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The changing role of educators in tertiary education

Teaching in institutes of higher learning is often considered a function performed by experts, in the presentation and reproduction of knowledge (Campbell et al., 2001) and regarded as unproblematic. However, this perception shifts when the role extends to preparing students for practical experiences in internships, requiring collaboration with workplace supervisors and seeking alignment between the expectations of learners, organisational requirements and education curriculum (Patrick et al., 2008). These challenges are compounded by the variabilities of emerging educational activities shaped by the occupational disciplines workplace partners engaged with, and students' need for readiness to effectively participate and learn in these highly situated practices (Caves et al., 2021). Therefore, professional development opportunities and experiences need to be aligned with these challenges. In particular, how tertiary educators negotiate the space between what is intended by government, industry, and education administrators, on the one hand, and the realities of enacting those provisions, represents a zone of activities and interactions in which those challenges are confronted and can be overcome, thereby creating professional development opportunities. Importantly, these educators' ability to engage frequently with and across several workplaces and workplace supervisors also offers opportunities for enhancing their understanding of how the disciplinary knowledge they teach is applied in practice. This understanding, in turn, informs how they can prepare students for work placements and enrich their experiences during placements.

Work-Integrated Education refers to a specific programme that sought to facilitate learning in both academic and workplace settings through the integration and transfer of knowledge and skills between academic and work settings. Whilst such educational activities might appear hybrid and restricted to just a few applied programmes, the trends and the likelihood is this kind of provisions to become both orthodox and universal across both vocational education and higher education programmes (i.e. tertiary education) is increasing (Billett, 2010). Consequently, the roles of tertiary educators engaged in such work-integrated education have become more complex due to increased massification, rapid changes in the global economy and an increasingly diverse body of students. Beyond traditional classroom teaching activities, these educators now need to engage with work settings and provide educational experiences that both utilise and augment students' workplace learning experiences. Considering the drive for professionalising and enhancing educational practices in work-integrated education, it is crucial to examine how emerging pedagogical practices impact teaching and learning, and how they can contribute to professional development.

It follows that the study described, reported and discussed here examines how the pedagogical constructs of work-integrated educators in Singaporean polytechnics are being reconstructed and extended as they implement internship modules and work-study programmes that support students' learning through work activities and interactions in the workplaces where they undertake their placements. What is proposed is that a grounded, situated and critical model of professional development can also be realised through these activities by teachers as they support their students' learning and collaborate with workplace supervisors. The data indicate that the richness of problem-solving and collaborations being undertaken by these educators provide effective professional development experiences yet, await the opportunity to be made more effective through both peer and institutional guidance. Consequently, this paper seeks to answer the following research questions:

1. What are the challenges encountered by tertiary educators engaged in work-integrated education?
2. How do the strategies implemented by educators contribute to effective professional development opportunities for themselves?

The following section reviews key research on professional development of educators to underscore our efforts in adding theoretical knowledge about pedagogical constructions of educators for preparing learners to be work-ready. Following, a description of the practical inquiry comprising interviews with these educators, findings associated with how they coordinate the learning experiences for their

students and their beliefs underscoring interaction with students and workplaces. Finally, the findings are used to propose a grounded and practice-based approach to educators' professional development for educators with roles for liaising with students and workplaces, coordinating courses and course directorship.

Embedding work experiences within tertiary education

Globally, there is growing interest in providing students in tertiary education (i.e. both vocational education and higher education) with structured work experiences. The educational aims here are usually associated with assisting students from tertiary education institutions to be able to move smoothly into performing effectively in workplaces upon graduation. A diverse range of experiences is provided for the students to achieve those goals, from relatively short experiences within work settings in which they are often observers for engaging in peripheral tasks, to longer term placements in which they perform occupational roles within the workplace and are expected to meet the requirements of employees (Patrick et al., 2008). This emerging requirement is also seeing a shift in the expectations of tertiary education from preparing people for occupations to meeting the needs of specific work settings (i.e., making them job-ready). This is a particularly tough educational goal because many of those requirements are not formalised, and it is particularly difficult to know where graduates will ultimately be employed (Rowe & Zegwaard, 2017). However, when those experiences are provided as elements of tertiary education programmes, there are expectations that there will be an awareness of the needs of the particular workplaces in which students are being placed and how their learning can be supported by supervisors in those workplaces (Winchester-Seeto et al., 2016).

Hence, the role of the tertiary educator is not only being extended to assist students prior to and after they have had these placements, but also to find ways of engaging with workplaces to support the quality of the experiences and outcomes during those placements (Patrick et al., 2008). Central to this education provision is enabling the integration of the two sets of experiences: those in the workplace and educational institution (Cooper et al., 2010). All of this extends the role of the tertiary educator beyond being a classroom teacher or instructor, to being a guide and facilitator, but also extending the education reach into workplaces which can require engaging and negotiating with workplace supervisors (Ferns and Campbell, 2014). Whilst for many, these changes may be seen as being burdensome and unwelcome, they herald an opportunity to extend the role of tertiary educators. Moreover, they offer a set of experiences that potentially can be used to further develop the capacities of these educators as they seek to enact such educational provisions in the form of internships in which graduates engage in paid forms of work attachment but also have intentional educational elements.

