Identifying the Needs of Flexible and Technology Enhanced Learning in Vocational and Professional Education and Training's (VPET) Workplaces

Ricky Yuk-Kwan Ng, Rechell Yee-Shun Lam, Kwan Keung Ng and Ivan Ka Wai Lai

Abstract The appropriate technology enhanced pedagogical approaches ultilising mobile and flexible technologies would generate better learning and teaching experiences in workplaces. However, there is a lack of in-depth study of Vocational and Professional Education and Training's (VPET) students, teachers and workplace mentors' teaching needs. With an aim to identify suitable pedagogical practices to devise suitable e-learning means for more effective learning and teaching in VPET's workplaces, 26 interviews with students, teachers and workplace mentors were conducted to identify the support and training needs that may be required by students and teachers for the identification of specific instructional strategies to derive innovative pedagogical practices. Findings of this study revealed that due to the advances in technology, blending face-to-face teaching with e-learning or mobile learning is the current trend in VPET's learning and teaching to accommodate flexible learning, enhance motivation and interaction. It is also suggested that Technology Enhanced Learning (TEL) together with guidance, collaboration and training would able to accommodate VPET students, teachers and workplace mentors' learning and teaching needs. Implications are on the resources, timely technical support and updating of innovative pedagogies, training for teacher and mentor and the acceptances of the 'new' by the students, teachers and workplace mentors.

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© Springer Nature Singapore Pte Ltd. 2017 W.W.K. Ma et al. (eds.), *New Ecology for Education – Communication X Learning*, DOI 10.1007/978-981-10-4346-8_9 107

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Keywords Vocational and professional education and training (VPET) \cdot Technology enhanced learning (TEL) \cdot Workplace learning \cdot Innovative pedagogies

1 Flexible and Technology Enhanced Learning (TEL) for Workplaces Learning

The Vocational and Professional Education and Training (VPET) stresses professional knowledge and values authentic practical experiences in workplaces (Avis, 2014; Bank, 2013; Harris & Simons, 2006). Prolong engagement in workplaces and guidance from workplace mentors on authentic tasks is the most common learning and teaching practices. A number of studies suggested that workplace practices would be able to deepen the levels of learners' engagement and collaboration so as to promote a coherent wholesome learning experience in workplaces (Hillier, 2009; Lee, Lam, Lui, & Pang, 2014; Mohamad, Heong, Kiong, & Rajuddin, 2012; Smith, 2003, 2006); it also provides "a fertile opportunity for learners to appropriate knowledge that connects theory to practice in a realistic and efficient way" (Brooker & Butler, 1997, p. 487). A mentoring approach has become an important part of VPET's curriculum. Nearly all of the trade-specific disciplines have integrated industry attachment (IA) into their programmes to enable students to apply their knowledge into real-life practices. The length of IA varies and resulted from a range of issues, such as the availability of workplaces for practices, the workload of workplace mentors, the design of module contents to complement the IA arrangements, the balance of the materials to be taught in schools and workplaces and the preparation of the students and mentors. To address the above issues, Ng and Lam (2015) and Ng and Leung (2014) proposed using mobile and flexible technologies to enable learning and teaching resources in the forms of video (Lecture Capture, Live Broadcasting, Wearable Technologies, Massive Open Online Courses (MOOC), Augmented Reality/Virtual Reality (AR/VR) and Instant Messaging (Social Media, Group Chat)) as complements and supplements learning and teaching strategies to facilitate self-paced learning and the enhancement of learning and teaching in workplaces. It is generally assuming that appropriate technology enhanced pedagogical approaches utilising mobile and flexible technologies would generate better learning and teaching experiences in workplaces (Errington 2001, 2004; John 2002, 2005; Lee et al., 2014; Liu, Han, & Li, 2010; Mullin 2013; Sangster, Maclaran, & Marshall, 2000; Smith 2003, 2006; Tsang, Yuen, & Cheung, 2014). In view of the above, this study aims to identify students, teachers and workplace mentors' needs and suitable e-learning means for more effective learning and teaching in VPET's workplaces. It is also expecting the findings would generate insight shed light on suitable pedagogical practices in workplaces.

2 Design and Methodology of This Study

Eight semi-structured focus group interviews with 53 students from four Vocational Education and Training (VET) institutions, one focus group with 20 teachers from one of the participating institutions, eight individual interviews with teachers from three of the participating institutions, and ten individual interviews with workplace mentors from four different industry sectors were conducted to diagnose the learning and teaching needs of students, teachers and workplace mentors. Open-ended questions were used for the above interviews and the answers were transcribed and analysed to identify learning and teaching needs and specific instructional strategies to derive innovative pedagogical practices.

3 Findings and Discussions

3.1 Semi-structured Focus Group Interviews with 53 Students

The focus groups comprised 53 students studying in Hotel, Hospitality, Tourism, Pharmaceutical Science, Nursery Education, Property Management and Design programmes. The interview questions covered the areas of learning practices and learning with technology, When asking their learning practices (for example, 'Do you like to study alone? Why?'), most of the students responded that they liked to study alone at home rather than in school. Nonetheless, they would like to study in groups with peers for idea exchange and information sharing. It indicated that students would like to study at their preferred places and not like to be bounded by locations, while being connected and interacted with friends and peers were important. In general, most of the students used personal computers and/or mobile phones for online information searching and communication with peers. Most of them regarded lecture notes as one of their most preferred learning tools because they could jot down important points during the lectures. A majority of the students liked visual images, videos, demonstrations, group discussions, interactive activities and tutorials in their lessons. On the contrary, students disliked long lectures without interactions, rigid teachers, fast teaching pace, unclear explanations and heavily loaded timetables. Their most frequently encountered difficulties in class were teachers' fast teaching pace, English vocabulary and jargons, classes involving theories, not being able to see and remember demonstrations as well as the understanding of lecture notes. They would seek help from peers face-to-face or via social media and going online for subject information (dictionaries and demonstration videos). They used computers and mobile phones to access Google, