Micro-Credentials in HEIs for Teacher Professional Development: Suggestions for the Philippines and Japan

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1. Introduction

The quality of education students enjoy is largely contingent on the quality of teachers (Nye, Konstantopoulos, & Hedges, 2004). Teachers, then, represent the most important variable in ensuring the quality of education in schools. It is not an exaggeration to claim that teachers are the primary factor in warranting student achievement (Carey, 2004; Smith & Gillespie, 2007). In 2010, the then Secretary of State for Education in the UK, Michael Gove asserted that "the single most important thing in education is improving the quality of the educational experience for each child by investing in higher-quality teaching. There is simply no way of generating educational improvement more effectively than by having the best qualified, most highly motivated and most talented teachers in the classroom" (quoted in Burstow, 2018). It is, therefore, imperative that we provide teachers with robust continuing learning opportunities (Feiman-Nemser, 2001).

To prepare such an opportunity for every teacher, the present study proposes a teacher-initiated, flexible, and personalized model for teacher continuing professional development (TPD) using an emerging micro-credentialing framework. Micro-credentials are short learning offerings that are focused on providing specific skills to learners. The definition set by the European Commission's Higher Education Consultation Group (2020) is one that is most quoted in published literature: "a proof of the learning outcomes that a learner has acquired following a short learning experience. These learning outcomes have been assessed against transparent standards"(p. 10). In the following sections, after discussing why our society needs the new model for TPD by referring to international trends in teacher education, the new model is introduced based on the TPD system in the Philippines. Finally, we will examine the relevance of the model to the TPD situation in Japan.

2. Teacher Professional Development and Learning

The continuing professional development (CPD) of teachers has been the subject of discussion and political intervention since the middle of the twentieth century (Amponsah, Ampadu, & Thomas, 2021). The conversation has not died down, as evident in the massive proliferation of literature that deal with unique concerns relative to fields and disciplines (Cirocki & Farrell, 2019; Daniel & Pray, 2017; Gün, Ertürk, & Kaynardağ, 2014; Schachter, Gerder, & Hatton-Bowers, 2019), policy issues (Burstow, 2003, pp. 13–15), and experimentation and application of various models (Borko, Jacobs, & Koeliner, 2010; Kennedy, 2005; Desimone, 2009; Imants & der Wal, 2020). As Guskey (2000) notes: "Never before in the history of education has greater importance been attached to the professional development of educators" (p. 3). As a related topic to lifelong learning, discussions have evolved to include many concepts related to curriculum, instruction, and career advancement (Eroglu & Kaya, 2021). Today, given rapid information and technology advancements, the focus is not only on what teachers need to learn, but also on how to design, develop, and implement teacher professional learning (White, 2021, p. 697).

In addition to robust teacher preparation, continuing teacher professional development is widely regarded as the most practical and effective means of enhancing education quality (Darling-Hammond, 2005; Darling-Hammond, Hyler, & Gardner, 2017). Teachers' professional success is hinged upon continuing learning

(Hargreaves & Fullan, 2012; Cirocki & Farrell, 2019). Unfortunately, the definitions of professional development are as numerous as the authors writing on the topic (Gordon, 2004, p. 5; Villegas-Reimers, 2003, p. 11; Romjin & Leseman, 2021, p. 2; Freeman, 2024, pp. 10–12). For Sparks and Loucks-Horsley (1989), professional development refers to activities that enhance teachers' job-related knowledge, skills, or attitudes. Oliva and Pawlas (1997) and Earley and Bubb (2004) define it as a structured series of activities designed to enhance the personal and professional development of teachers (Sheridan et al., 2009; Guskey, 2002). This paper adheres to the more comprehensive definition of Day (1999):

> *Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school, which contribute through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purposes of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues throughout each phase of their teaching lives (p. 4).*

The underlying consensus about TPD is that because of rapid socio-political and technological changes, the professional knowledge and skills that teachers acquired in their pre-service training gradually become inadequate (Gün, Ertürk, & Kaynardağ, 2014; Tang & Choi, 2009). An undergraduate degree merely imparts the knowledge and abilities necessary to embark on their teaching journey. "Teachers and leaders need to develop their professional thinking and practice continuously throughout their careers" (Cambridge Professional Development Qualifications, p. 3). Teachers need to enhance and refine their skills to meet the rigorous academic standards and expectations set for them and to update with existing knowledge in their field (Reese, 2010; Scales et al., 2011). Huberman (1995) argues that teachers need to be engaged in conscious professional development within the first six years of their career (Steward & Jansky, 2022; Du & Wang, 2017; Stewart et al., 2019).

According to Sachs (2016), teacher professional learning must lead to "the development of competent practitioners who are able to deliver, assess and improve student learning" (p. 423). Professional development (PD) is also crucial in fulfilling their other responsibilities as teachers (Goh & Wong, 2014). Teachers need to improve in general pedagogical knowledge, subject-matter knowledge, pedagogical content knowledge, knowledge of student context, evaluation and assessment of learning, clinical training, knowledge of techniques and tools to create and sustain a learning environment, multi-cultural knowledge and skills, socio-political and cultural sensitivity, and technological proficiency (Villegas-Reimers, 2003, pp. 39–41). The goal is to develop an "expert teacher" who possesses content and pedagogical expertise, automaticity, and professional responsibility (Villegas-Reimers, 2003, pp. 41–42).

Change is expected as a consequence of TPD. Guskey's (2003) definition of TPD epitomizes this: "systematic efforts to bring about change in the classroom practices of teachers, in their attitudes and beliefs, and in the learning outcomes of students" (p. 381). For Bergmark (2023), teachers must change in the three major areas of teaching, research, and collaboration. Villegas-Reimers (2003) asserts that PD impacts teachers' beliefs and behaviors (p. 20). Change is a keyword because TPD has traditionally been operating under a top-down system (Bergmark, 2023, p. 211; Burstow, 2018, p. 4). In the TPD ecosystem, the initiative and provider are typically the employer-school and the government with the agenda to introduce a new educational program, policy, or procedure, revise existing practices, or implement intervention over a perceived need (Burstow, 2003, pp. 34–41).