Continuing professional development of tertiary educators

Continuing Professional Development (CPD) generally refers to all forms of learning that improves one's professional expertise through the acquisition of new knowledge and skills that is beyond those acquired during initial training (Njenga, 2023), with the aim of enhancing students' learning (Phuong et al., 2018). Given the rapidly changing world of work and increasing expectations on tertiary education to foster work-ready students, continuous upskilling has become increasingly essential for educators (Day & Leitch, 2007). The form and focus of professional development are shifting from formal training programmes specific to localised classroom management to a broader, unstructured, opportunistic basis that accommodates to individualised needs of students and experiences of educators (Loy, 2024). Aligned with lifelong learning (Efu, 2023), CPD signals tertiary educators' efforts to continuously enhance their industry expertise and grow their pedagogical skills, which in turn, efficiently scaffold students' learning (Fairman et al., 2020; Efu, 2020).

Within professional development literature, there are many models used to describe the process and activities surrounding it. In general, professional development policies and how they are practiced by educators remain complex and multi-faceted, with each model serving as a means towards different purposes (Kennedy, 2005; Kennedy, 2014). Educators perhaps most commonly engage in professional development activities such as training workshops to acquire capacities their employers deem essential (Kwakman, 2003), collaborative learning and inquiry of their own practices with peers (Borko 2004;

Darling-Hammond & Richardson 2009), industry attachment (Choy & Haukka, 2009), and the use of meaningful reflections (Efu, 2023).

The professional development methods for WIE educators are similar to those in general education but include an added emphasis on occupational competencies (Fejes & Köpsén, 2014). These educators benefit from a dual identity—both as teachers and professionals in their field—which equips them with unique approaches. However, engagement in continuing professional development varies widely. For instance, a multinational survey in countries like Australia, Canada, South Africa, and the United Kingdom revealed a moderate need among educators for professional development in areas such as quality evaluation and curriculum design (Zegwaard et al., 2019). Institutional conditions such as funding limitations, restricted control over training focus, and time constraints can also significantly influence engagement (Adu & Okeke, 2014; Broad, 2015; Magwenya et al., 2023). Interestingly, vocational educators with administrative roles tend to participate more frequently in formal training activities than counterparts without such duties, and experienced educators are more likely to take on roles in curriculum design and mentoring (Njenga, 2023).

Furthermore, educators are more likely to adopt new teaching methods if they find them both meaningful and feasible (Tzafilkou et al., 2023). This highlights the importance of aligning professional development activities with educators' values and the practical realities of their roles. Critically, participation in professional development activities is believed to improve educators' knowledge and behaviour. However, there is a lack of focus on student outcomes and the transfer of knowledge and skills outside of formal classroom settings (Khan & Kiran, 2018) as an outcome of educators undertaking continuing professional development. Little research looks at how continuing professional development occurs through the act of mentoring students engaged in workplace learning. Also, literature often focused on conventional modes of professional development where learning occurs between teachers or with an expert, which excludes students as potential brokers of knowledge or the complementary roles between lecturers and workplace supervisors (Winchester-Seeto et al., 2016). Moreover, issues with assessing work-integrated learning and the lack of appropriate measures to provide robust feedback were attributed to educators' limited understanding (Ferns & Zegwaard, 2014). Against this backdrop, where the pedagogical expertise and industry relevance of these educators are under scrutiny, there is a pressing need to better understand how educators' continuous professional development practices unfold in their daily work.

Explanatory bases for our work

We identified pedagogical and curriculum considerations on work-integrated learning (WIL) as a useful framework to make sense of the challenges encountered by educators as they sought to integrate student's experiences in academic and work settings. For instance, Billett (2006) organises the WIL curriculum into three areas: the intended curriculum — what is intended to occur; the enacted curriculum — what occurs when the curriculum is enacted; and the experienced curriculum — what learners experience, construe, and learn as a result of its enactment.

