs' study by covering a range of professions to understand educator-practitioners' teaching approaches for transforming the students to develop their professional identity as new practitioner. The framework based on the professional identity five factor scale (PIFFS) (Tan, in preparation; Tan & Schmidt, 2012) will be used to analyse the qualitative data collected through interviews. The scale was created to address the gap in the professional education literature for a comprehensive measure of professional identity development. The five facets are (1) *Knowledge about professional practices*, (2) *Having the professional as a role model*, (3) *Experience with the profession*, (4) *Professional self-efficacy*, and (5) *Preference for a particular profession*. Interpreting Ajjawi and Higgs' (2008) study, their key findings concentrated on the PIFFS factors *Knowledge about professional practices*, and *Having the professional as a role model*. The first factor refers to knowledge about how subject-matter knowledge is used in professional practice, which incorporates norms and standards of practice, and contextual information such as a patient's history. The second factor describes the active modelling on the role of the professional. In the classroom, this may take place in the form of discussions on realistic case studies. In clinical education, internship or practicum lessons, students are given opportunities to act in the role of the professionals and model on the reasoning in the practice contexts. The current study was an attempt to go beyond these two facets in professional development. The five facets of professional identity development that guided our analysis will be described in detail in the next section.

### **Professional Identity Five-factor Scale (PIFFS)**

The construct was developed based on five key dimensions found in the literature that contributed to the formation and development of a professional identity. The professional identity is defined as: the self that has been developed with the commitment to perform competently and legitimately in the context of the profession, and the development of which could continue over the course of the individual's career.

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The first factor, *Knowledge about professional practices*, refers to knowledge students have about their future profession. To prepare for the professional practice, the students need to not only acquire (1) domain knowledge, but also to (2) understand and adequately internalize values and the norms of practice, rules and regulations determined by the relevant professional bodies and other licensing authorities, and (3) have a reasonable idea of the roles they would be expected to perform, the responsibilities they would have to bear, and the outcomes they would be accountable for (Buyx, et al., 2008; Cooke, et al., 2010; Dall'Alba, 2009; Monrouxe, 2010; Sheppard, et al., 2009; Sullivan, et al., 2007). These will enable them to be able to make reasonable judgment about the appropriateness of decisions and actions in professional roles.

The second factor, *Having the professional as a role model*, refers to the extent to which students have access to professionals as role models to look up to, and learn from. (Ajjawi & Higgs, 2008; Beckett & Gough, 2004; Timmerman, 2009). It is assumed that the feedback and critique from role models in their interactions with students help to shape students' thinking and reasoning (Ajjawi & Higgs, 2008; Beckett & Gough, 2004). This feedback provides students with concrete ways to bridge learning in the classrooms and real world practice (Goldie, et al., 2007; Ottewill, 2002). Learning from role models is not a passive process, but an active one where students are engaged in learning to think, reason and act like the professional. Further, having more than one role model makes room for students to explore provisional selves, as they make choices about the kind of professional they want to become (Ibarra, 1999).

The third factor is actual *Experience with the profession*. Experience is defined as authentic contact with clients in a professional context that enables students to learn about the professional practice and the role of the professional (Dornan & Bundy, 2004). Experiences in the field contribute to students' understanding of what it means to act as a professional-in-practice (Lave & Wenger, 1991). These experiences are useful as they provide opportunities for students to reconcile what they

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have learnt in the classroom. They can also use their learning strategies to organize their knowledge for practice (Beckett & Gough, 2004; Prince, Boshuizen, Van der Vleuten, & Scherpbier, 2005), and pick up the necessary skills for organizing and prioritizing assignments and tasks at the workplace (Fitzpatrick, While, & Roberts, 1996).

Given students have not graduated and not likely to be accepted as “full participants” or full members in the profession, they also will not have experienced yet the responsibility and accountability of the professional role (Lave & Wenger, 1991). Hence, to describe their involvement in the particular profession, the factor *Experience with the profession* would be more appropriate than experience *in* the profession

The fourth factor is *Professional self-efficacy*. This refers to an individual’s beliefs that he or she can really succeed in the profession. Perceived self-efficacy was defined by Bandura (1982) to be “judgments of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122). Self-efficacy research in education has shown that such personal beliefs influence students’ decisions to put in effort to successfully complete their tasks (Bandura & Schunk, 1981; Zimmerman & Kitsantas, 1999; Zimmerman & Ringle, 1981). Students with higher self-efficacy also show more perseverance to fulfill their tasks.

The fifth factor is *Preference for a particular profession*. Studies in motivation have shown that when American students personally identify with the focus of their learning, they are more likely to work harder, enjoy school more, and cope better with failures (Ryan & Connell, 1989; Ryan & Deci, 2003). Similar results have been found in studies involving students from the People’s Republic of China and Korea, suggesting that these observations are not culturally biased (Jang, et al., 2009; Vansteenkiste, et al., 2005). Having a strong *Preference for a particular profession* would thus be expected to facilitate the focus and commitment

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in learning, and as a result contribute to the development of their respective professional identities.

In summary, (1) *Knowledge about professional practices*, (2) *Having the Professionals as a Role Model*, (3) *Experience with the profession*, (4) *Professional self-efficacy*, and (5) *Preference for a particular profession* are elements of professional identity development which professional education can tackle to help students become the new practitioners.

## **Method**

### **Educational context**

This research was carried out at a polytechnic in Singapore where, a student population of about 14,000 students was being prepared for a wide range of professions in 39 diplomas, and in across six schools and a centre (i.e. School of Engineering, School of Applied Science, School of Health, Sports and Leisure, School of Hospitality, School of Information Technology, School of Technology for the Arts, Centre for Enterprise and Communication).

The baseline pedagogy at the polytechnic is problem-based learning (PBL). The aim of PBL is to facilitate students to learn in ways that mirror the professional practice (Barrows & Tamblyn, 1980). In PBL, the feature is the use of problem triggers placed in a context e.g. medical phenomenon and professional practice situations. Small groups of students work on the problem together: they analyse the problem, identify learning issues that are helpful for developing an adequate explanation for the phenomenon, follow up to research and prepare their explanations. When required, they would also determine the course of treatment, action or solution that best addresses the phenomenon. So instead of the conventional method of learning the theory followed by solving a given

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problem, students are first presented the problem to be “diagnosed” and then solved. Content is thereby learnt in a situated manner.

The role of the tutor is to provide guidance for the students’ learning process of constructing and acquiring knowledge: the activation of prior knowledge, search and processing of relevant information, thinking and reasoning the best response to the given problem (Hmelo-Silver, 2004; Norman & Schmidt, 1992). In such curricula, the intent is for students to take greater ownership of their learning, and becoming more self-directed as would a professional in practice who is continually learning to ensure competence is achieved. Finally, through actively engaging with, exploring and understanding the various aspects of professional practice in the regular encounters with problems, students are expected to develop a more realistic sense of what it means to be the professional.

Schmidt et al (2009) identified three main types of PBL implemented in the world, each with a different intent and emphasis for the use of PBL. Type 1 refers to the use of PBL to help students acquire content in a more relevant and meaningful manner. Type 2 describes the use of PBL to enable students to learn practical reasoning and problem solving skills. Type 3 is the category of PBL implemented for helping students to develop the capacity for self-directed learning. PBL when implemented in a comprehensive manner is inclusive of all “three types”. They suggested that the mixed findings of the effectiveness of PBL in education could be a result of the implementation of different PBL types.

The PBL structure implemented at the research site is a one-day, one problem approach. It encompasses all three types of PBL categorised by Schmidt and his colleagues. Students actively engage in gaining knowledge and skills through collaboratively solving a problem within the course of a day (Yew & O’Grady, 2012). Each class consists of twenty-five students. The lessons for each module take place once a week over a fifteen-week semester. Both formative and summative assessments for the



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learning process (problem solving approach and skills, self-directedness in learning) and acquisition of knowledge are put in place at the polytechnic to provide adequate feedback for student learning. The main exceptions to the use of the PBL approach at the polytechnic are practical skills modules which require the demonstration and safe use of equipment (e.g. use of lighting equipment in theatre management), and practicum modules where students learn in a simulated work environment that serves real clients (e.g. the restaurant service and culinary skills for students preparing for the hospitality industry).

### **Ethical considerations**

This research study was approved to have satisfied the ethical considerations by the Institutional Review Board at the polytechnic where the research was conducted. The accepted research protocol included signed informed consent by the interview participants, de-identified transcriptions, and controlled storage and access of data to protect the confidentiality of the information shared.

### **Participants**

This study applied purposive sampling or criterion-based selection study (Denzin & Lincoln, 2000; Merriam, 2009) to identify the subjects who can provide relevant and rich information, to address the research goal of understanding the influence of educator-practitioners' professional learning journey on their teaching approaches.

Seven interviewees were identified based on the following considerations:

- a. They have had experiences in the relevant professional practice they were preparing their students for.

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- b. There was evidence or recognition of their competence in their respective profession e.g. best trainee award, being a member of the judging panel of a regional or international competition, having established a presence in the local theatre scene, having been published in international magazines and had been awarded a scholarship by their employer organisation.
  - c. They continued to maintain strong links with the industry and/or have had recent experiences in the professional practice (defined in this study as no more than three years prior to the interview for this study).

Of the seven identified academic staff, six confirmed their participation. When approached, the seventh educator-practitioner was leaving for another organization within the next two weeks and was unable to make time to participate. The six participants were full time faculty members at a polytechnic in Singapore. They had joined the institution directly from their respective professions, and had been in the full time position for an average of 18.5 months, ranging from three months to three years. The six participants were from five distinctively different industries: spa, theatre, journalism, outdoor- and adventure- learning specialists and aerospace engineering. The educator-practitioners from the theatre and outdoor adventure learning professions were concurrently maintaining some form of professional practice in addition to their full-time work as educators.

As the focus of the study was on the influences from their professional learning journey on their teaching practice, neither the number of years of relevant experience, nor their age was recorded for the study.

### **Data collection**

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The data was collected between September 2012 and March 2013 through semi-structured interviews. All the sessions were voice-recorded and transcribed. There were two sessions conducted with each participant. The first round of interviews ranged from 45 minutes to an hour. The second round of interviews, ranging from 20mins to 45mins, was carried out after the first set of interviews were transcribed and analysed. The main intent for the second interview session was to clarify the responses provided by the participants during the first round of interviews.