3. Effective TPD Programs

The effectivity of TPD is contingent on many factors. Buysse et al. (2009) assert three key merit consideration: learners (who), content (what), and delivery mode (how). Schachter, Gerder, & Hatton-Bowers (2019) narrow Buysse et al.'s list to merely two: content and format. Bergmark (2023) highlights the significant influence of human resources, scientific resources, and organizational resources. Despite numerous overlapping, through sometimes contradictory proposals, there is an unmistakable consensus on what constitutes effective PD (Little, 1993; Hawley, & Valli, 1998; Garet et al., 2001; Harwell, 2003; Borko, Jacobs, & Koellner, 2010; Schachter, Gerder, & Hatton-Bowers, 2019; Bergmark, 2023; Sims

& Fletcher-Wood, 2020; Soine & Lumpe, 2014; Karlberg & Bezzina, 2022), although there is a concern about the lack of empirical research to validate the list (Wayne et al,. 2008; Sims & Fletcher-Wood, 2021; Popova et al., 2021). The list, which represents a synthesis of proposals from various published studies, shall be presented here, because they will form the foundation of our proposal to use micro-credentials (MCs) offered by higher education institutions (HEIs) in personalized TPD.

First, teachers need to claim ownership of PD. One of the problems of a top-down TPD approach is that teachers do not have control about joining TPD. When employer-schools or the government function both as initiator and provider, participants may be limited to a selected minority. As a result, TPD receives limited sense of ownership among teachers. There is consensus in literature that voluntary PD is more effective than obligatory PD (Cordingley et al., 2015; Timperley et al., 2007; Walter & Briggs, 2012). Autonomous motivation produces better results than controlled motivation (Zhang, Admiral, & Saab, 2021; Gagne et al., 2010). Teachers need to take ownership of their own learning (Soine & Lumpe, 2014). Internal motivations such as the desire to succeed in their career and effectively increase student learning enable teachers to pursue PD more wholeheartedly, in contrast to those PD opportunities imposed by their superiors (Smith & Gillespie, 2007; Noonan, 2018). Teachers are also disenchanted if the PD is misaligned with their objectives and needs (Lieber et al., 2010; Schachter, Gerder, & Hatton-Bowers, 2019).

Second, PDs need to be embedded and practice-based. Borko, Jacobs, and Koellner (2010) assert that effective PD must be situated in practice. Instead of uprooting teachers from their geographical situatedness, PDs must be embedded in their teaching practice, where there are opportunities to apply their acquired knowledge and receive support in honing new skills (Schachter, Gerder, & Hatton-Bowers, 2019; Cordingley et al., 2015; Desimone, 2009; Timperley et al., 2007; Walter & Briggs, 2012; Sims & Fletcher-Wood, 2020). By aligning PD with the actual environments in which teachers operate, the relevance and effectiveness of the learning experience are maximized, ultimately contributing to improved teaching outcomes and student success (Admiral et al., 2021). This embedded and contextual approach facilitates an immersion-like component that allows teachers to test their new acquired learning immediately and refine their skills in the process of experimentation and evaluation.

Third, PDs need to be content-specific. While there might be differences among novice and long-time teachers in what contents are crucial for their PD (Karlbert & Bezzina, 2022), there is general agreement that PDs are more effective when they involve learning in subject knowledge (Cordingley et al., 2015; Desimone, 2009; Dunst et al., 2015; Sims & Fletcher-Wood, 2020). Top-down PDs, with their emphasis on programs, policies, and procedures are perceived have too generic content. A paradigm shift concerning teacher identity is crucial here. Vermunt et al. (2019) note that the change is from perceiving teachers as "a subject expert, whose main responsibility is to transfer subject knowledge to the students" to "a learning process expert, whose main responsibility is to foster active, self-regulated and collaborative learning in the students" (p. 143). Because even theories and models evolve through time and nuances constantly emerge through perspective-rooted hermeneutics, teachers need to update their content knowledge.

Fourth, PDs need to be sustained over time. Top-down TPDs tends to be prescriptive and rigid one-size-fits-all trainings that invite an outsider-expert to address perceived shortcomings (Chan, 2016; Farrell, 2019). To decrease cost, the typical approach is to then organize a one-time in-service event where selected teachers are gathered to receive training relative to the intervention or change the initiators desire. This approach has generated sustained critique (Petrie & McGee, 2012; McGrady, 2017; Schachter, Gerder, & Hatton-Bowers, 2019). The consensus is that PDs are more effective "when given in larger doses" (Yoon et al., 2007) and when the learning dosage is spread over time, enabling teachers to digest, experiment, and practice their learning in their own classrooms (Cordingley et al., 2015; Desimone, 2009; Dunst et al., 2015; Timperley et al., 2007; Walter & Briggs, 2012; Schachter, Gerder, & Hatton-Bowers, 2019; Borko, Jacobs, & Koellner, 2010). The duration and intensity—number of contact hours and length of the module—are subject to the prerogative of the provider (Romjin, Slot, & Leseman, 2021; Popova et al., 2021) and are dependent on the intended learning outcomes.

