A Mind-Set Changing Project: Preparing Vocational and Professional Education and Training (VPET) Teachers with Technology Enhanced Learning (TEL) and E-pedagogies

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Abstract. Vocational and Professional Education and Training (VPET) emphasises in-class hands on practice and face-to-face theory delivery, e-learning and e-pedagogies are less common. The resistance normally rises from the argument of VPET's focuses on trade-specific hands on skills in authentic workplaces and the motto of 'practice makes perfect'. Nonetheless, with students' changing learning preferences and behaviours, the high accessibility of online and web-based information; VPET teachers are now confronting with challenges that trade-specific knowledge and demonstration of skills are widely available on internet and not solely transmitted by teachers. Furthermore, students' motivation and engagement in learning tasks are also issues that need to be addressed. In response, a mind-set changing teacher training project was introduced and this paper shares the empirical experience on nurturing VPET teachers' technology enhanced learning (TEL) and e-pedagogies competency so as to prepare them to cope with students' learning preferences and behaviours for teaching effectiveness. These series of training and engagement activities were carried out in four stages (1) Conceptualisation; (2) Familiarisation; (3) Acceptance and (4) Action. These training and activities enable teachers to adopt TEL and e-pedagogies in their daily teaching. Results of the project indicated that a well-planned scheme that aligned with the institution's strategy with gradual increment of intensity of e-elements infused in various training events allowed ease of acceptance and behavioural changes. Additionally, synergy from senior management, concurrent schemes, projects and awards to promote and encourage teachers to adopt TEL and e-pedagogies for innovative learning and teaching is also a critical factor in the teacher training scheme.

Keywords: Technology enhanced learning (TEL) · E-pedagogies
Vocational and Professional Education and Training (VPET) · Teacher training

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1 Introduction

Teachers in Vocational and Professional Education and Training (VPET) stress in-class hands on practice and face-to-face theory delivery over the use of e-learning and e-pedagogies, although learning management platform (LMP) such as Moodle, Blackboard or other online tools were first introduced in the participating VPET institution of this study in the 1990s. It is not surprised to learn that most teachers' e-learning activities rest on uploading and downloading course materials on the LMP without touching on the fundamental concept of using online materials to supplement and complement learning back then. The resistance normally rises from the argument of VPET's focuses on trade-specific hands on skills in authentic workplaces and the motto of 'practice makes perfect'. VPET teachers also approached e-Learning with doubts. To them, it seemed not feasible to practice hands-on tasks online or on simulation systems and devices. In an earlier interview, Ng and Lam found that teachers questioned how students could practise a simple task like tightening and loosening nuts and bolts on a simulator. They asserted that "in real life, you need to use a certain degree of strength to tighten and loosen nuts and bolts but, with today's technology, you may not be able to achieve it unless you invest a fortune to develop the hardware and software. Another teacher said that people only live once – you will not hurt in simulated environments if you make mistakes but will surely be injured in real life" (Ng and Lam 2015, p. 6). Very often, mis-conception happened because e-Learning and technology enhanced learning aim not to replace face-to face contacts and hands-on practices, they rather facilitate understanding of procedures, skills and provide repeated access to venues that are normally prohibited because of safety or confidential purposes. Pedagogically, e-Learning and technology enhanced learning (TEL) when complimented with blended and flexible learning will generate effective teaching and better learning experience for students (Tsang et al. 2014; Ng et al. 2016, 2017). Nonetheless, with students' changing learning preferences and behaviours (they are enthusiasts in mobile devices, engaged in technologies and online activities for information retrieval 24 h a day), the advancement of online and web-based networking information communication technology technologies (ICT) and the easy accessibility of mobile devices such as smartphones and tablets that provide "just-in-time contemporary learning and can be accessed from any site" (Choy 2006, p. 2), VPET teachers are now confronting with challenges that trade-specific knowledge and demonstration of skills are widely available on internet. Students' motivation and engagement in learning tasks should also be looked into. In an earlier study, Ng and Lam (2015) found that the readiness of the teachers regarding TEL and e-pedagogies is a salient issue to be address. Furthermore, VPET stresses on mastery of hands-on skills but conversely, TEL and e-pedagogies emphasise self-paced online and virtual learning experiences; how would teachers be prepared to adopt the changes for teaching effectiveness? To further address the issue, a three-year mind-set changing project was introduced and this paper shares empirical experience on nurturing VPET teachers' TEL and e-pedagogies competency so as to prepare them to cope with students' learning preferences and behaviours for teaching effectiveness.