The interviews had two key questions. The first was, “What led you to teach in professional education?”, and the second, “What were the influences from your own professional learning journey that had an impact on the approach you used to prepare students for the profession?” The purpose of the questions were to allow the participants to recall their transition into professional education and make the links between what they did in class and why they did it as a result of their own experiences. In their elaborations, they were expected to make reference to standards and expectations of the profession at entry level, their experiences with what it took to be successful in the profession, and their views on the role of professional education in preparing students for joining the profession. The following set of questions were prepared for prompting these aspects,

- i. In your industry, do companies hire fresh graduates? What kind of expectations do they have of them?
- ii. What kind of training do they provide to help these young graduates to be effective, to get up to speed?
- iii. What do you think is the role of formal education in preparing students to be effective in their professional careers?
- iv. What are the kinds of educational experiences that would be critical in achieving this role?
- v. How important are role models in their education here?

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- vi. If your industry emphasises experience more than academic qualifications, what then in your opinion is the role of education in preparing the graduates for their careers?
  - vii. How were you trained to become effective? How were you different from colleagues who may not have been as effective?

For the participants who wanted more information about the interview prior to the session, these questions were emailed to them. Otherwise, they were shown these at the start of the interview, when they were given details of the purpose of the interview to obtain their consent to proceed. To facilitate the sharing of relevant information and avoid the withholding of any, the participants were assured that they could indicate for any part of their responses to be removed from the dataset. This was in the event that they were uncertain about the impact of the information being published.

### **Analysis**

The content used for the analysis were what the educator-practitioners believed to be pertinent for introducing and preparing students for the world they would be entering. These were based on their personal knowledge gained from their formal education, and work experiences in the profession, such as the feedback they received regarding the effectiveness or impact of their professional work, and influences from their role models. The teaching approaches described in the interviews might or might not have been initiated by the interviewees at the polytechnic.

The purpose of the interpretive analysis was to understand the nature of the different approaches from the participants' perspectives (Merriam, 2009; Creswell, Hanson, Plano, & Morales, 2007) to identify commonalities and differences. The theoretical framework used for the

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analysis of the data in this study was based on PIFFS. The aim is to provide an adequately comprehensive lens for learning about how students in professional education are socialized to become the new practitioners (Tan, thesis in preparation). The five-factor professional identity development construct has been found valid and reliable in previous studies (Tan & Schmidt, 2012; Tan, thesis in preparation), and the quantitative data analysed were collected from students at the same polytechnic where these participants are teaching. The students were enrolled in a wide range of diploma programmes as described in the earlier section about the educational context of this study.

A colleague of the researchers who was not part of the team was approached to analyse about twenty percent of the data or one and half sets of transcripts to compare for any differences in interpretation of the data using the professional identity development construct. There were no disagreements in the interpretation.

## **Results**

In this section, we present relevant quotes of what the educator-practitioners believed to be helpful for preparing students for work and how these approaches contributed to the development of their students' professional identity on the five facets. The educator-practitioners' verbatim responses were identified by single initials followed by the profession or field that they represented; these verbatim responses have been edited for easier reading.

### ***Knowledge about professional practices***

The interviewees' responses for the facet of *Knowledge about professional practices*, included the learning of (1) terms and documents used in the industry; (2) overview of the production or work cycle, (3) the scope and nature of the profession and industry, and (4) the standards and norms of practice. R (Journalism)'s emphasis on providing students with

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“concrete links to industry” succinctly captured the focus and significance of this facet: to help students gain more accurate and realistic knowledge they could use in their future practice. Students would otherwise ended up speculating and hypothesizing what to expect in their future work, and what they needed to prepare themselves for.

**Common terms and documents.** As a first step, commonly used terms and documents in the industry were necessary to introduce to the students. For example, in journalism, the concept of the “rate card” was incorporated into the curriculum to ensure that students were aware of how they could access the online published profile of real publications. Besides having a real world resource to draw on for their learning, with that knowledge, students could also now make informed decisions of which publication they could target to get published and how they could pitch their stories to the editors.

**Overview of the production cycle.** In a module where R (Journalism) taught feature writing and editorial work, students experienced for themselves the full cycle of producing a feature article. The students in the class were given an individual assignment to be worked on over five weeks. The lesson in *“each week focuses on a different part of the process of getting published. The first part is to understand “what is a feature piece?”, the second week is about “how do you plan for a story?”, the third week is “how do you do research”, the fourth week is “how do you conduct proper interviews?” and then, it should build on itself, and then at the end of the fifth week they go to press. They do the design and layout and they submit the work. These are good broad strokes for them to see the whole production chain from concept to finished product. Which for most of them they would be involved in parts of it because not everybody’s gonna be a writer or designer, photographer.”* The intention was to support students for a more holistic learning experience to gain insights into their future work, and in what ways their contributions had an impact on the overall product.

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**Scope and Nature of the Profession and Industry.** Educator-practitioners could expand students' view of the scope and nature of the work carried out by the profession in the industry. R(Journalism) shared, *"Many students enter the diploma programme with aspirations to publish in mass publications. They are unaware of trade publications that present greater potential for career development...they don't realise that at that level(mass publications) it's a dime a dozen and the re-numeration is actually quite, quite low and where the money really is, it's in trade publications or even business to business communications, ...they are not very aware that there is a huge spectrum of content that's waiting to be written, and there is sore lack of credible or smart people to produce, or help clients produce this content."* Students' prior experiences with the profession are limited. Such information enables students to identify opportunities, such as learning specific subjects, to prepare themselves for the work. They can begin to be more active in exploring their career options in the profession.

From his own professional career mentoring writers as an editor, he made this observation, *"I have seen this trend, if the young writer comes in predisposed to reading good content, familiar with the classics and familiar with the subject matter we are specialising in they hit the ground running, not much mentoring. But if you have someone who is very well versed in lifestyle, and they are trying to transit to business writing then the learning curve is very steep. Because they need to pick up economic terms, it can get a bit technical...and I notice that those with a broad base of reading adapt very quickly, they might not be subject experts but very quickly they pick up terminologies, they pick ideas very fast."* He recollected his own experience at university: *"Before I went to university, before I started school in Texas, they mailed us this big brochure and it was called the University of Texa..., undergraduate unrequired reading list which was a series of books that would be very useful for the undergraduate to read, to get a grip on... yet if you'd read on all of these books they give you a significant advantage actually,*

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*because these are books that broaden your mind.*” This influenced him to give a group of year one students he was mentoring the “*Diploma in mass communication unrequired media list which is a series of movies and books for them to read.*”

There had been instances where learning laboratories were set up to simulate the work environment. The spa laboratory (spa lab) was one example at the polytechnic which had been designed for creating a calm and therapeutic ambience; it was furnished like a typical spa with furniture made of wood and piped in soothing music. M (Spa) shared how the teaching staff used the spa lab to help students learn: “*How we get them ready is we have a spa lab which is a real life setting of a spa so we actually teach them in a practical environment. And the module has been created to provide them with the skills that they can leave tomorrow, and walk straight into a spa and know how to handle a customer complaint, know how to check in a guest, check out a guest, meeting, greeting, sales, um, looking after a guest when they arrive, making sure they fill up the risks form so it makes them workplace ready.*” Students learned useable knowledge they could apply in their future work.

C (Aerospace) shared his past work experience with his students to help them see the relevance of what they were learning, “*I share with them my stories about... when I was working back then... for example landing gear, and I would tell them a story about landing gear, how I was doing it so they piece all these two together: what they are learning, and they try to imagine next time when they were working.*”

**Standards and Norms of Practice.** *Knowledge about professional practices* involved knowing standards of practice in the industry. In a diploma programme, students’ lessons were tied to industry recognized certifications such as the Level 1 Climbing certification. S (Outdoor & Adventure Learning) revealed that these lessons provided students with an edge to join companies with climbing activities for part time assignments, internship programmes or a full time position after they



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graduated. These companies would not then need to spend time and resources to have them trained in these specific areas before employing them. In this diploma programme, students were exposed to a range of modules to learn the technical skills valued by the industry, and also modules that enabled them to understand outdoor leadership and adventure education. These aimed to prepare students to be able to facilitate meaningful learning experiences for future clients.

In the aerospace industry, the requisite training of aircraft engineers was still carried out in the form of apprenticeship schemes within the industry by aerospace companies certified by the governing authority. The focus of vocational and professional education was thus to enable students to be ready for, and to successfully complete the apprenticeship scheme. The apprenticeship scheme prepared them for taking the written and oral examinations invigilated by the governing authority. A (Aerospace) shared what students gained from the polytechnic education: *“they are very much aware, they understand the skill that is required. So for them to be immersed in the industry it’s much easier”*. The students were also prepared for further education in the form of modular credits that could be articulated into university programmes, *“We need to prepare the students for the industry... At the same time we need to take into consideration the aspirations of some of the students to go into university”*.

During the course of their polytechnic education, students were given opportunities to experience internship programmes. The educator-practitioners' knowledge about the aerospace industry and professional practice led them to customize pre-internship learning programmes to support student learning. The customization took into account various considerations such as the type of work the companies engaged in, and the modules students had experienced.

The nature of the industry and its priorities were part of the *knowledge about professional practices* that educator-practitioners could

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impart. R (Journalism) elaborated on the importance of having facilitators with the relevant experiences, *“it’s the little nuances that will help the students fit better and work better...certain things you can’t pick up unless you have experienced it. For example, things like managing a publication. At the end of the day, it is very profit driven and if you understand that bottom-line drives major decisions in publication then you understand things like content is not as important actually as the advertisers”*. An extract of A (Aerospace)’s response also illustrated this, *“we try to reinforce in our students the issue of attitude and discipline, because the consequences of your action can be very disastrous.... we always explain to them that in aviation creativity is not something that we want. At the end of the day it is all about safety. Creativity, yes it is required, but not at the maintenance repair level. It may be required in the design engineering level, but not in the MRO (maintenance, repair and operations)...because if your creativity causes you to short change processes and put people’s lives are at stake then it’s definitely not what we want ok.... Follow instructions, follow what is required... Different industries operate differently...we need them to appreciate that this is how it operates.”*

### ***Experience with the profession***

There were two key aspects that contributed to this dimension of professional identity development: (1) involvement of clients in class assignments, and (2) support for internships. The educator-practitioners aimed to provide the necessary support to help students learn as much as possible from these experiences. The influences of these early experiences on student learning were also illustrated with quotes from the interviewees in the following paragraphs.

**Involvement of Clients in Class Assignments.** The following quote described students’ experience in producing work for a real client. Not only did the students gain *knowledge about professional practices* through assigned roles and responsibilities in teams, the experience also made possible an emotional connection with the work and profession.