Fifth, teachers need to engage in critical reflection. While one-time training events expect learning to have been completed in a day, sustained PDs provide teachers with sufficient time to assimilate new knowledge. Consensus in TPD literature affirms the importance of reflection in the learning process (Mertler, 2019; Romjin, Slot, & Leseman, 2021; Steward & Jansky, 2022). Reflection encompasses

"the intellectual and affective activities in which teachers explore their experiences in order to create new understandings and appreciation" (Boud, Keogh, & Walker, 2013). Freeman (2024) calls it "sense-making." Grounded in the learning outcomes, learning teachers might engage in team-based reflection (Leeman & Van Koeven, 2019), critical reflection (Behizadeh, Thomas, & Cross, 2019; Vesely et al., 2017), practice-based reflection (Bradshaw et al., 2018; Daniel & Pray, 2017), or interventions reflection (Jones & Brownie, 2015). However, scholars have cautioned that not all teachers automatically possess reflective skills (Romjin, Slot, & Leseman, 2021) and can be challenging given teachers' busy work environment (Mulryan-Kyne, 2021).

Sixth, teachers need to receive feedback and coaching. The lengthy duration of the PD, along with embedded and practice-based approach, afford room for receiving feedback from learning facilitators, something which is not possible in top-down one-shot training events. There is consensus in the necessity of PD program formats to include "frequent and recurrent opportunities to receive individualized feedback" both from facilitators and colleagues (Schachter, Gerder, & Hatton-Bowers, 2019, p. 11; Wayne et al., 2008). Two studies have identified that the combination of coursework and individualized coaching significantly improve teacher practice (Landry et al., 2009; Neuman & Cunningham, 2009). The opportunity to observe and be observed in classroom performance is also proposed (Soine & Lumpe, 2014; Admiraal et al., 2021; Borko, Jacobs, & Koellner, 2010; Exley, 2013). "Educative mentoring," Feiman-Nemser (2001) calls it, incorporates "professional accompaniment" that ensures that teachers are guided along the way in their learning experience. However, caution must be said that feedback and coaching must be pursued carefully, especially in the Asian context where people are less direct and confrontational. For instance, a survey among teachers in Ghana revealed that mentoring is considered as one of the least important forms of PD (Amponsah, Ampadu, & Thomas, 2021).

Seventh, there needs to be a culture of learning in schools. There is also agreement in literature that effective PD takes place in the context of a culture of learning, where positive and supportive relationships serve to encourage teachers in pursuing learning together (Cordingley et al., 2015; Desimone, 2009; Thompson & Goe, 2009; Dunst et al., 2015; Timperley et al., 2007; Walter& Briggs, 2012). A "community of practice" (Sims & Fletcher-Wood, 2020) encourages conversations and collaboration among teachers (Schachter, Gerder, & Hatton-Bowers, 2019). In fact, in a study conducted by Cirocki & Farrell (2019), findings suggest that the most impactful PD activity is participation in informal dialogues with colleagues. Teachers can engage in collaborative examination of teaching and learning through various methods. These include Teacher Design teams, which are professional learning communities that work together to design and redesign their teaching practices (Admiraal et al., 2021). Data Teams are another type of professional learning community that use data to analyze and enhance the quality of education (Hubers et al., 2016). Lesson Study involves designing and implementing an innovative lesson series, and then observing, evaluating, reflecting, and redesigning the series in a continuous cycle (Fernandez & Yoshida, 2004; Bocala, 2015). Collaborative research is also proposed by others (Kennedy, 2005; Mertler, 2019; Trauth-Nare & Buck, 2011; Bergmark, 2023). What is crucial in all these is that communities of practice provide the opportunity for people to interact with each other for the sake of learning (Carcia-Carion et al., 2020; Bergmark, 2023, p. 212).

Eighth, there needs to be strong institutional support. Although it is possible for a culture of learning to emerge as a result of the collective initiative of teachers, it cannot flourish without institutional support. One of the key complaints of teachers is that schools do not provide sufficient time to engage in professional development (Tooley & Hood, 2021b; Eroglu & Kaya, 2021; White, 2021). Other issues include lack of incentives for participation and lack of employer support in shouldering participation cost (OECD, 2014). The administrative leadership must serve as "the facilitator and champion of the learning community" (Schachter, Gerder, & Hatton-Bowers, 2019; Eroglu & Kaya, 2021). For Sione and Lumpe (2014) and Guskey (2002), the responsibilities of the institution and the administration is two-fold in the continuing professional development of teachers: in the form of support and pressure. The attitude of the principal, coherence between professional development and institutional mission, collegiality within the school, and the working conditions of teachers are important system factors in TPD (Smith & Gillespie, 2007; Admiraal et al., 2021).

4. Personalized Teacher Professional Development

First, as already insinuated in the paper, several of the characteristics of effective TPD enumerated above may be challenging for top-down approaches to achieve. Following Burstow's (2018) model, there are three important considerations in TPD: initiator, provider, and beneficiary. In the Philippine setting, initiative typically either comes from the teachers, the school or institution, or government. Initiatives from the latter two are considered top-down. This paper advocates a bottom-up teacher initiative, because the learner must determine what she needs in terms of continuing learning. As the teaching agent, the teacher knows her strengths and weaknesses best. Her PD choices are dependent on her "unique learning affinity" and perceived personal and professional development needs (Noonan, 2018).

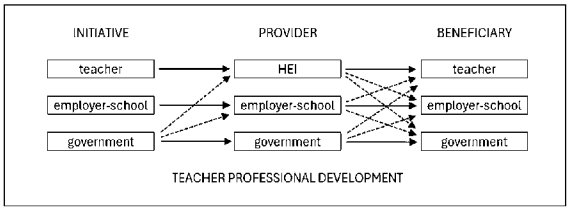

Figure 1: Initiator, provider, and beneficiary of TPD (revised from Burstow, 2018)

Second, there are three primary groups of TPD providers: (1) higher education institutions or private training groups, (2) employer-school, and (3) government. Typically, TPD initiatives from institutions and the government are also provided by themselves to ensure that their objectives are met. Teachers do not have a choice about this, but it must be noted that a "compliance-focused professional culture" causes dissatisfaction among teachers (Tooley & Hood, 2021b). When the initiative comes from the teacher, however, she would choose to undergo PD in a HEI. Here, teachers have prerogative in choosing what to learn and where to learn. Employer-school- and government-led PDs are sporadic and focused on a specific objective, which means that participating in them may only be possible in the one-time they are offered. This means an overall lack of PD opportunities for everyone (Eroglu & Kaya, 2021). HEIs, on the other hand, offer a numerous assortment of courses that teachers may choose from.