Building on the above, we further explore the dynamics of learning and development in the context of professional development for educators by considering Vygotsky's zone of potential and proximal development. Although the theory stems from development research focussing on young children, other studies have utilised this concept to show how adults continue to develop through internalising new and more complex thinking (Kuusisaari, 2013; Wass & Golding, 2014, Shabani, 2016). Importantly, the zone of development is not bound by learners' age, but instead, describes the transition and shift in cultural thinking (Compernolle, 2021). What sets the two zones apart can be understood in terms of the scope of learning that arises. For zone of potential development, the scope of individuals' learning arises based on their own readiness and efforts and can be extended and shaped by one's interest (Billett, 2018). However, sole focus on potential is complicated because it is difficult to set a parameter since an individual is capable of learning anything at some point in time (Cazden, 1997). Moreover, relying solely on one's existing knowledge and discovery efforts may be insufficient for learning new knowledge that is outside of the scope of potential development. So, learning beyond *potential* development, that is in the zone of proximal development, learning arises in a social context through social interactions which extends the scope of learning beyond what one could achieve independently (Boateng, et al.,

2022). This could appear in the form of guidance or inputs from others or collaborating with peers to problem-solve. Both *potential* and *proximal* development thus provides significant contribution by combining individual development and social interactions. Furthermore, while the zone of potential and proximal development is premised upon a space between an expert and novice participant – which is commonly the case of teachers and students – the concept also posits that within the process of providing support and guidance, both the teacher and student transform (Ash & Levitt, 2003).

Method

Study design and research participants

To gain a comprehensive understanding of the experiences of tertiary educators in their provision of work-integrated education, we conducted semi-structured interviews with educators recruited from three polytechnic institutions in Singapore. Educators were selected and recruited if they have at least one semester's worth of experience being a liaison officer for students during their internship. A total of 41 educators agreed to participate and were from a range of faculty (see Table 1). In addition to their role as lecturers, participants also highlighted administrative responsibilities related to coordinating these programmes with workplace organisations.

Table 1. Demographics of research participants

Characteristics	Participants (%)
Gender	
Male	34
Female	66
Programme type	
Internship programme	68
Work-study programme	32
Faculty	
Business	32
Applied Science	32
Supply Chain Engineering	27
Electrical Engineering	2
Hospitality	7

Data collection and analysis

A semi-structured interview guide was developed that sought to examine the experiences of lecturers implementing these programmes and focused on five dimensions: (a) experience, (b) support and educational guidance for learners, (c) enhancing the learning through internship and or work-study programmes, (d) expectations, and (e) reflections (refer to Supplementary Table 1). The interviews were audio recorded, and each interview lasted for about an hour. Participants were assured anonymity and confidentiality of data collected before the interview and were informed of their rights to withdraw participation at any time. Vouchers were mailed to the participants as a token of appreciation for their participation. However, a few participants were restricted by their institution's policies to receive them.

All interviews were transcribed verbatim with fidelity checks to ensure the accuracy of transcripts. Thematic analysis (TA) was conducted using an inductive approach by working from the bottom up where codes and themes are developed using the data as the starting point through an iterative process (Braun & Clarke, 2006; Braun et al, 2019). The six-phase thematic analysis approach as described by Peel (2020) was adapted for this study. An initial list of codes was extracted based on the first two transcripts. Considerations on suitable code labels coupled with detailed descriptions were concomitantly recorded. With subsequent rounds of coding new transcripts, the codebook was further revised and reduced to generate broader code categories (refer to Supplementary Table 2). Inter-rater reliability check was exercised by all coders involved. The codes and code categories were refined and informed by existing literature. Our data analysis led to the emergence of four themes that will be elaborated in the next section. Pseudonyms are used in the subsequent sections of reporting.

Findings

The findings are: i) challenges encountered by tertiary educators; ii) beliefs on the educational intents of work-integrated education; iii) strategies enacted by educators; and iv) professional development of educators.

Challenges encountered by tertiary educators

The educators reported four types of challenges in preparing and supporting students for their work-integrated learning journey. Frequency count, based on the number of participants who mentioned excerpts related to each challenge, was used to identify the more salient themes. The frequency count for each challenge were: i) difficulties in managing student engagement (31 out of 41 lecturers); ii) mediating expectations between various stakeholders (16 out of 41 lecturers); iii) ambiguity of their role in the workplace (11 out of 41 lecturers); and iv) ensuring quality placements (8 out of 41 lecturers). The strategies enacted by educators to address these challenges were reported as being tied to their beliefs on the educational intent of such programmes. This process was found to compliment the professional development of educators which will be elaborated in the following sections.

Difficulty in managing student engagement. This was the most salient challenge reported by the educators interviewed. This challenge is mainly attributed to the different levels of work-readiness observed among students:

> 'Some probably they may still excel at work, but some others probably, they need a holding hand. […] probably they have been used to receiving a lot of holding hands from the lecturers, so they may expect the company to spoon-feed them.' – Mr. Lim, Applied Science educator

Disparity in work-readiness was proposed to be most apparent amongst students who are entering the workplace for the first time as they report cultural shock and struggle to meet workplace demands. This disparity is widened as students are placed across a range of job functions within the industry. While educators claimed they had endeavoured to equip students with a foundational understanding of technical concepts and practices to apply in the work settings, some students reportedly struggled to relate the concepts learned to their job functions:

> 'They may not be able to draw reference to why finance is critical to what they are doing. Because a lot of them they are at the concierge, F&B, or front office; more on the operational aspect of things.' – Bernard, Hospitality educator

The challenge to engage students is further exacerbated when students are not open to share problems with educators. Dawn describes her interaction with her applied science students as follows: 'The thing is she [student] didn't tell me anything. Even if I ask them, "So how are you all? Everything okay?" They will say, "Okay, okay." (...) They are afraid that they might fail, so they don't dare to say much.'