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*“For the team project they take on specific roles, so someone has to be the sub-editor, someone has to be the editor...and the classroom becomes like a production house... the facilitator takes on the role of the managing editor who is commissioning work, and the sub-editors and editors are responsible for every aspect of the publication: from the proposal all the way to the end product... We were also serving a real corporate client actually... we looked for companies that are hungry for people to produce content, and they don't have the bandwidth for the budget so we found that the NGOs (non-governmental organisations) are the ideal partners to have because they do worthy causes and the kids also get a different form of learning. They see poverty, they see the difficulties of migrant workers... so from this semester that's just past ... students went out to get real stories. They interviewed real workers, in their context so it was very compelling... at the end of it when they came back, and on the last day of class they had to present...to the client about what changed them...some of the girls were actually brought to tears”, R (Journalism).*

Z (Theatre) described more approaches that provided structured support for students learning to produce work for real clients. One was in the form of a theatre practicum module, *“...so they are going to do production from scratch. They are separated into groups, and they are going to select a certain performance interest group ...maybe wind symphony or what they have here with The Republic Cultural Centre. And they are going to do a production. Of music or theatres, or something. So, I'm like super excited about it.”* Other forms of structured support were project assignments. Examples are students being required to watch a play and submit a review, and students having to volunteer in front-of-house services at various arts venues and follow up with reports about the experiences. The final year projects in her school were all linked to industry partners. Further, Z (Theatre) had experienced students in her classes who worked part-time and they *“sometimes pick up very bad habits, so that we have to unlearn and relearn.”* She did question their

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choices, *“I always asked them why”* in order to help them to understand why alternative methods were better.

**Support for student learning at internships.** Internships were compulsory for some diploma programmes, with some for periods of up to six months. R (Journalism) elaborated on the factors that would contribute to the success of an internship, *“...whether the companies are ready to take interns, whether they have a proper induction programme and it’s also leveraged by whether the students themselves get internships in companies that they understand ...what the companies do and whether it dovetails with the students’ own goals”*; and the need to *“pair the students with a mentor and to handhold them through the process and to have proper checkpoints along the way, I think ... it can be potentially very powerful”*.

**Impact of internship in professional education on student learning.** For the aerospace related diploma programme, students were sent for internship either in the first or second semester of their third year, so if they had not experienced specialization modules related to the work of the companies they were scheduled to be attached to, pre-internship programmes were arranged. On the other hand, students were likely to have gained *knowledge about professional practices* during the period of their internship that may give them an edge over their peers in class, *“In that twenty weeks they might have acquired some relevant knowledge that when they came back here (polytechnic) it became very easy for them to understand”*, A (Aerospace). S (Outdoor & Adventure Learning) shared a similar experience, *“We realise that the students who come back from their Industry Immersion Programme are so much easier to handle in class because they realise all the things we’ve been nagging them about, they realise why we get them to take care of their things, always wear the safety harness, do this, do that. So now when they come back, automatically they do it. We realise also the discussion is much more vibrant because now they have their own personal examples to give. So if*

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*you ask, have you encountered this example before, you'll see all the hands shooting up."*

### ***Having the professional as a role model***

The educator-practitioners might be the first professionals the students interacted with, and on a regular basis. As such they are expected to be influential in shaping the students' ideas about what it meant to be the professional. An example was the spa industry where the leading professionals were not typically profiled in the mass media and were only known within the industry. Hence, the facilitators were likely to be the first point of contact until the students began their internship. M (Spa) said, *"I suppose the people they really relate to are their facilitators, because...we're their first point. Maybe when they move out in their internship programme, they might meet people and work with people, find a mentor within their organisation. But again unless they are completely, really into the industry and do lots of research and self-finance their way to go overseas conferences or courses or buy books, they are still going to have somewhat a limited amount of knowledge and not know a lot of professionals, who the professionals are, and it's not like there is a book which lists all the people that are in the industry. It's quite um, it's still somewhat small, and it does come and go...some have been around longer than others but it's not like anyone's on the front page of a magazine"*.

**Learning to be like the professional.** The demonstrations, feedback and critique that the educator-practitioner gave contributed to the students' development in becoming the novice practitioners. A clear example was the role simulation exercise in a spa customer service lesson: *"They are involved in the process of writing the script. Then I would act it with someone. Someone would be the guest and I would be the spa manager or supervisor, whoever the person is supposed to deal with the complaint. And we go through an exercise and we try with the different ways... But we put them in the situation where we have to also think on our feet... They practice with other people, taking turns with different*

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*scenarios. And then we change them around so that they won't be in the same comfort zone with the same people... And then we watch them, and we go around and we check for, rather than the normal rubrics, we have an additional rubrics that looks at things in a practical environment like their smile, their posture, their vocabulary, their timings, whether they are following the SOPs, the standard operating procedures” M (Spa).*

Z (Theatre) attempted to impart her experiences as a theatre practitioner by throwing curve balls at her students to challenge them to think quickly on their feet. She found herself trying to balance between inundating them with her experiences and getting them to learn to think for themselves: *“What I try to do in class, what I try to prepare my students for, would be to be actually very quick thinking so I throw them a lot of things...to be prepared as much as possible you know...sometimes it's just like, oh no, there's so many things to say about this you know I'll throw it out like, oh no, oh no, I got to hold it back so... I got to get them thinking, to push a bit more, and the fact is that it's very difficult and the thing is, the reality of it is that the theatre world, they would be swallowed whole, you know, they will not survive after one production.”*

Being able to think on their feet was a recurring theme for this contributing factor of professional identity development. In the aerospace related diplomas, students only gained troubleshooting skills of an aircraft engineer when they were part of the apprenticeship programme in the industry. Their polytechnic education could help them prepare to be more ready to think on their feet, in order to learn troubleshooting skills on the job and perform their role competently: *“One good thing about ODOP (one day, one problem) ...is at least we have taught our students to think now, think on your feet right now...rather than do it later...I think that is quite important.”*

**Professional values and ethics.** *Having the professional as a role model inevitably involved an alignment with professional values and ethics that were important in the profession. S (Outdoor & Adventure*

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Learning)'s approach vividly illustrates this: *"I think right from the start we set ourselves as role models for the kids, we tell them you just look at the way we dress, you look at the way we conduct ourselves. When we say we have to wear a helmet, we're the first to wear a helmet." The students were reminded about their future professional role, "It's something I impress upon them. That someday you're going to stand before them being in my shoes and what if your students ask you, 'Instructor, you say must wear helmet you yourself don't wear helmet' ...so this whole idea of having to become a role model is instilled in the students right from the start. You have to wear shoes for your students, why? Next time if your students come to you wearing slippers, are you going to let them climb the rock wall?" He added, "One thing about outdoor practitioners, we take care of our equipment very well because we use them very heavily, so...we instill in our students...how to take care of their equipment, how to maintain their equipment...Every time they come back from their training, the first time I make them do is to take care of their equipment first before they cool down, drink water ... All these are actually work ethics that outdoor practitioners...pick up along the way. We learned by experience because we didn't have formal education about these things. Now, we are passing on to the next generation."* The practice of good work ethics helped to manage the risks and hazards associated with the nature of the activities and the use of equipment in outdoor and adventure education.

As formal education was not the same as a full-scale apprenticeship, there were limitations to the influence of role models for professional practice. An example was the profession of an aircraft engineer, where the main formal education took place in the industry. The polytechnic education prepared students to be more ready for succeeding in the apprenticeship scheme managed by aerospace companies which are certified by the local governing authority. The apprenticeship scheme in turn prepared the employees to undergo written and oral examinations conducted by the governing authority to become licensed aircraft engineers. The troubleshooting skills could only be learnt during the

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apprenticeship scheme. C (Aerospace) explained: *“Until you are on the ground then you would realise for yourself ...how to go about doing it... that is where you start learning to pull your resources ... all these I learnt through my seniors... as they troubleshoot I saw how they put all these things together and as they did it I learn from them... by asking them why they came up with this solution, instead of the other...”*

A (Aerospace) elaborated on the difference between school and the apprenticeship scheme: *“It’s different because what you learn here is the methodology but that two years’ of experience is just like saying that now that it’s time for ... two years of experience on an aircraft.... This is your actual experience, not from the cases that you read... you see ... an actual aircraft, being operational...We have to internalize the troubleshooting skills. We actually have to write down all the different tasks we have gone through and then at the end of the day after three years...including two years of logged experience, you’ll submit ... to CAAS (the aviation governing body) ... You still need to show that you have clocked in enough work experience, because the work experience will tell you how best to troubleshoot it or how best to go around it.”* He elaborated on the oral examination by the governing body: *“So they may say that oh you have done this before right, so how about if this and this happens, what will be your course of action? At the end of the day, if you have not participated in the problem solving you’d not be able to answer. Then they would say, so have you thought if this happened, what will happen? ... So if you don’t know anything about the system, if he created another scenario, you wouldn’t be able to respond right? You wouldn’t know to suggest to him a plausible answer so that’s how they actually test you.”*

### ***Professional self-efficacy***

**Deliberate practice.** The approaches shared by the educator-practitioners for helping their students develop confidence for professional practice were situated learning oriented and involved iterations of practice



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with different scenarios. Students learned through feedback and critique by peers and their tutors or facilitators. In some professions such as journalism, students could already begin building their portfolios to showcase their work and competence.

Z (Theatre) felt that the practicum learning was crucial in contributing to students' development of *Professional self-efficacy*: *"They need to have this safe ground to make all these mistakes and to learn and to see what else they could do before they start work. I felt that when I was ... in junior college; it gave me a lot of confidence."*

M (Spa) shared that it was important for students to be familiar with delivering on general expectations and they needed to learn how to think on the spot: *"Obviously there are some key things to follow such as being empathetic, nodding your head and then there's you know, other things that they just don't know what the guest would say, so they would have to think on their feet... they practice with other people, taking turns with different scenarios. And then we change them around so that they won't be in the same comfort zone with the same people. So they get familiar, be practicing and handling a complaint with someone else who isn't like their best buddy. And then we just keep rotating around so that the different scenarios help them with their confidence. And so what that ... practical exercise helps them is to be brave when they go into start their IIP (Industrial Internship Programme). So I feel confident that on Monday when my students start their IIP, they're plonked at the front desk and someone, a guest comes in, they know how to meet and greet them. They may be obviously a little bit nervous, and they won't know necessarily any unique things that are particular to that spa, that they will be able to say, good morning.... can I assist you....that they will have a foundation to work from."*

In the following paragraph, M (Spa) elaborated on an example of how a customer service excellence lesson was conducted over the course of the day, the first part in the classroom and the second part at the spa lab.

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Students were involved in developing the scripts and provided with the opportunity to learn to think on their feet with variations to the given scenarios,

*“For example let’s just say they do something on customer complaints. So in the morning we talk about what is the effect of having a customer complaint, what they value about customer service, what does it mean, what are the behaviours and what’s the impact if we don’t do anything about it. In the afternoon, we do scripts of the right things to do. So for example it might be, I give them a handout and it would be some cues about step one that mentioned posture, eye contact, then maybe step two would be listen to what the guests say. We give them some feedback or we prompt. They are involved in the process of writing the script. Then I would act it with someone. Someone would be the guest and I would be the spa manager or supervisor, whoever the person is supposed to deal with the complaint. And we go through an exercise and we try with the different ways. Sometimes someone can be funny and be really difficult, and someone with quite more manageable things. But we put them in the situation where we have to also think on our feet.”*

The theme of deliberate practice was shared by Z (Theatre) who cited her own educational experiences in gaining knowledge about theatre practice that has influenced her development of a practicum module on theatre practice. Throughout the two year theatre studies programme in junior college, she was required to work on several projects that enabled her to experience different aspects of professional practice. These provided the ground for iterative learning of putting together the different components of practice: *“...it was like from day 1. Ok, we had workshop training, ok now you’re going to do your first project ... a monologue. You’re going to act on your own, you’re going to self-direct ... Ok, the next one will be a dialogue, you’re going to work with a partner, you can use any space you want, you can think about this, you can think about that, then the last year was a group work.”* The learning experiences helped build her confidence in professional practice.

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**Building portfolios.** R (Journalism) observed that students could begin building their portfolio by publishing, and noted of some who “*have work published already... this was before they were going out on internship, so it looked very good. Um, they were competent, had the basic skills, so they knew how to do research they, knew how cite, their work had no grammatical or major spelling errors. It was, they were good enough to hit industry.*”

### ***Preference for a particular profession***

#### **Motivating and developing student interest in the profession.**

An emotional connection would be helpful in motivating students, as inferred from R (Journalism)'s reflection on the potential usefulness of field trips such as to media companies. He suggested that the “*the buzz, with breaking news especially, they might get excited about, might reinvigorate the ones who are, “dead”... you happen to be the company that's breaking the news, it's very exciting.*” He recognized that not all of his students were “hungry to be published” which he had observed to be the key factor distinguishing the successful writers from the rest. Both R (Journalism) and Z (Theatre) believed that students developed their interests from dealing with subject matters close to their hearts or issues that mattered to them. R (Journalism) elaborated on the approach he had taken: “*They must be passionate about something. Within the curriculum we create the space for them, we try to nudge them, to something they might be interested in so it is a key consideration for planning or developing your curriculum, to keep it broad enough and yet have the ability to help the students build or create depth and quality.*” Said Z (Theatre), “*I advise them to work where their heart is, to go through with that, because I think with theatre it takes a lot of work, the process is just very, very painstaking and so especially when I supervise, or when I advise, I stray away from the whole this is what you gotta do, because this is what it is... but I go with what you want to do at the end of the day...*”

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A (Aerospace) felt that PBL helped students develop their interest and directed their attention to what they needed to know to be proficient, *“I mean... solving problems helps to capture student interest you know, because now they think, how, why...We’re talking about technical things, how to do it ... It helps them to appreciate also the fact that if I need to solve this problem, I need to have certain level of proficiency.”*

A (Aerospace) also felt that the passion for the aircraft was important: *“We always tell the students you need to be passionate about that and you need to be committed. Once you have a bit of passion, it solves a lot of issues then you are willing to accept the certain peculiarities about the industry.”*

**Knowing their preference.** It was important to help students to know what would be expected of them so that they could make realistic decisions about their *preferences for particular professions*. He illustrated with this example: *“If your creativity causes you to short change processes and put people’s lives at stake then it’s definitely not what we want ok. So this is always something that we tell them, don’t be creative. Follow instructions, follow what is required. This is something that we sometimes have to impart to the students. Different industries operate differently. Then we need them to appreciate that this is how it operates. Maybe if they don’t feel good about it, we always tell them maybe you want to reconsider, it is the truth. You don’t want to be trapped in an industry which you don’t really like. What we found is that people in that situation, they always take the shortest route when things go tough and that’s not really something we want in the aviation industry.”*

Along the same vein, S (Outdoor & Adventure Learning) shared that he had students who confided him that they realized they were not suited for the profession, because *“after these three years here they realised that it’s a lot of hard work involved, you’re out in the sun every day, you’re away from family most of the time. They realised that this was*

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*not what they wanted to do, they wanted to pursue other things like banking, teaching, different things.”*

When students were not enrolled in diplomas related to their future work, Z (Theatre) encouraged them to make the most of their learning; *“What I try to help them with is to work towards that dream so I try to motivate them, I try to make them see the link between what we’re doing here and what aspects of it they can use for later on so that they would be clearer on things and sometimes they just don’t see it because they look at...ok this is what I have to do, this is just theatre, theatre but the skills that you get in theatre for example I could teach, I could do events, I could do so many other things I could do even menial best work ... I can classify things in excel because I know the processes, I see, I can understand. I try to get them to work towards that.”*

### **Discussion**

The goal of this study was to gain insights from the educator-practitioners' perspective on the role of professional education in preparing students for the profession. Six teaching staff members from a polytechnic were interviewed for what they believed to be helpful for getting students ready for professional practice. At the time of the interview, these full-time faculty staff members had joined the educational institution (directly from the industry) for an average of 18.5 months, ranging from three months to three years. They were practitioners from five different fields: (1) journalism, (2) spa, (3) theatre, (4) aircraft engineering, and (5) outdoor and adventure education, and some have continued to maintain some form of professional practice while teaching. The content that they shared was analysed using a professional identity development framework, based on PIFFS to understand how their approaches contributed to the students' development to become the new practitioner.

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Students' prior knowledge about the profession is limited. The educator-practitioners seek to address the knowledge gaps needed to be bridged for students to have their perspectives transformed to develop a more realistic understanding of the profession. These gaps include the knowledge about the physical environment and ambiance that they would work in, where they would apply what they learnt. In a study about medical education, Koens, Ten Cate and Custers (2003) suggested that the interpretation of contextual information in each situation needs to be meaningful, and should include both the semantic, as well as a commitment to resolve a medical problem and provide adequate care for the patient. In other words, students need to care about the learning and performance outcomes. *Experience with the profession* provides for the emotional connection between the students and the clients and other stakeholders. An instance is the empathy that happens when students experience first-hand the immediacy of the situations, and the impact of their contribution and work in the real world. As illustrated by Cox, 1999 using the example of laboratory simulation (Edmond, 2001): 'Regarding use of laboratory simulation which, although it has its place in the initial stages of learning psychomotor skills, cannot replace the situated knowledge, the feedback, the infinite variety and the moral and ethical elements of social responsibility that can only be experienced in the 'real world' (Edmond, 2001, p.256).

In studies about the role of early experiences in medical education, staff reported the students became more aware of their future professional status, roles and responsibilities (Diemers, et al., 2008; Dornan & Bundy, 2004). The students in the studies had a better idea of the clients' experiences and able to relate to them with greater empathy (Diemers, et al., 2008; Dornan & Bundy, 2004). In medical education, the tutors felt that these early experiences taught students 'what it is like to feel unwell', "to recognise and value diversity, acknowledge patients' expertise, and respect confidentiality" (Dornan & Bundy, 2004, p.4). Dornan & Bundy (2004) believed that early experiences would be

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“complementary to any contextualising and integrating effect of problem-based learning”. Indeed from Diemers et al’s study, students made comparison between learning from paper, simulated and real patients. The last of which provoked a strong motivation to study so as not appear incompetent. The students were able to experience the variety of manifestations of illnesses (some of the effects that might not have been possible to simulate) and the patients’ responses to the illnesses.

In this study, educator-practitioners saw their role to be supporting student learning in authentic experiences either by facilitating the process in school assignments or providing customized preparatory course prior to the experiences such as internships. The intention is to help students maximize their learning experiences. The support for learning in clinical or practice placements has been discussed in the professional education literature. Students require help to make sense of the differences between what they have been taught and what they observed in practice which might be the “hurried approach” because of the limited time the professional had for meeting job demands (Cox, Irby, Stern, & Papadakis, 2006; Melia, 1987). The professionals might, however, be too busy to be able to make time to explain the rationale and judgment for the actions taken. Students had also reported feeling uncertain about how they were performing because of the lack of regular feedback. It seemed to them that feedback was only given when things did not go right, but they were not sure what exactly they had done alright and how they could do better (Gray & Smith, 1999; Melia, 1987). In one research study, medical students highlighted the need for an appropriate forum to allow students to express feelings related to clinical experiences (Pitkala & Mantyranta, 2003). Overall, having a tutor as a mentor could enable students to gain more from their clinical experiences. This was also brought up by one of the interviewees.

The educator-practitioners in this study were very clear that they were the first, or among the first professionals with field experiences that the students encountered. As a result, they saw themselves as being

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responsible for inducting their students to be as successful as they could when they graduated. Harré (1983) noted that people have to know what a social identity looks like in order to acquire its attributes (Dickie, 2003). Besides being a role model for the students, the educator-practitioners felt that it was important for students to actively model on the role of the practitioner as they went about their learning, and they saw their feedback as important prompts to shape their students' learning to develop the perspective and approaches of the new practitioner. This included the learning of work ethics. Supported by the institution's assessment policies, the educator-practitioners are in the position to assess their students in professionalism, critical engagement with the content, and reflective practice.

Some of the educator-practitioners highlighted the importance of the students learning to think on their feet to be able to perform on the job in future. They gravitated towards learning activities that get students to develop the confidence and ability to deal with the nature of real world practice that is less predictable, complex and situated. The activities include role-play of different scenarios, where they can guide students through feedback and facilitate discussions amongst them for reflecting and learning from the experiences. The deliberate practice could also be in the form of iterative learning of approaches through practicums and projects to help students develop the experience, resourcefulness and confidence to perform on the job. Students are thus enabled to develop their own personal practical knowledge about dealing with professional contexts. Deliberate practice has been considered to be an important factor for expertise development (Ericsson, 2004; Ericsson, Krampe, & Tesch-Römer, 1993).

All the educator-practitioners believe in the significance of interest and passion in the profession. Their own individual experiences illustrated how these were driving forces for their choices of professional development and in overcoming challenges at work.



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Z (theatre) studied very hard in the national examinations to get into the only junior college that offered theatre studies as a subject and she started volunteering actively since she started the programme at age 17. She shared: *“Because I was thinking that it doesn’t make sense for me to actually just study theatre and not practice it. That’s when I started volunteering, started crewing, started you know working for nothing...My whole attitude was just I’m going to get as much experience ... I can get.”* Subsequently she involved herself in a wide range of arts related activities in her exploration of the profession: *“And I’ve actually done ... a lot of speech and drama, a lot of creative writing and exercises or programmes for secondary school and primary school....I have done script writing to directing and design work, acting and over the past I think, three four years I started doing managing and producing work mostly in, for non-profit organisations ... Theatre. I’ve also done dance... because of my commitment with this institution, I am only able to practice very little, ... most of the time it’s just for stage management or production management, something that doesn’t take me away too much from my work”.*

M(Spa) was in a mass communications degree programme that could have led her to jobs in public relations and sponsorships. However she chose to concurrently pursue a part-time diploma in public relations and to volunteer on a weekly basis at a public relations firm. M elaborated: *“It was my own initiative, ... I was also studying, doing a part-time diploma in public relations, I felt that if I wanted to do that then I should start getting serious and so I just rang a few places and, um, they were happy to have someone come and help them out once a week so I did that during my university life.”* The company eventually offered her a position after she graduated. On looking back, she realized that only two subjects she studied at university were useful for her career – the use of computers and writing.