Third, PDs that are initiated and conducted by employer-schools will have the employer-school as the primary beneficiary; the same may be said for PDs initiated and provided by the government. It is assumed, however, that PDs initiated and provided by the employer-school and the government also benefit teachers by extension (represented by the dotted arrow). PD initiated by teachers, on the other hand, will have the learning teacher as the primary beneficiary; the employer-school and the nation benefit by extension.

5. MCs in Higher Education Institutions

The optimal scenario in TPD is a bottom-up approach, where because of the prevailing culture of learning at their schools, the teacher takes the initiative to pursue continuing learning with the objective of becoming a better person and professional (Bergmark, 2023). As indicated above, this cannot happen in employer-school or government-based PDs. Given that "teachers will be free to take on different roles as mentors, mediators and guides, facilitators, learning coordinators, assessors, and designers and compilers of learning tools, with their work occurring in multiple learning environments, extending beyond traditional classrooms and into new modes and mediums" (Scott, 2015), it is important that they have access to an array of PD opportunities that can help them fulfill any of these roles. Teachers must pursue PD where their topics of interest are offered when they need them, and they can choose from formal and informal avenues (Tarc, 2012) or through HEIs and private, third-party organizations. This paper focuses on the role of HEIs.

Given that personalized learning is one of the key education trends in the twenty-first century (Brown, et al., 2021, p. 236), the role of HEIs in TPD will continue to soar. The emphasis on teacher-led approaches and teacher autonomy also brought forward the focus on teacher agency (Imants & Van der Wal, 2020), in which teacher motivation and volition are considered indispensable components of meaningful education (Biesta, 2015). Teachers are active agents who shape their own engagement and future. Since engaging in TPD is equivalent to earning more employment currency, learners need to be treated as "highly individualized consumers" who are empowered to act in alignment with their economic interests to enhance their capital resources (Varadajan, Koh, & Daniel, 2023, p. 8). This is where HEIs are particularly helpful because they afford flexible, student-centered learning through offering MCs (Tooley & Hood, 2021). MCs are increasingly perceived as "an innovative approach to support self-directed

learning" (Bowen & Thomas, 2014; Farmer & West, 2017; Gish-Lieberman, Tawfik, & Gatewood, 2021). Historical studies note that the emergence of MCs and badges correspond with the necessity for flexible, self-regulated learning in an increasingly busy world (Besser & Newby, 2019; Cheng et al., 2018), especially among working adults (Hunt et al., 2020; Ahmat et al., 2021).

PD for teachers in the form of MCs was first offered by Digital Promise in 2015 in collaboration with BloomBoard in the U.S.A. (Tooley & Hood, 2021b). Policies were later generated in Europe, New Zealand, Australia, and the U.S.A. In higher education, the global hype over MCs started in 2020, during the pandemic (Wheelan & Moodie, 2021). It is considered as "the latest shiny new thing" in educational discourse (Brown & Nic-Giolla-Mhichil, 2022), with a significant proliferation of publications on the subject since 2021 (Brown, McGreal, & Peters, 2023). This means that MCs in the formal educational context is at an infancy stage (Ha et al., 2022; Maytin et al., 2023). Research on the subject is still limited (Selvaratnam & Sankey, 2021; Ahmat et al., 2021). Because MCs in higher education is new, the landscape is "messy and poorly defined, with many competing viewpoints" (Brown & Nic-Giolla-Mhichil, 2022). A wide-scale adoption of MCs is considered "unpredictable" for now (Pirkkalainen et al., 2023). The problem is further exacerbated by the lack of consensus on the definition of MCs (Hanfy, 2020; Olcott, 2022) and the many interchangeable terms for it (Brown & Nic-Giolla-Mhichil, 2022; Clements et al., 2020). Despite these challenges, more HEIs are establishing MCs initiatives (Resei et al., 2019), because they consider MC's strategic importance in increasing learning opportunities and educational flexibility (Bradley et al., 2018; Kiiskila, Hanfy, & Pirkkailainen, 2022; Pirkkalainen et al., 2023), expanding their enrollment (McGreal & Olcott, 2022; Varadarajan, Koh, & Daniel, 2023), and earning revenue (Brown, McGreal, & Peters, 2023). The increased work being done related to policy in many nations reveal the increased interest in offering MCs globally (Selvaratnam & Sankey, 2021). However, McGreal and Olcott (2022) caution HEIs about engaging in the MCs market. In a survey conducted in the U.S.A, Lang and Sharp (2023) found that public universities in urban settings with high-earning graduates are the ones likely to offer MCs.

Wheelahan and Moodie (2021) argue that MCs "are an extension of the discourse of employability skills," or the need for employees to reskill and upskill themselves in a rapidly changing workplace (Deloitte Insights, 2019; Olcott, 2022). HEIs are pressured to align their curriculum with industry needs and competency standards by offering courses and MCs that quickly equip workers with appropriate and required skills (Oliver, 2019; Desmarchelier & Cary, 2022). Brown, McGreal, and Peters (2023) thus see MCs as an opportunity for "a strategic reset" for HEIs (McGreal & Olcott, 2022; Olcott, 2022; Velvaratnam & Sankey, 2020), especially in rethinking the credentials continuum (McGreal & Olcott, 2022). While HEIs may have different motivations for entering the MCs market, it cannot be denied that MCs in HEIs "provide a real opportunity to challenge the status of traditional qualifications, democratize access to higher education, and deliver a more equitable and inclusive culture of lifelong learning" (Brown, McGreal, & Peters, 2023, p. 5). Although MCs represent "laissez-faire principles of individual choice, education as a personal commodity and the goal of creating an unrestricted global higher education market" (Brown, McGreal, & Peters, 2023, p. 5), it harnesses the potential for inclusive, flexible, and personalized professional development which busy, working adults such as teachers, desperately need (Ahmat et al., 2021).