As revealed by Dawn, her dual identity as a lecturer and liaison officer in Applied Science can sometimes be contradictory for students. As a liaison officer, they are required to ensure the well-being of their students while assessing student's workplace performance. However, this may result in a misconception as students perceive their sharing of workplace challenges as a reflection of poor workplace performance, which deters students from sharing. Such deterrence is especially problematic when workplace conflict escalates but educators are unaware and unable to provide timely support, as revealed by Emily, an applied science educator: 'Because we are in school, then sometimes we are not able to contact on the spot. So, if there are behavioural issues, then it may be difficult to sort it out immediately.' In this way, a key problem, and potential learning opportunity is in learning more about more effectively learning to manage students' placements.

Mediating expectations between various stakeholders. 16 educators reported challenges in mediating the mismatched expectations between students and workplace supervisors. Specifically, workplace supervisors were reported as having high and perhaps unreasonable expectations of the students to

perform at the workplace in terms of their technical skills and ability to cope with the workload, even during peak periods:

> '(…) these students who go out on internship, most of them, it's their first time having an office job, for them it's quite a culture shock (…) in the peak period especially, it can be quite challenging for the students. And sometimes the managers or the supervisors assigned to them are not aware of these challenges that the students are facing.' – Talia, Business educator

Other than workplace supervisors, educators also shared challenges in addressing parents' concerns for their children, as described by Talia: 'When there are events, the students will be working later hours but parents are not accepting this. So basically, we are like listening and trying to handle the parents' perspective also, because there are over-protective parents too.' Hence, through their work activities, there is the potential to learn more about how best to manage the different stakeholders' expectations.

Ambiguity of educator's role and responsibility at the workplace. 11 educators revealed difficulties to establish a clear definition of their role at the workplace. Notably, educators highlighted their dilemma on what constitutes an appropriate level of support when level of work-readiness varies among students. For instance, some students may expect lecturers to resolve workplace issues for them, as highlighted by Ms Liao, a business educator: 'I have to draw a line, how much of a teacher I will play, and how much of a LO [Liaison Officer] I will play. Because they can easily tell me everything and all the woes and ask me to settle for them.'

Furthermore, the level of support that educators can provide is constrained by the limited time and capacity, especially outside of their school teaching hours. This challenge is exemplified by Mr Koh, a business educator who notes, 'Sometimes it is hard for us when we are teaching, managing the students in school but also the other students outside of the classroom that we don't see.' This situation highlights the role ambiguity arising from student placements. It underscores the need for a broader, more expansive understanding of educators' role, specifically, how and to what extent they should intervene to resolve the students' workplace issues.

Ensuring quality placements for students. Among educators who reported challenges in ensuring the quality of placements, the predominant concern was that the learning outcomes for students might be compromised when companies prioritize hiring over students' learning objectives:

> 'There are companies that probably are using them as just an extra manpower; they don't abide by the learning plan, and students are just doing data entry for the sake of just helping the company.' – Ms. Chua, Business educator

This challenge requires educators to engage with workplaces to help strike a balance between the work and learning components of placements.

However, here the key point is that the professional learning associated with these four points are to be most likely only able to be developed through these educators engaging in the kinds of activities which they list above as being challenges. Less likely, will effective professional development experiences come from taught courses or lectures, but here, the everyday work of engaging and supporting students in work settings and collaborating with workplace supervisors provides a platform for this ongoing learning. However, there are other areas where educators need to further develop their capacities. These include understanding the diverse belief systems that various stakeholders had about work placements within work-integrated education, with stakeholders ranging from students, workplace supervisors and parents, and the educators themselves.