2 The Project

As teacher trainers in the Centre for Learning and Teaching (CLT) and responsible for teacher training and development in the participated VPET institution, the authors conducted environmental scan, analysed the institution, teachers and students' needs in order to advise the senior management team on the institution's e-learning strategy and direction. Allan and Seaman (2014) found that in United States, online learning growth significantly over the last decade and 66% of higher education institutions asserted that online education were their long-term strategy. Environmental scan found that e-Learning and TEL was adopted in Hong Kong's tertiary education institutions to facilitate learning. Although nearly 95% out of the 3,000 teachers in the participated institution in this study were using the LMP to supplement their teaching, the most frequent activities were uploading course information, notes and extended readings. It was noticed that only 10% of teachers further developed their own complimentary, extended and blended-learning activities such as online tutorials exercises, assessments, forums or video sources. Teachers always regarded TEL as extra workload because of the revision of existing teaching materials and the design of learning and teaching activities, without mentioning the technological know-how. A number of researchers agreed that the most common training needs of teachers rested on technology skills (Barczky et al. 2010; Arinto 2013; Lane 2013; Betts 2014). A survey on training needs was conducted by CLT with a number of 287 responses from teachers showed that more workshops on e-Learning/Information and Communications Technology (ICT) in education would equip teachers and instructing staff to adapt TEL in their daily teaching. Churchill (2017) also contended that how technologies will be used in daily teaching largely depends on teachers' understandings of the affordances and the possibilities of the technologies. On the other hand, students had different views on e-Learning. A study by the CLT in 2014 with 4,117 students studying in VPET indicated that all of them obtained information online via websites or social media. It was also found that more than 40% of them stayed online from 21 to 24 h every day. The average number of devices (phones, tablets, notebooks, computers) owned by each student is 1.82 (Centre for Learning and Teaching, Vocational Training Council, 2014). The results indicated the online learning preferences and learning habits of students and suggested to blend face-to-face teaching with e-Learning or TEL to further enhance student motivation and interaction. It echoed Cronje's point that "as students' knowledge of what technologies can enable, brings with it a need for flexibility. Students wants to be able to attend set lectures if they so wish, but they also want the ability to view (or-re-view) those lectures in the form of online videos or online audio podcasts" (Cronje 2016, p. 132). In addition to the data collected from teachers and students, the authors also reviewed the e-Learning, TEL and e-pedagogies training activities (seminars, programmes, workshops and sharing sessions) that were developed and offered by CLT over the last three years for an understanding of the teachers' participation and needs. In view of the percentage of acceptance and adaptation of e-Learning in daily teaching and with an aim to up-scale the usage of e-Learning as complimentary, extended or blended-learning activities, a project on implementation of E-Leaning and TEL was generated in 2014 and proposed to various