6. TPD Pathway Options

As stated by the European Higher Education Area (EHEA), MCs empower HEIs to customize educational offerings to meet the diverse needs of various learner group (Bideau & Kearns, 2022). HEIs can target self-regulated and active learners who desire personalized learning by organizing MCs into "personalized paths where earners select their preferred option for each requirement on the path" (Zhang & West, 2020). HEIs are in the best position to offer TPD through MCs to teachers who take ownership of their own TPD journey. One of the buzzwords both in PD and MCs is "responsibilization," which means that learners are responsible for their own educational experience, including looking for opportunities and developing their professional profile (Reynoldson, 2023). Instead of being prescribed by higher authorities about what learning to pursue, teachers explore the educational market to choose their preferred learning products to enhance their professional profile. Teachers in PD may thus be considered as "shoppers of learning" (Reynoldson, 2023) who will choose products and services that are compatible with their needs and circumstances. Progressive conversations on student-centered learning,

self-regulated learning, self-efficacy, self-automation, self-realization, and personalization legitimized MCs as the best educational alternative (Wills & Xie, 2016; Wheelahan & Moodie, 2021). This means that underlying notions of democracy and negotiation between learners and providers need to be considered by TPD providers such as HEIs (Exley & Ovenden-Hope, 2013).

Given that teachers are expected to perform various responsibilities beyond teaching (White, 2021, p. 698), they require competencies that pre-service education have been unable to provide. In addition, socio-political and technological advances create new needs related to the teaching profession, so explorations have to be made concerning the needs of teachers facing new professional challenges (Garcia-Carion et al., 2020). To address this, and recognizing the diversity of professional teacher practice, HEIs may create professional pathways designed to equip teachers with relevant knowledge and skills (Exley & Ovenden-Hope, 2013). MCs are perfect because they "can support the diversification and tailoring of learning opportunities to support individual learning pathways" and "be used to widen access to education and training to a more diverse range of learners" (Bideau & Kearns, 2022). Figure 2 presents an example of professional pathways for teachers. HEIs are in the best position to offer MCs because of the human, infrastructural, and systemic resources they already possess. Moreover, HEIs have research capabilities to identify which area in TPD needs more attention (Amponsah, Ampadu, & Thomas, 2021).

In Figure 2, three major pathways are available: (1) instruction, (2) administration, and (3) research. The list may go on, because new educational pathways fit for credential purposes may be created in different contexts (Brown et al., 2021). Teachers may choose which to prioritize in their PD. As "shoppers of learning," they may pick-and-choose MC courses according to their needs, which may include several from instruction and a few from administration. Given the increasing demands placed on research teachers today, teachers may also need to enroll in research-related MCs (Bergmark, 2023). The danger of taking MC courses from different pathways is that learners may end up taking seemingly fragmented content (Javorcik & Polasek, 2019), although teachers fulfilling multifarious responsibilities may have no choice but to pursue this route. For those who have identified their specific career pathway, the TPD pathway is crucial for them to focus in a specific area. For instance, aspiring school administrators may focus on the administration pathway in their TPD.

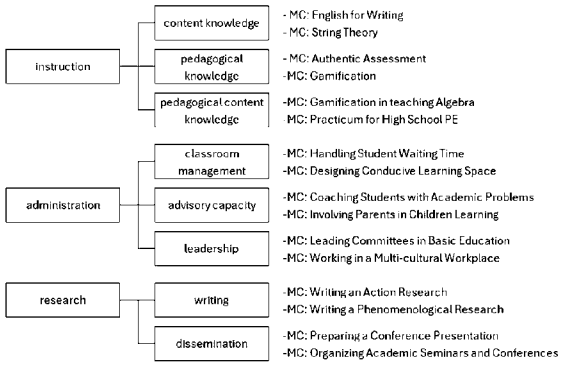

Figure 2: Sample of PD Pathways for Teachers

A "mentored pathway" (Exley & Ovenden-Hope, 2013) may also be used. From the school's side, administrators may identify teachers to be equipped as experts in a specific area and guide them towards attaining the competencies to fulfill these roles. On the side of the teachers, the use of personalized Professional Growth Plans (PGPs) to set improvement goals and ways to meet them will be helpful (Tooley & Hood, 2021a). This individualized PD approach will allow administrators and teachers alike to evaluate their progress using their own self-crafted rubric. On the side of HEIs offering the MCs, PGPs can be used as the basis for program chairs to give academic advice and guidance to teachers on the specific pathway they wish to pursue.

7. Granular Skill-based Learning

MCs enable micro-learning and focus on granular competencies (Berry, 2017). In contrast to one-time training events organized by employer-schools which cover general topics, MCs pursue smaller bites of learning meant to inculcate specific competencies. While general topics may be somewhat helpful, teachers would better spend what little time they have in learning specific skills they urgently need. MCs deal with small units, which allows learners to focus on one thing at a time (Park, 2018) and achieve mastery of a specific content or skill (Zhang & West, 2020; Maytin et al., 2023). The advantages of micro-learning include increased motivation, higher participation in collaborative learning, better concept retention, and enhanced learning ability and performance (Leong et al., 2021). HEIs can design their MC offerings by unbundling 3-unit courses to "grain sized" MCs, and

learners can choose which granular learning they would pursue (Tooley & Hood, 2021b). The responsibility of ensuring that they invest in the right combination of granular learnings to achieve their desired professional development rests on learners, while the responsibility of offering good MC courses to choose from rests on the HEI (Reynoldson, 2023).