Beliefs on the educational intents of work-integrated education

The educational intent of the programme is to equip and develop work-ready students, in both their technical expertise and canonical occupational practices. These overarching intentions set the stage for educator's expectations for the following groups:

Students. Educators often reported viewing the programme as an opportunity for students to become independent and take ownership of their learning, as shared by Gerald, a business educator: 'They have to take ownership of their learning experiences (…) if you sit quietly in a corner and you are not raising hands to ask questions, I think it is a missed opportunity.' This expectation for students is further encapsulated by the idea that the workplace setting is different from that of the school, which is proposed by some educators:

> 'They must realise that in the work environment, unlike in school where sometimes you don't know, the obvious thing is to ask your teacher. (…) We are moving away from that; we want to inculcate this idea to source for the answer yourself first, and you need to make judgement of whether what you are doing, or what you are sourcing makes sense to you.' – Pamela, Electrical Engineering educator

Educators also reckon the importance of students realising the programme as more than just a module, but to 'embrace it as a learning journey'. Based on this premise, it is reasonable that educators envisage the programme as a platform for students to test for fit, and expand their industry network:

> 'They should see the internship not really as a module, but as an opportunity for them to grow, find out for themselves (…) is this suitable or not suitable for them.' – Jason, Business educator

> 'It's their chance to step out of their comfort zone. (…) I ask them to build a network, look for your supervisors, your co-workers on social networks and connect with them.' – May, Business educator

So, reported here are outlines of a set of expectations held by educators which may align or conflict with those of workplace supervisors and parents. However, as key agents in negotiating across workplaces, students and educational programmes, the perspectives of these educators are important as they are central to the enacted curriculum.

Workplace supervisors and parents. Support from workplace supervisors and parents are reported to be paramount in enriching student's work-integrated learning experience. Support from workplace supervisors entail offering meaningful work for students to 'put what they have learnt into practice' and deepens their skill sets. As proposed by Nadia, a hospitality educator: 'It may not be just part of their daily work; perhaps finding an opportunity for them to take on certain special projects for the hotel, and to apply what they have learnt.' Also, supervisors should be understanding towards students' transition during the initial weeks, yet strive to expose students to the reality of work:

> 'I expect them (workplace supervisors) to mentor students and help them ease into the industry. The mentors should show them the reality and not sugar coat anything. (…) If they can expose the students to the actual setting of the industry, I think that would be best.' – Darren, Applied Science educator

On the contrary, the type of support from parents is different from what is expected of workplace supervisor. Parents need to come onboard by giving their children the space to independently resolve workplace issues, as illustrated by Jenn, an applied science educator:

> 'I think parents also need to be on board; cannot over-protect their child also. We had cases where something happened at work, and then it's always the parents that stepped in to resolve the thing; it's never like the student trying to resolve the problem."

What has been proposed here is that there is a key role in managing the expectations of these two sets of individuals who sit outside of the educational provision yet are central to it.

Lecturers. It is worth noting that educators saw themselves as more than just a lecturer but a coach as well. As put forth by Matthew, a business educator: 'If LO [Liaison Officer] see themselves as coaches, this is where the value really come (...) when you spend time one-on-one with the student to coach

them through the process.' This is further reinforced by expectations for educators to be empathetic and compassionate mentors towards students:

> 'For me, compassion is important, I put myself in their shoes and empathise. (…) I don't really treat them like students and teachers; it's really more about relationship that you have with them. That they would always look forward to talking to you, so I always keep myself open-minded in everything. And then keep my doors open also.' – Kelly, Business educator

The situation about a broader role for the educator in such programmes, is not something to be taken for granted or with expectations that others will know, understand and be supportive of that broad role. Yet, it is through the kind of engagements described above that the professional capacities to engage, negotiate and achieve greater shared understanding amongst the educators, workplace supervisors and parents is only likely to arise through the educators' fulsome engagement in these broader roles, and likely, some success with them. It follows then that beyond understandings, these educators will need to learn and practice a different set of strategies than when they are positioned as primarily classroom teachers.

Strategies enacted by educators

The underlying reported beliefs of the programme were pivotal in shaping the strategies enacted by educators. These strategies were proposed to be concerning the four components of curriculum, assessment, pedagogy, and coordination with organisations. The frequency count of each strategy were as follows: curriculum (41 out of 41 lecturers), coordination with organisations (40 out of 41 lecturers), pedagogy (39 out of 41 lecturers), and assessment (8 out of 41 lecturers).

Curriculum strategies reported being enacted include an institutionalised pre-internship briefing and refresher workshop to align expectations and equip students with the necessary technical expertise for their job scope, respectively. To address the disparity in work-readiness among students, Education and Career Guidance (ECG) counsellors also organised workshops that cover resume writing and other work etiquette. The assessment enacted includes a range of deliverables such as reflection journal, internship videos, technical competency checklists, and evaluations from both educators and workplace supervisors. Pedagogical strategies enacted include career guidance based on educator's personal experience and rapport-building with students. The last component highlights coordination work with organisations through training and briefing for workplace supervisors to align expectations.

What is novel in the enactment of strategies is in the interplay of different components. For instance, Mr. Chew, a business educator, describes how he utilises students' reflection to provide timely feedback for the student:

> 'It's not compulsory, but I will read their reflection immediately and give them feedback. I think as a mentor, it's just my due diligence that when I received a reflection, I'm supposed to read it and at least comment on it, rather than park it until the end of their journey.'