R(Journalism) interned with a local major press during university and had stayed active in publishing until he joined this educational

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institution. C(Aerospace) spent three years at a local company learning to be an aerospace engineer with nominal pay, in a job that required a diploma, and not the degree he had. A(Aerospace) spent more than twenty years in the aerospace industry working in different aspects and at both technical and managerial levels. S(Outdoor & Adventure education) started working part time in the outdoor and adventure education industry since he was at university, before joining full-time, the polytechnic's adventure learning department, and subsequently the academic department offering the Outdoor and Adventure Learning diploma.

Their interest provided the direction for their efforts and use of resources, and the commitment to follow through their endeavours in professional development. They identified the educational programmes that would support them in building the capabilities to be ready for the profession, and the opportunities for gaining as much relevant work experience as they could get.

These key findings provide a way of considering the design of curriculum and the delivery of teaching for transforming students to become the new practitioner. At the polytechnic where the study was conducted, the baseline pedagogy was PBL. Only one educator-practitioner out of the six interviewed made specific mention of PBL.

Overall, these approaches elaborated by the educator-practitioners in this study are not particular to PBL. However, they can support and enhance the delivery of PBL. Students can actively model the professional by defining issues to address from problem scenarios (*Having the professional as a role model*), their learning can involve serving real clients (*Experience with the profession*), and opportunities built in for deliberate practice (*Professional self-efficacy*). The key characteristics of PBL are (1) the use of ill-structured problem triggers simulating real life complexity to drive the learning objectives (*Knowledge about professional practices*), (2) requiring students to actively learn to model like the practitioner by activating prior knowledge and analyzing the problem

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trigger to identify the learning issues, (3) carry out research to develop a reasonable response to the address the learning issues and thus problem trigger, (4) learn collaboratively, (5) articulate and be able to justify and defend their responses, (6) reflect on the learning outcomes and use of learning strategies, and (7) guided throughout by a tutor who acts as a facilitator to scaffold their thinking and reasoning (Barrows & Tamblyn, 1980; Hmelo-Silver, 2004; Schmidt, 1993). These six aspects encompass all three types of PBL practice classified by Schmidt et al (2009): Type 1 PBL that aims to help students learn content, Type 2 PBL which focuses on helping students gain problem solving skills, and Type 3 PBL which intends for the students to become more self-directed in their learning.

The PBL approach allowed for students to actively experience the kinds of problem scenarios professionals may encounter and the ways they need to approach the situations. This helps them to actively explore if the professions is something they want to commit to (*Preference for a particular profession*). When students were enrolled in programmes not of their choice, one of the educator-practitioner would make effort to try to help them see the relevance in the work of their preference. Through the different diploma programmes, some students realized what it meant to be working in the profession and decided that the profession was not what they wanted.

Implementing the teaching approaches is not without challenges. One educator-practitioner highlighted the struggle she had in managing the need to give students the space to learn to think and learn from their mistakes, and the urge to tell them what they should and should not do. Also, while authentic experiences were useful, educator-practitioner would also need to balance providing this with ensuring adequate student learning. One of the principal findings in Dornan & Bundy's (2004) study was that early experiences in medical education should not, however, compromise the learning of biosciences, the sound knowledge of which was still necessary to complement clinical skills. In Dornan & Bundy's (2004) study, staff also reported concerns about cost and logistics in

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supporting authentic learning experiences. In this current study, some of the educator-practitioners appeared to have found solutions to manage the cost, such as arranging for students to learn content in their lessons through servicing real clients from non-profit organisations or school performing groups. The provision of support for student learning such as finding client and suitable work would, however, do require planning, logistics and resources.

In internships, learning is opportunistic and dependent on the situations that arise, and the capacity of their onsite supervisors to help students make sense of what is going on (Beckett & Gough, 2004). Ideally the students develop learning strategies in class that can help them learn more effectively in a less structured environment for learning such as internships.

There will still inevitably exist a gap between the students' learning at the polytechnic and their ability to perform independently and successfully in the workplace. They need to adapt to the new environment and its organizational culture, and to deal with the demands of the job as a full-time staff. There would be new technology or equipment that could not be made available in school for learning and practice. With the rapid expansion of knowledge, technology and changes in the landscape of the profession, the new practitioners need to continue to learn to stay competent and develop their expertise.

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## **Chapter 6: Conclusion - A Provisional Theory of Professional Identity Development**

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This thesis contributes to the literature on professional education research, a professional identity measure — Professional Identity Five Factor Scale (PIFFS) — that can be used for all types of professions, is developmental in nature, and can be widely used in professional education research. The purpose of its development is to pave the way for more generalizable understanding of how professional education contributes to the development of students' professional identities. A comprehensive construct would be useful for understanding the complex development of professional identity, act as a guiding frame of reference for the design of professional education programmes, and facilitate the comparison of pedagogical approaches.

Five existing measures are reported in the literature: the Professional Identity Scale (PIS) (Adams, et al., 2006), the Professional Self Identity Questionnaire (PSIQ) (Crossley & Vivekananda-Schmidt, 2009), the teacher professional identity scale (TPIS) (Cheung, 2008), the Professional Socialisation Scale (PSS) (Du Toit, 1995), and the Professional Role Orientation Inventory (PROI) (Bebeau & Monson, 2012). These professional identity measures were found to be limited in a number of ways. First, they tend to concentrate on one profession rather than professional development in any professional training programme. Second, the dimensions are not as comprehensive as what can be inferred from the current literature, thus limiting a conceptual understanding of the professional development construct. In addition, except for the PROI, the other measures have only been analysed using exploratory factor analyses and least squares regression analysis. They have not been validated using

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confirmatory factor analysis which is a more theory-driven approach and can test the stability of the factor structure. There was thus a need to create a new professional identity development construct to aid understanding of how professional education shapes students' professional identities and that would suffer from these shortcomings to a lesser extent.

The research site for the four studies reported in this thesis was a polytechnic in Singapore which prepared students for a wide range of professions. The student population of about 14,000 students was enrolled in 38 diplomas delivered across six schools and one centre (i.e. School of Engineering, School of Applied Science, School of Health, Sports and Leisure, School of Hospitality, School of Info-communications Technology, School of Technology for the Arts and the Centre for Enterprise and Communication). Every year, students compete for places at the five polytechnics in Singapore and for particular diploma programmes. It is common for students to proceed in an assigned (rather than chosen) polytechnic and complete a diploma programme in a profession that is not their first choice. This research site would therefore in principle provide a rich base for understanding the professional identity development of students with different levels of motivations and across different types of professions.

Chapter 1 discusses the existing literature on professional identity development. From this literature review we deduced that there must be at least five dimensions relevant to professional identity development. The five key elements seem to be: (1) *knowledge about professional practices*, (2) *having a professional as role model*, (3) *experiences with the profession*, (4) *professional self-efficacy*, and (5) *preference for a particular profession*. They are described in the follow paragraphs.

*Knowledge about professional practices.* The educated professionals would be distinguishable from lay persons: not only by the body of knowledge and understanding about the discipline, but also the capacity to achieve the standards, and comply with the regulations

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determined by the professional bodies, and government licensing authorities. They would have a good idea of the typical roles and responsibilities in the profession, and what the professional is accountable for (Goldie, et al., 2007; Monrouxe, 2010). Their professional conduct would reflect the values and ethics of the profession. All these enable them to be able to make reasonable judgment about the appropriateness of decisions and actions in the professional role. In general, the new practitioners need to be equipped with adequate *knowledge about professional practices* or knowledge ready for use in practice, when they enter the profession.

*Having the professional as a role model.* The second factor addresses the need to have role models who demonstrate in concrete ways how theory and practice are linked (Goldie, et al., 2007; Ottewill, 2002). In particular, the way the professionals in practice reason and deal with profession related issues (Ajjawi & Higgs, 2008; Goldie, et al., 2007; Ottewill, 2002; Timmerman, 2009). It may also include the way the role models are dressed. For instance in the hospitality industry, being well-dressed is part of the industry service standards to project a professional image. In the classroom, the feedback and critique from the role models help to shape students' thinking and reasoning (Beckett & Gough, 2004; Diemers, et al., 2008). Learning from role models is not a passive process, but an active one where students are engaged in learning to think, reason, and act like the professional. Further, having more than one role model makes room for students to explore provisional selves, as they make choices about the kind of professional they want to become (Ibarra, 1999).

*Experience with the profession.* The third factor encompasses both direct and less direct involvement in the professional role. Experience is defined as authentic contact with clients in a professional context that enables students to learn about the professional practice and the role of the professional (Dornan & Bundy, 2004). Direct experiences might take place in internship, part-time work or apprenticeship arrangements. Even then, however, students are most likely not in the role of the professional

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but assisting and observing the professional. The bulk of the students' involvement with the profession is expected to be less direct, such as student involvement in community service projects with the tutor's guidance. It may also be in the form of students' interactions with professionals at events, and their efforts to keep abreast of the significant news and events of the profession. These networks and experiences not only provide students with a more realistic idea of what it means to become the professional, they also connect students to developmental networks and relationships (Dobrow & Higgins, 2005). These are beneficial for their professional development.

The fourth factor, *professional self-efficacy* is about the individual's personal beliefs about, and confidence in their own professional competencies. We expect that *professional self-efficacy* would contribute to the propensity to perform and deliver the professional service, and in ways that meet or surpass the norms and standards of practice. This is because studies have linked self-efficacy with effort, persistence and achievement (Caprara, et al., 2011; Zimmerman & Cleary, 2006). Ideally, students should feel they are being prepared for the professional practice. That they are in the process of becoming the practitioners who can make reasonable professional judgments. And able to adequately address each given professional situation with the relevant array of knowledge, skills, tools and resources.

The fifth dimension *preference for a particular profession* contributes to the strength of professional identity because it drives the individual's focus to direct his or her attention, energies and commitment to become the practitioner ready for practice; and subsequently to engage in continual professional development for developing expertise (Ryan & Deci, 2003). Professional identity development is part of what Berger and Luckmann (1966) have described as secondary socialization, and is contingent on the primary self that has been formed from the upbringing and prior education. The level of compatibility or contradiction between the primary and secondary self, that is, the degree of relevance of the



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secondary to the primary self, influences the assimilation and integration of the secondary self (Berger & Luckmann, 1966).