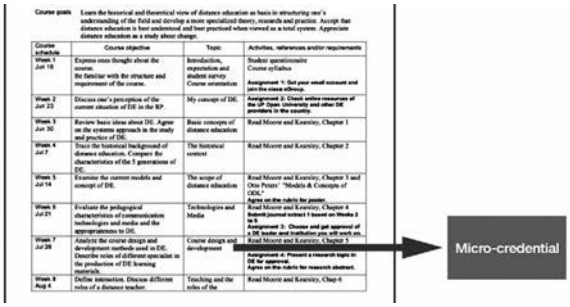

Figure 3: Sample of unbundling courses to create MCs

HEIs are strategically positioned to offer grain-sized competencies to teachers in PD because they already have program courses, which can be easily broken to smaller learning bites. Figure 3 illustrates this. A3-unit course may be divided into several MCs, offered in several weeks, with specific knowledge and skills which learners will attain upon completion. As Reynoldson (2023) says, "Where a traditional education comprises a range of teaching, assessment, study support, social, career-advisory and other pre-professional services, a 'micro' education may involve just one of these" (p. 959). For learners, granular learning can help them in profiling their skills, which will enable them to show their competencies in meeting employment requirements. MCs enable recognition and value of possessing specific competencies (Tooley & Hood, 2021a). Studies have shown that being able to display badges as evidence of competencies is greatly valued by micro-credential takers (Gish-Lieberman, Takfik, & Gatewood, 2021; Jones et al., 2018). In TPD, MCs will allow teachers to build a "portfolio of skills" that they can readily show as professional currency (Perla, Vinci, & Scarinci, 2023).

The drive towards more granular learning stems from the common clamor among industries over the incompetencies of university graduates in performing employment tasks expected of them. HEIs "bear the heaviest burden of responsibility for skills shortages" (Tran, 2018). Cote and White (2020) write:

> *First, traditional teaching and learning models have not adapted adequately to changing student demands and labour market needs. Higher education—particularly the university sector—has been confronted with a growing list of critiques to the still-dominant, campus-focused program models: long and relatively inflexible programs; inadequate recognition of prior learning; slow or limited innovation in pedagogy; insufficient student supports for career-readiness; weak alignment to labour market needs; and a limited commitment to online and digital-enabled learning (p. 8).*

Brown et al. (2021b) also write: "Frontloading skills and competences through our schools and universities is not sufficient to prepare active and well-educated citizens for the rapidly changing nature of work and actively participate in building a more sustainable future" (p. 2). Employees need to update their knowledge and skills to fill the gap between their formal education and the evolving needs of a fast-changing society and workplace environment (Bideau & Kearns, 2022). Bite-sized learning addresses this need in the shortest possible time, which is beneficial both for employers and employees (Gauthier, 2020). In the case of teachers, they will not need to invest plenty of time and finances in enrolling in broad courses or take a master's degree just to acquire a specific skill offered within the course (Mertler, 2019). In addition to quickly being able to show credentials to fulfill current responsibilities, MCs can also be used to show eligibility for advanced roles in higher positions (Tooley & Hood, 2021a).

8. Stackable, Credit-bearing MCs

The unbundling of higher education provides an effective alternative to traditional credentials (Ehlers 2018). One of the advantages of unbundling education is that MCs can be taken by learners as stand-alone credentials or as credit-bearing, stackable credentials. This is why HEIs are advantageously positioned because they can offer MCs alongside or within formal academic credentials. This is good news for TPD, because in contrast to merely receiving a certificate of attendance (as in one-time, in-service trainings), teachers can accumulate credits that can lead to earning an academic certificate, diploma, or degree from an HEI (Kato, Galan-Muros, & Weko, 2020). The shared assumption in literature is that MCs "can count towards a parent academic qualification"

(Wheelahan & Moodie, 2021), because they are formed through the disaggregation into smaller components of courses of degree programs (Fong & Janzow, 2017). While this procedure is feared to suffer from a disconnected atomization of education (Wheelahan & Moodie, 2021), it also benefits from its granular learning capacity. Negatively seen, MCs "are based on a behaviourist approach… in which qualifications can be disaggregated into components and unproblematically reassembled. MCs are premised on methodological individualism in which the sum is the total of the parts" (Wheelahan & Moodie, 2021, p. 223). From a positive perspective, on the other hand, MCs represent a dynamic shift in education that provides learners with targeted, flexible learning opportunities, personalized learning, and learner-centered "responsibilization" of learners' preferred professional development pathway.

MCs are "a stackable certification of assessed learning that is additional, alternate, complementary to, or a formal component of a formal qualification that emphasises verified learning outcomes" (Hanfy, 2020). HEIs would do well to focus on offering credit-bearing MCs that lead to a formal qualification, regardless of whether students pursue the formal qualification or not. For instance, Australian HEIs offering MCs prioritize credit-bearing MCs (White, 2021), especially postgraduate short courses (Selvaratnam & Sankey, 2020). Following Oliver's insights (2019), Australian HEIs design their MCs by ensuring level equivalency with the Australian Qualifications Framework and calculating learning hours that translate to number of formal credits (White, 2021). HEIs anywhere in the world would do well to follow the same. The unique contribution of HEIs, in contrast to PD programs or trainings offered by employer-school, governments, or private organizations, is that only HEIs have the unquestionable qualification to offer credit-bearing MCs. In the absence of globally recognized policies on awarding, converting, combining, and transferring credits (Olcott, 2022; McGreal & Olcott, 2022), MCs taken from non-HEIs may be subject to suspicions regarding rigor and quality, and HEIs will be uneasy awarding credits to them.