In his recount, the belief of educators functioning as mentor is surfaced. This belief foregrounds the pedagogical practice of providing timely feedback that is pertinent to the situation that students are facing at their workplace, hence personalising student's learning to their circumstances. Moreover, the use of reflection journals as an informal assessment tool encourages students to take ownership of their learning. As detailed by Jason, a business educator, students engage in reflective writing on: 'their own learning, how they are actually contributing to the organisation, how well they are settling in, and the areas for development', which inadvertently alleviates student's resistance to share workplace problems with lecturers as they structure their experiences as an ongoing learning journey rather than an outcome of their work performance. Yet, within this strategy is also a place for educators' own professional development. By proxying the students to reflect and develop their own strategies, tertiary educators are likely to negotiate their roles and develop specific capacities associated with engaging with workplaces, negotiating with parents, and monitoring students' well-being and individualised learning experiences.

Another example describes the interplay of curriculum and coordination with organisations based on the technical competency form to ensure the quality of placement. The technical competency form is a set of formalised checklists, developed by the school, that lists a range of activities for students to engage in at the workplace. These activities are structured based on their specialisation. For instance, marketing interns can expect activities such as planning and assisting in marketing campaigns. As described by Tammy, a business educator:

> 'The supervisor is supposed to fill in the technical competency form (…) ensure that the intern achieves a minimum of seven technical competencies so that the students are engaged in meaningful work throughout the 22 weeks. (…) We also make it flexible; the advice to the supervisor is if you find that the intern is able to manage it, then you should try to move him or her to do more value-added task.'

The account above also depicts an interplay of curriculum and coordination with supervisors in creating opportunities to further expose students to other meaningful tasks that may not be included within the standardised competencies checklist. This is further enriched by educators' pedagogical practice during site visits to evaluate tasks given to students. As shared by Raymond, an applied science educator:

> 'I actually get them to bring me on a tour (…) I sit down with them, when they do the insect sorting, I also do the insect sorting. I just want to experience what they do so that it helps me better evaluate whether the companies are giving them meaningful tasks to do.'

It thus suggests that these activities have a reciprocal potential for both the students' and educators' development and warrants a deep dive into how professional development can be achieve through practice.

Professional development of educators

In enacting strategies that addresses the challenges encountered when delivering the intended curriculum, educators had the opportunity to critically appraise their existing practices and capacities. Through this process, educators were observed to engage in professional development in the two aspects of technical industry knowledge and pedagogical expertise. Professional learning on technical knowledge were reportedly found to occur through educator's interactions with students and workplace supervisors:

> 'As a mentor or as an LO, when you are partnered with certain companies, you learn certain new processes, new technologies that they are embarking, or any protocols that the students are doing (…) so kind of helping you up-skill your knowledge, even though you are not in the industry anymore.' – May, Business educator

These interactions present itself at an opportune time as highlighted by Lionel, a supply chain educator, who has been working as a lecturer for 12 years: 'The trend is changing too rapidly due to technology disruption' yet 'I feel that I know what is going on in the industry, something to keep me refreshed.'

The professional learning gained by educators was found to strengthen their pedagogic practices as educators reflect on their existing practices and sought to translate their learning back into the curriculum by updating the syllabus or creating new courses to fill in the gaps observed:

> 'And it's like a self-discovery journey for me as a teacher also. (…) in our conversations, it reflects back on my teaching style, and also whether what I do in class is helpful for them.' – Rachel, Business educator

> 'I feel that the LO role is a doorway for us to have a sensing of what's going on in the industry. (…) In fact, one of the CET course that I came up with, it's because of me being an LO with a PI and they said that "This one is very lacking here, do you think there's something we could do to build up this skillset?" (…) So, we end up having a CET programme with the PI coming on board as one of the trainers.' – Linus, Applied Science educator

So, in these ways, there is range of practicalities and possibilities associated with these educators' professional development arising through their everyday practice of advising, supporting and guiding students during these work placements. Whilst these are of a different order than attending taught courses and workshops, they offer potential that can be perhaps only secured through their engagement in the kinds of activities that comprise their engagements with students, parents and workplaces.

Discussion

Challenges when implementing the intended curriculum

The investigation examined the pedagogical constructs employed by polytechnic educators in the context of work-integrated education. Findings from this study reveals four challenges encountered by educators as they implement and deliver the intended curriculum. The most salient challenge reported by 76% of the educators was the management of student engagement due to disparity among student's work-readiness and student's reluctance to share workplace challenges. As educators are situated within school compound with limited physical presence at the workplace organisation, it is therefore unsurprising that few educators (27%) reported ambiguity in establishing a clear demarcation of their responsibilities at the workplace. Since educators have limited purview over the workplace, they are often reliant on student's sharing and supervisors' inputs to get a sensing of what is happening at the workplace. However, this reliance further complicates the issue of student management as students may be hesitant to share workplace challenges with their liaison officers out of worry that it would affect their performance grading. Consequently, educators may lack cognisance to effectively identify and fulfil their responsibilities when their students are at the workplace. Additionally, educators (39%) also reported challenge in mediating expectations between various stakeholders that extends to student's parents as well. Finally, ensuring the quality of placements that aligns with learning plans set forth for their students was a challenge reported by 20% of the educators.