### **Development of the Instrument**

Chapter 2 describes, in two studies, the development of the new measure based on these theoretical considerations. In the first study, an initial survey instrument was developed and used for collecting 2,930 sets of data from the polytechnic. The measure's scales fitted the data reasonably well in a confirmatory factor analysis, suggesting that the PIFFS has sufficient construct validity. Measurement reliability using the coefficient  $H$  as an indicator, turned out to be sufficient. To further validate the five factors in the construct, the sample was divided into two groups (high and low scores) based on the overall Professional Identity score. If each factor were to contribute to the strength of professional identity, there should be significant differences found in all five factors. In the first study, there were none found between the two groups. The survey items were further fine-tuned in a second study to improve the sensitivity of the instrument. Using the latest version, 1,295 sets of data were collected the following semester in the new academic year. Besides achieving construct validity and reliability using the same analysis carried out in the first study, the improved survey instrument in the second study had the stronger Professional Identity group scoring significantly higher than the other group in all five factors. The instrument was named the Professional Identity Five Factor Scale (PIFFS).

### **Influence of Personal Relevance on Learning to Become a Professional**

In Chapter 3, the data collected from 1,295 students (from Study 2 in Chapter 2) for validating the instrument was further analysed to gain insights into the professional identity development of students at the polytechnic. The research site of the studies used problem-based learning as a pedagogy. Given that problem-based learning is a pedagogical strategy designed (among others) for socializing students for professional practice,

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students' learning experiences at the polytechnic were expected to contribute to their professional identity development in a significant manner. The results for the cross sectional analysis across the Year 1, 2 and 3 students were disappointing: for the entire sample, and for the group of students without prior vocational education, a *decline* was observed in the factor, Having the Professional as a Role Model. We argued that the sizeable proportions of students not enrolled in diploma programmes related to their future work (NRel) and those who were unsure of the relevance (URel) likely accounted for the lack of significant increase in the factors in the cross sectional analysis for the entire sample. The combined proportion of NRel and URel students amongst the first year students was 41%, and amongst the third year students was 60%.<sup>3</sup>

Students who are not in their diploma course of choice and students who simply have no idea yet on what their preferred profession is, are indeed responsible for the lack of development observed. For the NRel group of students enrolled in diplomas not related to their future work, no significant differences were found in the cross sectional analysis. For the URel group of students, unsure about the relevance of their diplomas to their future work; there was even a decline in the factor, Having the Professional as a Role Model.

We found, on the other hand, that the group of students who was enrolled in diplomas course seen as related to their future work (Rel) displayed significant increases across the cohorts on three factors. The three factors were, Knowledge about Professional Practices, Professional Self-efficacy and Preference for a Particular Profession. Interestingly,

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<sup>3</sup> Students also began their professional education with relatively high baseline scores, and this could in part account for the smaller than expected increases. The mean baseline scores were above the neutral point for four factors: *knowledge about the professional practice*, *having the professional as a role model*, *professional self-efficacy*, and *preference for a particular profession*. The fifth factor, *experience with the profession* was an exception.

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these results seem to suggest that the PBL implemented at this polytechnic contributes more to these factors than to Experience with the Profession and Having the Professional as a Role Model. Having a pedagogical approach specifically aimed at fostering professional development in students seems insufficient to make up for authentic, that is: actual, experiences with clients and industry professionals; for the availability of professionals who can act as role models; and for the students to have adequate practice to model on the role of the professionals in work contexts.

Students who knew what they wanted and were in their diploma course of choice (Rel) scored significantly higher on academic achievement than the two other groups (NRel and URel). This finding however leaves room for at least two interpretations. This group is more motivated to study hard because they are in their diploma course of choice. Or: these are the better students, otherwise they would not be in their diploma course of choice and therefore they demonstrate higher achievement. When we analysed the data further, we found that amongst the Year 1 students, there were no significant differences in the grades between the three groups. Amongst the Year 3 students, significant differences between the groups were found in their GPA. There is thus some evidence to suggest the influence of relevance on achievement outcomes.

The relationships between scores on the PIFFS and academic achievement were also studied. The results suggest a weak effect of Having the Professional as a Role Model on test scores. No effects were found from the other factors on grades. When the data was analysed for each relevance group, no effects were found for each of the PIFF factor and the overall Professional identity score on the achievement outcomes.

### **Impact of Education in Professional Identity Development: Students' Perspectives**

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Given the purpose of professional education to transform students from lay persons to new practitioners, what are the ways this education can support students' understanding of what it means to be working in the profession, and thus their professional identity development? This question was examined in Chapter 4 focusing on the students' perspective, and in Chapter 5 on the educator-practitioners' perspective. We described as educator-practitioners, staff with previous field experiences who may still be maintaining their professional practice concurrent to their teaching position at the polytechnic. In both studies, the PIFFS was the basis for the theoretical framework applied for analyzing the qualitative data.

The study reported in Chapter 4 had two objectives. The first was to identify what students themselves saw as the most important educational experiences that helped them to acquire insights into the nature of their future profession, and second, how these polytechnic educational experiences compared with other sources of influence, such as experiences from secondary school or vocational school, actual work in a professional environment, and personal experiences. Actual work in a professional environment referred to work initiated by students that were not required by the polytechnic or previous school. The employment could be on a part-time basis when students were not attending lessons, freelance work with flexible working hours, ad hoc work opportunities such as event management, or even a business set up and run by the students, such as a blogshop. Examples of personal experiences were the influence of family members who worked in their chosen profession, and reality media programmes that depicted the profession.

Data were collected from the same batch of 1,295 students who participated in two previous studies. They were asked to describe the significant events or incidents that helped them understand about working in the chosen profession. The results indicated a significant association between sources of influence and the relevance of the diploma to the students' future work. Students who were enrolled in programmes relevant to their future work (Rel) indicated that they benefitted from the

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polytechnic education. Those who were unsure about the relevance of polytechnic education to their future work (URel) and those who were simply not in their programme of choice (NRel) benefitted more from their personal experiences. Even more telling about these students' lack of significant influences is the observation of the URel students' tendency to not answer the question or give irrelevant or vague responses.

The second goal of the study in Chapter 4 was to understand which elements of polytechnic education contributed to students' professional identity development. The five factors identified earlier served as organizing principles for their responses about the polytechnic education's influences. A finding from the study in Chapter 3 was the polytechnic education could do more for the students in terms of *experiences with the profession* and *having the professional as a role model*. The findings from Chapter 4 provide some insights into how students' learning experiences can be enhanced in these two dimensions, based on what students found to be helpful. The italic responses in the following paragraphs are brief descriptions of the students' responses.

***Knowledge about professional practices.*** Students often referred to particular course modules that were central to their understanding of how theories could be applied in practice. They were introduced to the *terms, knowledge of systems*, the use of the *tools of the trade*, and practical experiences with *simulated work environments*. Their understanding was developed through (1) *performing practical tasks* related to their future professional life; and (2) *collaborative learning experiences* such as working in groups that simulate roles in a professional team.

Here the pedagogy at the polytechnic, problem-based learning, played a special role. By presenting students with a range of scenarios that they might encounter in their professional life, problem-based learning would provide them with ideas of the *scope and nature of the work* they would engage in. The learning included the types of risks, responsibilities decisions and actions associated with the profession. Some students

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reported that they were assigned tasks involving actual research into their future profession. These tasks helped them to appreciate the future work environment and, in particular, to become aware of the challenges faced in the industry and how difficulties had been overcome. Their polytechnic facilitators also shared their work experiences in class, and conducted talks to inform them of what they needed to work at to develop themselves to become industry-ready.

***Having the professional as a role model.*** Learning from role models in professional education is about learning to reason and act like the professional. The problem-based learning pedagogy provided students with the regular practice of *learning to be the practitioners*, to solve problems and deliver on assignments that could be *required of them in professional practice*. As they had to provide a solution by the end of the day, some students reported getting a sense of what it took to *deliver work by given deadlines*. The *regular feedback* they obtained from the facilitators and their peers gave them the experience of handling critique to improve the quality of their work and their contribution to good teamwork. There were also students who have had the opportunities to make field trips and *observe exemplary professional behaviours*. Through these, students indicated, they developed an idea of expectations of their performance in the future.

***Experience with the profession.*** Exposure to the profession is defined as authentic contact with clients in a professional context that enables students to learn about the professional practice and the role of the professional (Dornan & Bundy, 2004). The experiences the students had could be direct or indirect. In the former, they were in the role of budding practitioners delivering work for real clients through practicum modules, coursework assignments, final year projects, and internship programmes. Indirect experiences included opportunities to learn from *professionals in the industry* through talks and field trips about the (1) jobs, (2) work environment, and (3) challenges faced in the profession. As a result of these direct and indirect experiences, students gain knowledge of what

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their future *work environments* could be like, and a *broader perspective of the scope and nature of their future work*. They appreciated better what their facilitators stressed in class. They gained practical experiences of what it meant to *behave professionally*, how to be *responsible for delivering quality work* on time. They also began to appreciate the importance of *planning and organizing schedules, good time management and teamwork*. Their knowledge about the *significant players in the field* and key products has also expanded through such experiences organized by the polytechnic.

***Professional self-efficacy.*** The problem-based learning pedagogy provided students with opportunities to learn how to *approach problems* contextualised in real life scenarios, work on them *like a professional* would, and *learn from their mistakes to make better professional decisions*. The regularity of engaging in these activities using the one day one problem approach at the polytechnic helped them to feel more prepared for work. They learned to become more *familiar and efficient with the daily routines and basic knowledge* dealt with in their future work. These included regular observations of rules and regulations, and learning to become adept at the use of equipment typically used in the profession. For students who struggled more with being a good team player, or who were shy, learning opportunities were presented in the problem-based learning *collaborative learning environments*. Additionally, events introduced through the polytechnic contributed to the students becoming *more confident at interacting with customers*.

***Preference for a particular profession.*** The profession-specific modules were opportunities for students to actively explore their interest for a particular profession. As a result, they discovered if they enjoyed solving problems related to that profession, felt inclined towards the scope and nature of the work, and were interested in the role they simulated in class and in practicum sessions. The *specialization modules* helped them to think through the potential tracks they could pursue further when they

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graduated. The *elective modules* enabled them to discover their interests and make more informed decisions about their career paths.

### **Impact of Education in Professional Identity Development: Educator-Practitioners' Perspectives**

In Chapter 5, data were collected from a group of educator-practitioners about the approaches they believed were helpful for student learning in polytechnic education, as a result of the influences from their own professional learning and development journey. The six interviewed educator-practitioners had joined the polytechnic as full time staff, directly from the industry. A few of them were still maintaining some form of practice in addition to their full time work at the polytechnic. At the time of the interview, these full-time faculty staff members had joined the educational institution for an average of 18.5 months, ranging from three months to three years. They were practitioners from five different fields: (1) journalism, (2) spa, (3) theatre, (4) aircraft engineering, and (5) outdoor and adventure education.