Rasmussen and Zanville (2021) propose "incremental credentialing," where learners obtain academic learning awards throughout their learning journey. Institutions may develop comprehensive pathways from MCs to macro-credentials that match the aspirations of learners (Varadajan, Koh, & Daniel, 2023). HEIs can create MC awarding pathways for their students to earn credit-bearing MCs that can turn to academic certificates, diplomas, and degrees. This can motivate students to continue enrolling in more MCs.

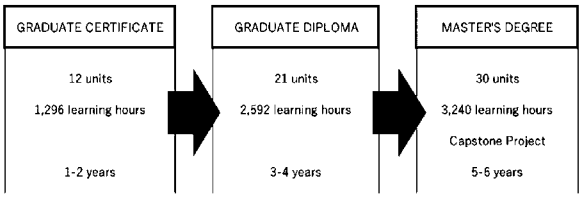

Figure 4: Sample of Incremental Credentialing

Figure 4 is an example of what incremental credentialing would look like in the Philippines. Following the stipulations of the Commission on Higher Education's (CHED) Memorandum Order 15, Series of 2019 on graduate programs, Philippine HEIs can establish an ascending graduate-level validated learning certifications. As long as the academic rigor and expectations are aligned with the Philippines Qualifications Framework (PQF) level 7 domain descriptions and expectations, HEIs may stack credit-bearing MCs that would result in academic awards. The earned master's degree, upon completing an equivalent of 30 units (including finishing a Capstone Project) will be a professional master's (in contrast to research master's), since MCs are supposed to be skills-based. How to count the number of units earned through MCs will be subject to institutional policy, although they must be aligned with national expectations related to academic rigor, learning hours, and learning outcomes. HEIs would also need to be flexible concerning maximum residency requirements to accommodate mostly part-time students. When personalized TPD pathways are added into the equation, the progression of the learning certifications will be as seen in Figure 5.

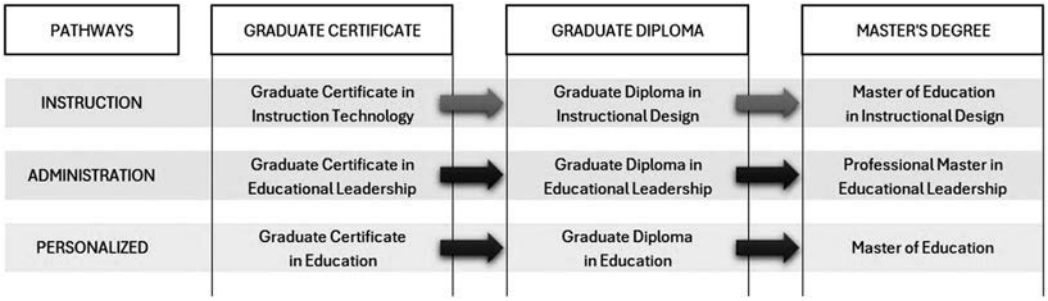

Figure 5: Sample of Incremental Credentialing in TPD Pathways

Philippine HEIs have a great deal of latitude in naming graduate certificates and graduate diplomas, since no regulations exist for these. However, master's degree programs need to be applied through CHED, and the curriculum must be approved by the same government body.

9. Instructional Innovation

HEIs are in the best position to offer micro-credentials also because they have the resources and expertise to develop and implement innovative instructional designs. With the advent of Pedagogy 3.0, HEIs can leverage technology, learner-centered methodologies, and personalized instruction in offering MCs to enhance educational outcomes. This enables immersive and decentralized educational experiences that are consistent with the increasing demand for micro-credentials. Distinguished by its improved connectivity via blockchain, AI, and decentralized networks, Web 3.0 promotes collaboration and creativity while offering a flexible, autonomous learning experience. These developments enable higher education institutions to provide micro-credentials that are accessible to both domestic and international students.

10. Implications for TPD in Japan

The personalized TPD model developed in the previous sections was originally constructed in the context of the Philippines. However, the personalized framework for TPD coincides with the trend of TPD in Japan at the right time. One major trigger for the move towards personalized TPD in Japan was the abolition of the teacher license renewal system in July 2022, and the revision of the laws concerning educational civil servants and teacher licenses in May 2022. After that revision, a new TPD concept was introduced to create and maintain records of individual teachers' training histories at boards of education and to provide guidance and advice on improving their qualifications using these records, as a way of realizing a personalized TPD with a bottom-up approach. As a part of the new TPD approach, some online systems that support teachers' learning using open badges, etc. (e.g. I Dig Edu by Tokyo Gakugei University and OKUTEP by Osaka Kyoiku University) are already in operation.

However, there are three major challenges to realize the incremental credentialing as discussed in the present study. First, TPD providers in Japan can be arbitral. HEIs' role in TPD is not clearly defined in the current framework in Japan, although the Ministry of Education, Culture, Sports, Science and Technology (MEXT) expects HEIs to offer quality programs for TPD. Second, digital system, such as a digital wallet, to support the personalized and lifelong learning record for teachers is not standardized across the country. Third, the MEXT has not authorized a micro-credential system in higher education accreditation framework. Although those challenges appear to be not simple to untangle, the flexible and personalized TPD model is still relevant to also the current situation in Japan.

The relevance of the model is quite true for the current context of Ehime University's role for TPD in the region. In general, the HEIs are more able to offer a cutting-edge knowledge and technology, compared to other institutions in the region. Therefore, boards of education and HEIs in the region can collaborate to shape the new and effective form of TPD, adapting new technologies, which support personalized and bottom-up TPD practice.