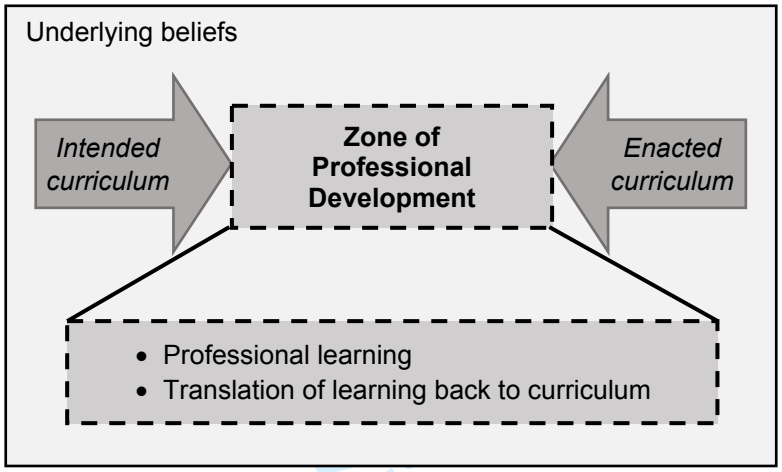
In addressing these challenges, educators were found to enact strategies that best aligns with their beliefs regarding the purpose of work-integrated programmes. As suggested by Opfer et al., (2011), the beliefs that educators hold to be true are significant for their practice especially when these beliefs are considered valuable for both themselves and their students. These beliefs then become central to their own teaching and practice. As reflected in our findings, educators perceived the programme as a means for students to take ownership of their own learning while educators themselves functioned as mentors for their students. Therefore, they enacted strategies such as commenting on reflection journals to prompt further thinking and encouraging students to research on solutions first before consulting lecturers.

Zone of professional development

While educators are equipped with a wealth of experiences, technological advancements and evolving world of work can potentially outdate educators' current academic domain knowledge. Lending weight to this impending phenomenon, a recent study in Singapore found that more than half of the adult educators studied could be at risk of falling behind in their occupational and pedagogical competencies in the long run (Chen & Murphy, 2023). Considering our findings above, in light of the zone of potential development, educators tapped on their existing knowledge pedagogy gained from past work experiences and initial educators training. Educators then engage in continuous professional development based on their own efforts and curiosity, especially in areas where they are teaching in, to stay updated with the industry. Such personal efforts are found to useful for shaping the scope of learning that arises (Billett, 2018). However, as elucidated by educators' beliefs and enactment of pedagogical strategies explicated in the section of findings above, their learnings on latest industry trends are also afforded through hearing from students as they share about their work. This aligns with our understanding that learning indeed arises through social interactions is the hallmark within the zone of proximal development (Boateng, et al., 2022). These social interactions hence serve as pivotal points for educators to engage in professional development (Ash and Levitt, 2003) as they are afforded through exposure to opportunities for developing both technical industry expertise and pedagogical expertise of managing students, albeit remotely at times.

Similarly, our study also found that formative assessments such as reflection journals are a source of information for educators to better understand student's thinking and acting, and establishing the most productive pedagogical strategy that would in turn support their students for their workplace challenges. It is also worthwhile nothing that such interactions are not limited between educators and their students. Opportunities for professional development are also potentially to be realised through interactions with alumni, industry partners, colleagues, and counterparts from other institutions. Henceforth, we propose that a zone of professional development arises as educators negotiate through the challenges and contradictions of the intended and the enacted curriculum (Figure 1). Within this zone of professional development lies both the potential development through individual efforts and the proximal development through social interactions.

Figure 1. Zone of Professional Development



The outcome of this zone of professional development is manifested within the experienced curriculum where learners come to experience, construe, and learn as a result of its enactment. In our findings, educators reported actions such as reviewing of lesson plans and updating of syllabus based on students' sharing on industry trends or workplace supervisors' feedback on gaps within the existing curriculum. While effortful, educators have also shared how they collaborated with workplace supervisors to develop new courses that addresses the skills gaps observed among students. Other than improving curriculum through constructive alignment, educators also reported benefits such as expanding and sourcing new industry placement for their students and opportunities to engage in consultancy projects for educators themselves.