committee for discussions. Under the proposal, an implementation plan adopting e-pedagogical approaches and TEL strategies would be rolled out to support the implementation of TEL. Members of various learning and teaching committees generally agreed to adopt E-learning and TEL to enhance effective learning and teaching, to enrich students' learning experiences and the institution's competiveness in the sector. It was also suggested using e-Learning and TEL to accommodate the demographic changes of pre-vocational to in-services learners to cope with the increasing life-long learning and continuous professional development needs. The 3-year Implementation of TEL Project from 2015 to 2018 which included a series of seminars and workshops and engagement activities was then endorsed. Accompanied with the training seminars and workshops were a number of activities including collaboration on development of learning and teaching aids using various kinds of technologies such as learning and teaching platform customisation, video broadcasting lectures, augmented and virtual reality (AR/VR) and wearable technology and mass open online course (MOOC). These series of training and engagement activities were considered as a mind-set changing project that was carried out in four stages (1) Conceptualisation, (2) Familiarisation, (3) Acceptance and (4) Action in order to enable teachers to adopt e-Learning and TEL and e-pedagogies in their daily teaching. To ensure participation, blessings from senior management of the institution were given to academic disciplines' leaders for smooth implementation of the project.

3 Implementation of the Project

A need analysis was conducted for an understanding of the teachers' engagement in e-Learning and TEL by first reviewing the training provided and teachers' participation. The year-round seminars and workshops offered by CLT were categorised into three different focuses namely (1) Developing as Professional, (2) IT Enhancement Programme and (3) Teaching, Learning and Assessment. Based on teachers' needs, the workshops numbers and titles varied over the years. A comparison of the number of headcount of the training workshops conducted in Academic Year (AY) 2014/15, AY2015/16 and AY2016/17 in the aforementioned categories is shown in the following table:

Table 1. Headcount of the training workshops in AY2014/15, AY2015/16 and AY2016/17

Focuses	No. of headcount AY2014/15	No. of headcount AY2015/16	No. of headcount AY2016/17
Developing as Professionals	245	254	185
IT Enhancement Programme	574	1049	1098
Teaching, Learning and Assessment	3675	3250	3793

The results of AY2014/15 indicated that out of the three focuses, IT Enhancement Programme had the least participants (n = 574) when compared to the other two and that was resulted from the pre-conception of the needs and usefulness of e-Learning. Teachers' priorities were in Teaching, Learning and Assessment related training such as 'Classroom Management', 'Outcome-based Learning and Teaching', 'Planning for Active Classes', 'Design Multiple Choices Assessment' that enabled them to accommodate their urge needs in daily teaching practices. Short talked with teachers in training workshops showed that most teachers regarded e-Learning and TEL as extra workload and they would like to further modify their existing teaching materials if extra time (less teaching load), training and support were given. To address the above and as planned, the training and engagement activities in the project on implementation of E-Leaning and TEL (2015 to 2018) were to be carried out in four stages (1) Conceptualisation, (2) Familiarisation, (3) Acceptance and (4) Action, to gradually enable teachers to get to know e-pedagogies and adopt e-Learning and TEL and into their teaching practices.

3.1 'Conceptualisation' and 'Familiarisation'

In the 'Conceptualisation' and 'Familiarisation' stages in AY2015/16, training workshops on e-pedagogies and TEL were held regularly. To enhance participation and increase attraction, overseas and local guest speakers with expertise on e-Learning and TEL were invited to deliver seminars, workshops as well as sharing sessions to keep abreast participants' awareness and conceptualisation of the trend and usefulness of e-Learning and TEL. A range of seminars and workshops with topics on 'Harnessing Open and Flexible Resources (OER)', 'Mobile Design: Teaching Language and Literacy with Mobile Technologies', 'Situated Knowledge Building and Mobile Technologies in the third Space: Moving Beyond 21 Century Learning', 'e-Books Production for Teaching and Learning Packages', 'Design Video Resources to Facilitate Self-directed Learning in Flipped Classroom', 'AR/VR Technology for Education and Training' and 'Using MOOCs to Enhance Learning and Teaching' were organised with 612 headcounts. In addition to the above and with the aim to familiarise teaching staff with the LMP (Moodle), eleven workshops and three seminars ranged from 'Kickstart with Moodle', 'Gearing Up for Moodle', 'Use of VeriGuide for Assessment', 'Sharing Session on Moodle Customisation Project' and 'Moodle Information Session' were held with a number of 437 headcounts. Table 1 showed the total number of headcounts in the IT Enhancement Programme had recorded a significantly increase of 82.8% participation (n = 1049) in AY 2015/16 when compared to AY2014/15 (n = 574).