11. Challenges Related to Micro-credentials in HEIs

Despite the current rave about micro-credentials since the pandemic, especially in several Asian countries, there are lingering challenges in adopting MCs as an educational solution in higher education. First, the lack of common understanding and definition of MCs creates confusion (Hanfy, 2020; Wang et al., 2020). For instance, because of the current openness in understanding MCs, a few groups that have traditionally offered certificates have started to call their certificate awards as micro-credentials despite having made no changes to their instructional and assessment modalities. This lack of standardization undermines the credibility and perceived value of MCs among stakeholders, including employers, students, and educational institutions. Without clear benchmarks or quality assurance measures, the potential of MCs to address specific skill gaps or complement traditional degrees remains underutilized. Consequently, this potentially hinder the scalability and global recognition of MCs in the higher education landscape (Brown & Mhichil, 2022).

Second, the absence of common quality and accreditation frameworks leaves room for loss of accountability in education standards (Zhang & West, 2020). Although proposals have been made on these matters (Pawilen, Tomida, & Eugenio, 2023; Pawilen, Tomida, & Eugenio, 2024), a common consensus remains to be reached. While it is encouraging that frameworks and guidelines are being released by each nation involved in MC (e.g. Malaysia, Australia, Philippines), their proliferation point to some sort of quality standard pluralism which is showing no sign of abating.

Third, because MCs in HEI is new, its implementation, especially as credit-bearing courses, remains untested (Zhang & West, 2020; McGreal & Olcott, 2022). Despite the current hype, there is no empirical data that demonstrates the need (Kato, Galan-Muros, & Weko, 2020; McGreal & Olcott, 2022). It remains "an unproven concept" (Colleges & Institutes Canada, 2021, p. 12) because no empirical studies have been produced yet. As of yet, the concept of using MCs as an alternative educational modality, although quite mesmerizing, is yet untested in actual long-term implementation. As such, as Kiisla, Hanfy, & Pirkkailainen (2022) note, the lack of empirical research about how MCs operate in the context of HEIs leaves potential implementers with no practical guidelines to follow or emulate.

Fourth, there are fears that the craze over MCs in higher education is fueled by economic gains, which may compromise the integrity of academic standards (Altahir et al., 2023). Ralston (2021) voices a strong critique about the seemingly market-driven language of the micro-credentials economy. According to Ralston (2021), the problem of the current burgeoning "neo-liberal learning economy" is that credentials are treated as commodities, functioning as products or services that are marketed, sold, and obtained in the same way as any other goods in the marketplace. This commodification of learning risks shifting the focus of education from fostering critical thinking and intellectual growth to merely meeting market demands for specific skills. Wheelahan and Moodie (2021) aptly call MCs "gig qualifications for a gig economy," emphasizing their alignment with short-term economic objectives rather than long-term educational and societal goals. If left unchecked, this could undermine the broader mission of higher education to promote knowledge creation, ethical citizenship, and the public good, reducing it instead to a transactional, profit-driven enterprise.

Fifth, concerns have been raised about how MCs can lead to bypassing or replacing formal education (ETUC & ETUCE 2020). Ralston (2021), being one of the most vocal critics of MCs in higher education, asserts that "the craze represents a betrayal of higher education's higher purpose and a loss for students and faculty who continue to see university learning as more than vocational training" (p. 92). Tooley and Hood (2021) aptly reminds that despite the advantages they offer, MCs must be regarded as an additional option in the teacher professional development journey, not as a replacement for all existing educational pathways (p. 10). It is critical to maintain a balance between innovative and traditional approaches in education. However, even positioning MCs as alternative or supplementary offerings is seen by others as a form of "university elitism" meant "to protect the higher status of traditional macro-credentials" (Brown & Mhichil, 2022, p. 951).

Finally, the adoption of MCs in HEIs requires significant changes in institutional structure, funding, and direction (Hanfy, 2020; Olcott, 2022; Ahmat, 2021; Brown, McGreal, & Peters, 2023). The study of Varadarajan, Koh, & Daniel (2023) reveals that implementing micro-credentials can be disruptive in higher education operations and quality assurance. There are expressed concerns

related to the unique academic support of educators, students, and technologists when MCs are offered in HEIs. Additionally, new issues emerge in evaluating academic credits and learning hours, changing instructional modality, including laboratory in learning activities, and designing assessments (McGreal & Olcott, 2022). The challenges are compounded by the fact that institutions possess instinctual reluctance to change, and where change happens, they usually take their time. Moreover, according to McGreal & Olcott (2022), while microcredentials require financial investment and resources, making cost a significant consideration for funders, providers, students, and employers, they are unlikely to serve as a major revenue stream.

12. Conclusions

MCs offer great promises in accomplishing the professional development needs of teachers in the twenty-first century. Of course, it must be acknowledged that "MCs should be one tool in the teacher professional learning toolkit, not the entire toolkit" (Tooley & Hood, 2021a, p. 10). But considering the characteristics of effective TPD, MCs offer the best TPD approach. HEIs have a significant role to play, because they can easily offer personalized PD pathways that other PD providers are unable to provide. Considering the characteristics of effective TPD, MCs offered by HEIs are crucial in facilitating the personalized lifelong learning of busy, adult learners who require a variety of skills to fulfill their professional responsibilities as teachers. The article advocates for an agent-centered PD, in contrast to top-down PD opportunities that are selective and generic. HEIs are in the best position to offer specific and granular skill-focused MCs with various learning pathways that are aligned with teachers' current tasks and career pathways. HEIs can ensure that the MCs they offer are credit-bearing and stackable, so that teachers in professional development may receive at graduate level learning certifications at various intersections. HEIs are strategically positioned to offer these because they already have the human, infrastructure, and systemic resources to offer flexible learning environments.

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