The following paragraphs summarise the findings in the study.

***Knowledge about professional practices.*** The educator-practitioners sought to address the knowledge gaps to be bridged for students' perspectives to be transformed into the new practitioners' that consisted of a more accurate understanding of the professional practice. These gaps included the knowledge about the physical environment and ambience that they would work in, and where they would apply what they had learnt. Field trips and simulated learning laboratories were examples given of how these gaps could be addressed to contextualize students' learning for easier transfer to their future workplace.

Students' prior knowledge about the profession are limited. Educator-practitioners had "insider" information they could share with students. Such information included challenges they themselves



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experienced as professionals in practice, and how they overcame these; and the career options students could actively explore. An educator-practitioner shared about helping students to develop an overview of their profession such as how their work fit into the overall project or production outcome. Students can thus get a better a sense of how the industry worked and the impact of their role in work cycles and work teams. The example he gave was a project assignment that required students to simulate a real world project team and collaboratively learn to complete the assignment. Another educator-practitioner indicated that he prepared students for industry-relevant certification as part of their professional education.

*Experience with the profession.* Students' development in the affect dimension such as empathy and interest can be stimulated with an authentic learning experience involving real clients. They experience first-hand the immediacy of the situations, and the responses to their work in the real world. The educator-practitioners in this study supported student learning in authentic experiences either by facilitating the process, when these were part of school assignments, or providing customized preparatory courses for getting them ready to make the most of their internship experiences.

*Having the professional as a role model.* The educator-practitioners in this study were very clear that they were the first, or among the first, professionals with field experiences their students encountered. Besides demonstrating to students the approaches used in professional practice, they felt that it was important for students to actively model the role of the practitioner as they went about their learning. They saw their feedback as important prompts to shape their students' learning, and consequently to develop the perspective, approaches and work ethics of the new practitioner. The regular assessment at the polytechnic provided for the educator-practitioners to emphasise and direct the focus of the student learning to incorporate professionalism, critical engagement with the content and reflective practice.

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*Professional self-efficacy.* Two educator-practitioners highlighted the importance of students learning to think on their feet to be able to perform in their job. They gravitated towards approaches that helped students develop the confidence and ability to deal with the nature of real world practice that is less predictable, complex and situated. They built into their lesson plan, activities such as role play of different scenarios, to provide for students' deliberate practice. During these sessions, they gave them feedback, asked them to give peer feedback and facilitated group discussions for students to reflect and learn from the experiences. One educator-practitioner felt strongly the importance of giving her students iterative practice of performing the role of the practitioner through practicums and projects. She felt that this would help students develop the experience, resourcefulness and approaches to be able to perform the job self-efficaciously in future. This was an influence from her own professional learning journey, which she attributed to have played a significant part in developing her self-confidence.

*Preference for a particular profession.* All the educator-practitioners believed in the influence of interest and passion in the profession. Their experiences illustrated how these were driving forces for their own professional development and in overcoming challenges at work. Their interest provided the direction for their efforts, use of resources, and the commitment to follow through their endeavours. At the polytechnic, the problem-based learning approach allowed for students to actively explore the kinds of problem scenarios professionals could encounter and the ways to approach these. They could then make more informed decisions about whether the particular profession was something they preferred to commit to. When students were enrolled in programmes not of their choice, one of the educator-practitioners would make the effort to try to help them see the relevance in the work of their preference.

### **Comparing the Student and Educator-practitioner Perspectives.**

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Both perspectives on how professional development is fostered were similar despite variations in the way they were described and explained. When compared on the basis of responses in each dimension, the main difference between both groups had to do with the development of *professional self-efficacy*. The educator-practitioners emphasized the importance of students to be able to think on their feet and respond to changes in scenarios and requirements. This theme did not occur in the students' responses. The practice that students referred to were related to the routines, regulations, and rules they had to be familiar with in order to function in their future work. The educator-practitioners were sensitive to the dynamic, complex, less predictable, and changeable real life scenarios in contrast to the structured, organized and less ambiguous nature of the learning in education.

One educator-practitioner reflected that problem-based learning allowed the students to have regular practice at thinking on their feet, and to learn collaboratively, with the guidance of their facilitators at the polytechnic. Perhaps more can be done about helping students respond to variations in the problem for the day to give them practice in learning to think and perform like the professional. This modeling on the role of the professional contributes to the dimension *having the professional as a role model*, which the study in Chapter 3 had concluded that the polytechnic could provide more for student learning.

The other dimension that the study in Chapter 3 also suggested for the polytechnic to enhance for student learning is *experience with the profession*. This was similar to the finding in the study in Chapter 4, where, unlike the other dimensions, problem-based learning (the main pedagogy at the polytechnic) was not specifically mentioned by students in the factor *experience with the profession*. Authentic contact with the industry needs to be built into PBL to enhance students' learning to become new practitioners.

### **How PBL Contributes to Students' Professional Identity Development**

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The process of learning to integrate knowledge and skills to perform in professional practice contributes to the development of students' professional identity. Students can benefit from their education through, (1) the development of *knowledge about professional practices*, (2) *having professionals as role models*, and (3) *authentic experiences with the profession*. Practice in professional contexts contributes to the development of *professional self-efficacy*, and active exploration of learning to become the professional contributes to students' development of *preference for a particular profession*.

The responses of students and teachers as exemplified in Chapter 4 and 5 showed how problem-based learning helps students in gaining an understanding of what it meant to be working in their chosen profession, and as such accommodate the aforementioned factors for professional identity development. A key feature of problem-based learning is the use of real world problems as stimulus for learning relevant knowledge and skills related to professional practice, and getting students to think, read up and reason like a professional. Discussions with peers in collaborative learning enable students to test their ideas and thoughts, and get feedback. These provide a simulation of experiences that are close to real practice. Ideally, when students become more skillful in the problem-solving process, they gain the attributes of the lifelong learner who is able to learn on the job. When real clients or authentic contact with industry professionals are involved, these learning experiences have already prepared them for the vagaries of the profession. Tutors guide students in this process and provide timely scaffolds and closure for the learning with the aim that students can over time, become increasing less dependent on them. In this sense, tutors may influence the way students learn new knowledge and skills in professional practice. Regular practice with the problem solving process, with the support of facilitators and peers, can help students gain confidence in the approaches to deal with professional situations. Finally, the active exploration of the nature, scope and

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approaches of the professional can enable students to make more informed decisions about their future careers.

It seems that problem-based learning is particularly suited for professional education. Students can actively model how the professional may systematically approach the problems of the domain by defining key or learning issues from problem scenarios and developing reasonable solutions. This is meant to mirror a systematic approach to diagnose and treat an issue. Student learning can involve serving real clients, with opportunities built in for deliberate practice to reflect, learn and improve in the applied approach for learning.

Implementing these teaching approaches is not without challenges. One educator-practitioner highlighted the struggle she had in managing the need to give students the space to learn to think, and learn from their mistakes, and the urge to tell them what they should and should not do. Also, while authentic experiences are useful, the educator-practitioner would also need to factor in the time for ensuring that all the learning objectives and outcomes are adequately addressed. One of the principal findings in Dornan & Bundy's (2004) study was that early experiences in medical education should not compromise the learning of biosciences, the sound knowledge of which was still necessary to complement clinical skills. In Dornan & Bundy's (2004) study, staff also reported concerns about cost and logistics. In the current study, some of the educator-practitioners appeared to have found solutions to manage the cost, such as arranging for students to learn content in their lessons through servicing a real client.

In internships, learning is opportunistic and dependent on the situations that arise, and the capacity of their onsite supervisors to help students make sense of what is going on (Beckett & Gough, 2004). Such as helping students understand why the approaches may seem in conflict with what they had learnt (Cox, et al., 2006). Ideally the students develop learning strategies in class that can work for them in a less structured

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environment for learning, such as internships. And ideally when students become more skillful with the use of learning strategies, they will become more adept at learning on the job in future.

Notwithstanding the pedagogic efforts of professional education, there will inevitably exist a gap between the students' learning at the polytechnic and their ability to perform independently and successfully in the workplace. They need to adapt to the new environment and its organizational culture, and to deal with the demands of the job as a full-time staff. There would be new technology or equipment that could not be made available in school for learning and practice. With the rapid expansion of knowledge, technology and changes in the landscape of the profession, the new practitioners need to continue to learn to stay competent and develop their expertise.

### **Future Research**

This thesis has shown how the questionnaire that we developed and tested, the PIFFS, has been used to derive findings that can potentially be generalized beyond the polytechnic where the research was conducted. Future studies should extend the use of the PIFFS in more varied settings and educational contexts, and provide for the following aims:

1. Studies of predictive validity that can help us answer the question of how good the PIFFS is in predicting success at the polytechnic. Although the study in Chapter 3 did not find strong links between PIFFS and academic outcomes, it could be a function of the PIFFS being self-reported, and mediating outcomes such as observed achievement oriented behaviours need to be factored in a path relationship.

2. Longitudinal studies to capture the development of students over their three year polytechnic education. A shortcoming of our research was the studies were cross-sectional, leaving open the possibility that the year groups compared were different.

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4. Comparative studies to identify the strengths of different pedagogies in contributing to students' professional identity development. Perhaps some didactic approaches that provide students with more guidance, practice and feedback are more successful than others in helping students to develop professionally.

5. Micro-level studies with experimental designs for specific teaching interventions that can contribute to the development of professional identity. Examples include the use of simulators and virtual reality applications for learning.

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Annex A1**Professional Identity Survey (Original)****Why do this survey?**

Thank you for your participation in this survey. It is important to us at Republic Polytechnic that we continue to research and understand the work that we do, particularly in the area of student learning. The entire survey takes about **15 minutes** to complete.

Please do attempt all the questions without any distraction, as accurately as you feel they represent your experience. The first thought about your experience generally is the most accurate impression. There is no right way or right answers for each specific question – so there is no need to feel anxious.

Your responses will remain anonymous. If you have any questions, please do not hesitate to contact MS Tan Chin Pei from the Centre for Educational Development at [tan\\_chin\\_pei@rp.sg](mailto:tan_chin_pei@rp.sg), tell: 31001803.

**I am ready to take this survey**

*Please **circle the response** that most accurately describes your experience.*

In this survey, “Profession” refers to the kind of work, job or career that you will have when you graduate. Examples are Assistant Engineer, Journalist, Business Development Junior Consultant, Sports Coach, Sports Service Provider, and Health Promotion Officer. The “Industry” refers to the range of jobs & services and the environment associated with the profession. Examples are Electronics, Media, Banking & Finance, F&B, Airline & Aerospace, and Healthcare.