While there is considerable research on the professional development of educators, recommendations for effective methods for professional development remain inconsistent. Furthermore, what works for one institution may not apply to another due to cultural differences. Specifically, educators in work-integrated education would require additional professional competencies beyond traditional classroom teaching to include stakeholder management with industry partners, finding suitable placements and assessing student's learning outcomes (Köpsén & Andersson, 2018). This corroborates existing literature on the complex and multifaceted nature of continuing professional development policies and practices, and how each model serves as a means towards different purposes (Kennedy, 2014). It is, therefore, imperative to consider the extra commitment required of these educators to engage in professional development activities when recommending strategies for professional development (Ferns & Campbell, 2014). It is also timely to identify alternative models of professional development that caters to the needs of educators, signalling the shift in form and focus of professional development to a broader, unstructured basis that accommodates to individualised needs (Loy, 2024). As Adu & Okeke (2014) suggest, addressing these barriers to engage in professional can lead to more active participation of educators in continuing professional development initiatives.

Given the challenges in identifying effective models of professional development, the concept of the zone of professional development highlights the potential for a grounded, practice-based approach

towards CPD practices that extends beyond workshops, or refresher courses on teaching competencies. As educators encounter challenges and resolve them, they inevitably encounter new set of challenges. In this dialectical process, strategies for each challenge can emerge through successive adaptations (Ash and Levitt, 2003). Our work emphasizes the importance of continuous development in professional learning, focusing on individual effort and social interactions. As Shabani (2012) suggests, "to enhance ZPD progression, teachers need to continually define new goals or illusionary zone throughout their teaching life" (p.110), which is crucial given the rapid evolution of industry and technology.

The zone of professional development also captures the potential role of students and others such as workplace supervisors and colleagues as potential sources of knowledge (Köpsén & Andersson, 2018). Margolis et al. (2017) also highlights the nuanced and complementary approach of teachers learning from physical presence of their students. Yet, while student presence can create more synergy for educators to engage in continuous development, it also introduces unpredictable scenarios. For instance, students who are quiet or uninterested in their job scope may be less inclined to share about their work with their lecturers and thus, limit the opportunities for educators' professional development. Yet, this could present as an opportunity for educators to improve their pedagogical expertise.

Conclusion

Despite the challenges encountered by educators during the implementation of work-integrated learning programmes such as internship and work-study programmes, educators have adapted by aligning their strategies with their educational beliefs. This approach, while fostering learning, sometimes required negotiation with the students between the intended and the enacted curriculum. The tensions consequently served as a catalyst for in-situ professional development among educators. Critically, our work reveals that the challenges inherent in the implementation of work-integrated education are opportunities for professional growth, and embracing these challenges as part of the work of educators can lead to effective pedagogical strategies for enriching the educational experience in polytechnics.

The study findings are limited to the context of work-integrated education provisions in Singapore, and although the sample is varied in terms of faculty and length of experience, further testing will be required to examine the level of corroboration with similar programmes in different contexts. Another aspect to consider is that for this investigation, the interview sample were drawn from three different institutions, and across different faculty and positions which provided varied perspectives and institutional practices. However, it is plausible that some educators may hold reservations when expressing dissatisfaction about their institutions, potentially leading to a more positive tone. While we are proposing for a grounded approach to professional development, future research should also consider organisational conditions such as leadership, institution structure and culture which are paramount in how educators come to understand and engage in professional learning (Veen et al., 2012).

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Supplementary Materials

Supplementary Table 1. Summary of interview questions

a) Experience	
• How long have you been a LO and how were you assigned this role? • What challenges did you encounter as a LO, and how did you respond?	To provide the opportunity to share basic personal information and relationship between mentor and mentee
b) Support and educational guidance for interns	
• What support and guidance are provided for the students before, during, and after their internships? • What are some learning outcomes for the student?	To probe on current practices
c) Enhancing the learning through internship/WSP	
• What more should be done to support and guide students prior, during and after their internship? • How does the workplace provide training and opportunities for your interns?	To probe for areas for further enhancement of programme
d) Expectations	
• What are your expectations of yourself as a LO? • What expectations do you have of your student interns, workplace supervisors of your interns? • What do you find most satisfying and unsatisfactory about your role as a mentor?	To probe more on why they enjoy/ not enjoy being a mentor and to discuss current role
e) Reflections	
• What are some takeaways you have gained from your mentorship journey? • What have you learnt from your student interns?	To explore the impact of mentoring

Supplementary Table 2. Coding frame

Nodes	Sub-themes	Themes
• Capstone project • Alignment with workplace practices • Reflection journal • Career counselling workshops	Curriculum	Challenges Managing expectation Beliefs
• Communicating with students • Site visits	Pedagogy (lecturer's strategies and support)	Managing expectations Professional development
• Pre-internship briefing • Post-internship briefing • Class discussion on school days	Peer engagement	Managing expectations Beliefs
• Management of hiring portals • Crafting of job training blueprint	Coordination with workplace	Challenges
• Updating syllabus • Keeping oneself up to date via visits to workplace	On the job learning experienced by educators	Professional development