Using Kirkpatrick's (1994) four-level framework (Reactional, Learning, Behavioural and Results), the authors further evaluated the training activities' effectiveness and impacts on the teachers' readiness and acceptance to changes in their teaching practices. The model categorises the training outcomes to 'Reaction' focus on the trainees' satisfaction, 'Learning' on the acquisition of knowledge, skills, attitudes, 'Behaviour' addresses the improvement of behaviour on the job and 'Results' on trainees' achievement and productivity improvement. Feedback forms were used to collect instant reflections after each seminar and workshop in the first level (Reaction) and the second level (Learning) of analysis. In general, the overall rating on the structure, content relevancy,

alignment to learning outcomes, facilitation and materials and resources provided in the seminars and workshop was 4.6 on a scale of 1 to 5 (1 = Strongly disagree, 5 = Strongly agree). Qualitative feedback such as 'very practical and can be used during my class', 'the introduction app was very useful for teaching', 'Spark video is useful' and 'MOOC introduction is useful' indicated the teachers were benefited in terms of conceptualisation, familiarisation and application of e-Learning and TEL. However, feedback such as 'more different useful applications on ICT teaching can be introduced', 'the new tolls for teaching are quite good and should teach all teachers in order to facilitate the use of them', 'more practices are needed', 'more time for practicing the tools' and 'would like to have more consultation on applying AR/VR technology to enhance teaching' revealed that teachers were eager to learn more in order to adopt the latest learning technologies in their teaching. Views on staff's performance after the training were collected from senior staff of respective academic disciplines in various committees' meetings for the third and fourth levels (Behaviour and Result) of analysis. Senior staff observed that there were increasing self-initiated e-learning projects by teaching staff, including customisation of the Moodle platform with online assessments and discussion forums to suit specific modules' teaching needs, the embedded of videos as lecturing and instructional materials to enable flipped learning, the request for support and further consultation on developing TEL packages and resources. Most of the teachers realised and recognised the benefits of facilitating better learning and teaching experiences to both students and teachers. The above showed a promising behavioural change amongst teachers towards the adaptation of e-Learning and TEL.

3.2 'Acceptance' and 'Action'

With the results indicating general acceptance of using e-Learning and TEL from the training and feedback from meetings, the project had progressed into the 'Acceptance' and 'Action' stages in AY2016/17. Alongside with the on-going training seminars and workshops, sharing sessions of the self-initiated e-learning projects by teaching staff were organised to share experiences so as to consolidate the acceptance from a wider population of teachers. Making references to the successful projects, the sharing sessions also allowed teachers to reflect and plan for the applications of TEL in the coming 'Action' stage. As shown in Table 1, the training headcount on IT Enhancement Programme remained around 1098 with slight increment.

The authors once again evaluated the training activities' effectiveness using Kirkpatrick's (1994) four-level framework (Reactional, Learning, Behavioural and Results). The overall rating on the structure, content relevancy, alignment to learning outcomes, facilitation and materials and resources provided in the seminars and workshop was 4.5 on a scale of 1 to 5 (1 = Strongly disagree, 5 = Strongly agree). Qualitative feedback such as 'the case studies enriched the seminar', 'new apps can be applied on helping us on teaching', 'the workshop can overcome how to use Mentimeter', 'would like to share with students off lecture', 'live demonstration and practice in computer lab could facilitate my learning', 'workshop clearly showed how to create online assignment', and 'all useful, very practical' indicated teachers' positive views on using TEL. Senior staff of respective academic disciplines also revealed that a number of their teaching staff were

eager to apply what they have learnt to enrich their teaching contents and activities in various committees' meetings. The results indicated a gradually mind-set change and acceptance of the e-pedagogies and applications. In view of the above, it was considered the right time to progress the project into the 'Action' stage.