- |   |  |       |    |
|---|--|-------|----|
| 1 | Do you already know what kind of work or profession you <b>prefer</b> ?<br>If your answer is “Yes”:<br>I would like to become... | Yes   | No |
|   |  | _____ |    |
|   |  | _____ |    |

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
2	My future work is related to the diploma I am enrolled in.	1	2	3	4	5
3	My polytechnic education is relevant and useful in preparing me for my future career.	1	2	3	4	5
4	When working on problems in class, I imagine myself to be in the shoes of a professional in my future work environment.	1	2	3	4	5
5	I actively learn what I believe I would need to know and be able to do when I enter my future occupation.	1	2	3	4	5
6	I believe I can already reason like a professional in a company.	1	2	3	4	5
7	I admire most those teachers who are professionals in the area that I would like to enter.	1	2	3	4	5
8	I have some idea about the roles and responsibilities of	1	2	3	4	5

		Never True	Not Really True	Neutral	Somewhat True	Definitely True
	different jobs in the profession I will be entering.					
9	I know about the different types of professionals I will be working with in my future work environment.	1	2	3	4	5
10	I am sure I will have no problems dressing and behaving professionally in my industry.	1	2	3	4	5
11	I am not sure if I can fit into the working environment of the profession.	1	2	3	4	5
12	I am working part-time or running a business relating to what I am studying.	1	2	3	4	5
13	I have attended the internship programmer offered by RP. If your answer is "No": I am keen about the internship programmer RP has to offer.	Yes	No			
		Yes	No			
14	I am part of an interest group (inside or outside of RP) related	1	2	3	4	5

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
	to my profession.					
15	I know personally some people who work in my future profession.	1	2	3	4	5
16	I have already found out what it takes to enter and do well in the industry.	1	2	3	4	5
17	I follow developments in the industry in newspapers and on television	1	2	3	4	5
18	I want to contribute to the good reputation of the industry of my profession.	1	2	3	4	5
19	My first impression of the profession was very positive.	1	2	3	4	5
20	I have thought about different possibilities of what profession I will pursue after I graduate but I am not certain what will happen.	1	2	3	4	5
21	In class, I don't really enjoy working on problems related to the industry.	1	2	3	4	5
22	I am already pretty	1	2	3	4	5

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
	sure what kind of profession I <b>will</b> enter after completing the polytechnic or university education.					
23	Before I entered RP, I already had some prior experience related to profession.	1	2	3	4	5
24	I am aware of the impact of the decisions I make as a professional in the industry.	1	2	3	4	5
25	I have interacted and learned from professionals in the industry outside of school or through events organized in school.	1	2	3	4	5
26	I feel poorly prepared for a real job.	1	2	3	4	5
27	I am concerned that I may not meet the expectations of my supervisor or boss.	1	2	3	4	5
28	I believe that I will easily get along with my colleagues, get their cooperation, and have informal conversations with them.	1	2	3	4	5

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Once again, thank you for your participation.

Researchers:

Ms. Tan Chin Pei, Centre for Educational Development, Republic Polytechnic. Contact details: [tan\\_chin\\_pei@rp.sg](mailto:tan_chin_pei@rp.sg), tell: 31001803 (please do not dial “6” in front)

Prof. Henk Schmidt, Erasmus University, Rotterdam.



## Annex A2

**Professional Identity Survey (Revised)****Why do this survey?**

Thank you for your participation in this survey. It is important for us to understand your learning experiences here at Republic Polytechnic. Therefore we ask you now and then to respond to surveys such as this one. The entire survey takes about **10 minutes** to complete.

Please do attempt to answer all the questions without any distraction, as accurately as you can. The first thought about your experience generally is the most accurate impression. There is no right way or right answers for each specific question – so there is no need to feel anxious.

Your responses will remain anonymous. If you have any questions, please do not hesitate to contact Ms Tan Chin Pei from the Centre for Educational Development at [tan\\_chin\\_pei@rp.sg](mailto:tan_chin_pei@rp.sg), or tell: 31001803.

**I am ready to take this survey**

*Please **circle the response** that most accurately describes your experience.*

In this survey, “Profession” refers to the kind of work, job or career that you will have when you graduate. Examples are Assistant Engineer, Journalist, Business Development Junior Consultant, Sports Coach, Sports Service Provider, and Health Promotion Officer. The “Industry” refers to the range of jobs & services and the environment associated with the profession. Examples are Electronics, Media, Banking & Finance, F&B, Airline & Aerospace, and Healthcare.

1 Do you already know what kind of work or profession you **prefer**?      Yes      No

If your answer is “Yes”:

I would like to become...

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
2	My future work is related to the diploma I am enrolled in.	1	2	3	4	5
3	My polytechnic education is relevant and useful in preparing me for my future career.	1	2	3	4	5
4	When working on problems in class, I imagine myself to be in the shoes of a professional in my future work environment.	1	2	3	4	5
5	I concentrate in my studies on what I believe I would need to know and be able to do when I enter my future occupation.	1	2	3	4	5
6	I believe I can already think and reason like a professional in a company or organization.	1	2	3	4	5
7	I admire most those	1	2	3	4	5

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
	teachers who are professionals in the area that I would like to enter.					
8	I know the nature of the work I will do in my future profession.	1	2	3	4	5
9	In most work environments, professionals with different backgrounds work together. I know of the different types of professionals I will be collaborating with.	1	2	3	4	5
10	I have a good idea about the roles and responsibilities of my future job.	1	2	3	4	5
11	I am not sure how a professional in my industry makes decisions.	1	2	3	4	5
12	I admire professionals who are already working in my future work environment.	1	2	3	4	5
13	I am sure I will have no problems dressing and behaving	1	2	3	4	5

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
	professionally in my industry.					
14	I know what kind of applications, tools and equipment I will handle in my future occupation.	1	2	3	4	5
15	I work part-time in (or am running) a business related to what I am studying.	1	2	3	4	5
16	I have attended the internship programmer offered by RP.	Yes	No			
	If your answer is "No": I am keen to know more about the internship programmer RP has to offer.	Yes	No			
17	I am part of an interest group (inside or outside of RP) related to my profession.	1	2	3	4	5
18	I know personally some people who work in my future profession.	1	2	3	4	5

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
19	I am not sure if I will be able to adapt to the working environment of the profession.	1	2	3	4	5
20	I follow developments in my future industry in newspapers and on television.	1	2	3	4	5
21	I am already pretty sure what kind of profession I <b><u>will</u></b> enter after completing the polytechnic or university education.	1	2	3	4	5
22	Before I entered RP, I already had some prior work experience related to in the profession of my choice.	1	2	3	4	5
23	I am aware of the impact of the decisions I make as a professional in the industry.	1	2	3	4	5

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		Never True	Not Really True	Neutral	Somewhat True	Definitely True
24	I have a good idea about the rules and regulations in the industry.	1	2	3	4	5
25	I have interacted with professionals in the industry outside of RP or through events organized in RP.	1	2	3	4	5
26	I feel poorly prepared for a real job.	1	2	3	4	5
27	I am not sure about the kind of challenges faced by the professional in the industry I will work in.	1	2	3	4	5
28	I believe that I will easily get along with my future colleagues, get their cooperation, and have informal conversations with them.	1	2	3	4	5
29	I'm confident that I can do an excellent job in the future.	1	2	3	4	5
30	I have no doubt that I will master all the skills necessary to succeed in my future work.	1	2	3	4	5

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Once again, thank you for your participation!

Researchers:

Ms. Tan Chin Pei, Centre for Educational Development, Republic Polytechnic. Contact details: [tan\\_chin\\_pei@rp.sg](mailto:tan_chin_pei@rp.sg), tell: 31001803 (please do not dial “6” in front)

Prof. Henk Schmidt, Erasmus University, Rotterdam, Netherlands.

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## Curriculum Vitae

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Chin Pei, Tan was born on 11 April 1973 in Singapore. She had completed her education mainly in her country of birth, first at Raffles Girls' Secondary, then National Junior College, and National University of Singapore, where she graduated with a Bachelor in Science (Estate Management), with honours. Her worklife has been varied, with a common thread in development work in the public service: traversing industrial properties and industrial estate development, and people development in the social services and education sector. Prior to joining the education sector with the Republic Polytechnic, she was involved in the planning and conceptualising of learning platforms, the development of training programmes and roadmaps for professionals in the social service sector.

At the Republic Polytechnic, as an academic staff with the Centre for Educational Development, she had been in charge of modules, and carried out curriculum and assessment design, delivery and analysis. She has taught both the young adults in a critical thinking skills module, and also educators from both the private & public education sector in a specialist diploma programme in applied learning and teaching. She had conducted training in problem-based learning (PBL) locally for the polytechnic staff and also overseas to foreign participants. In the area of research, she had managed large scale institutional research projects such as the student feedback surveys, and led programme evaluations of different pedagogies.

As part of her own personal growth she completed a low residency masters degree in transpersonal psychology with Naropa University in Colorado, United States.



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## Presentations

1. Tan, C.P. (2013). *Professional Values and Ethics: Can these be learnt in school?*

Invited speaker at the Institute of Technical Education (ITE)'s 9<sup>th</sup> Teachers' Conference: The Future of Values-Driven VTE, Singapore.

2. Tan, C.P. & Schmidt, H. G. (2013). *Influence of Motivation on Professional Identity Development and Achievement in Polytechnic Education*. Paper presented at the 2013 Joint SELF Biennial International Conference and Educational Research Association of Singapore (ERAS) Conference, Singapore.

3. Tan, C.P., Lim, L-A.Y.L. & Yew, E.H.J. (2013). *Impact of Facilitation on Student Achievement*. Paper presented at the 2013 Joint SELF Biennial International Conference and Educational Research Association of Singapore (ERAS) Conference, Singapore.

4. Tan, C. P. & Schmidt, H. G. (2012). *A Measure of Professional Identity in Vocational Education: A Developmental Perspective*. Paper presented at the American Educational Research Association 2012 Annual Meeting Vancouver, British Columbia, Canada.

5. Tan, C. P. & Rotgans, J.I. (2011). *The Influence of Ego-resiliency on Student adaptation, Engagement & Achievement in an Active Learning Classroom*. Paper presented at the American Educational Research Association 2011 Annual Meeting New Orleans, United States.

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6. Tan, C.P. Rotgans, J.I. & Schmidt, H.G. (2010). *Influence of Personal Relevance and Professional Importance on Problem Interest & Learning in a Problem-based Learning Classroom*. Paper presented at the International Symposium on Advances in Technology Education (ISATE) 2010, Kagoshima, Japan.

**Publication**

Yew, E.H.J., Chew, A.Y.L., Goh, K.P.L. & Tan, C.P. *Impact of Frequency and Quality of Written Feedback on Student Learning*. (Manuscript submitted).