During the 'Action' stage, respective disciplines contributed subject contents while CLT provided instructional design and technological supports on production. A number of deliverables on the development of e-Learning and TEL resources that included customisation of Moodle platform, Mini-MOOCs, discipline-specific online learning resources, AR/VR applications, lecture capture system and wearable technologies (head-mounted devices and multi-function glasses such as HoloLens) were developed on a small piloting scale. These e-pedagogical approaches enable interaction and meaningful learning activities and tutorials that occur during the face-to-face time under teachers' guidance. Together with appropriate instructional design and technology as enabler, these approaches provide students with a large degree of learning autonomy and nurture students for a higher degree of self-directness, self-management, persistence and independency. During the implementation, the collaboration and support from different units was the key success factor. CLT provided advice on instructional design and production of innovative technologies, assist in the development of e-Resources for disciplines, deliver training workshops and seminars, and organise sharing sessions. The nominated teachers of nine disciplines provided the content of modules for the TEL development while the institution's information technology supporting division (ITSD) provided technical support and maintenance for those platforms and applications (Moodle, and Mini-MOOC). To ensure timely support, campuses' technical teams provided on-site technical and production services. The deliverable of the implementation of TEL in AY2017/18 is shown below:

1. A Task Force on Implementation of TEL was set up with CLT, ITSU, Disciplines nominated teachers and campuses' technical teams as Members to implement and report on the progress and effectiveness of application of TEL;
2. Production of one to two mini-MOOCs by each of the nine academic disciplines;
3. Nine sets of e-Resources for respective disciplines on selected modules;
4. Production of six AR exemplars and six wearable technology exemplars; and
5. Customised the Moodle platform to integrate the lecture capture system for one-stop access of all learning ad teaching resources and ease of management.

The above intended deliverables of the project were agreed between staff representatives of all levels and signified an institutional-wide mind-set and behavioural change. The project implied that an emerging concept change and paradigm shift in learning and teaching. It also addressed the increasing importance of e-pedagogies.

3.3 Lesson Learned

Results of the project indicated that a well-planned training scheme that aligned with the institution's strategy with gradual increment of intensity of e-elements infused in various training events and engagement activities allowed ease of acceptance and behavioural changes. As the project is still on-going and the above intended deliverables

are in progress, the following salient points are yet to be further addressed. Firstly, a close communication for timely dissemination of up-to-date knowledge in technological advancement and experiences through sharing sessions, internal publications and various committees will ensure penetration to all levels of staff in the institution. Secondly, effective TEL lessons rest on the planning, instructional design and the appropriateness of the technology being used. The TPACK framework (Technologies, Pedagogies and Content Knowledge) (Herring et al. 2016) provided a promising guideline and method for content, instructional design and information technology experts for reference. Thirdly, technologies come and go, so does enthusiasm. Discrete consideration on the investment of resources on software, gadgets and facilities will minimise the risk of rapid outdating of technologies. To sustain motivation and engagement, it is suggested to launch concurrent schemes and awards to encourage and recognise teachers who adopt TEL and e-pedagogies for innovative learning and teaching. Lastly, the alignment of the e-Learning and TEL development to the institution's learning and teaching strategy as well as blessings from senior management are also one of the successful factors.

4 Conclusion

With an aim to promote e-Learning and TEL to teachers, this mind-set changing project demonstrated a good example for practice sharing. This paper started with the pressing needs of e-Learning and TEL in today's VPET and higher education institutions and argued the usefulness of TEL and e-pedagogies in VPET. A need analysis was conducted to diagnose teachers and students' learning and teaching preferences and habits followed by the proposal of the 3-year Implementation of TEL Project. The process, intended deliverables and progress were then described. Salient points were also mentioned in order to shed light for further development and research.

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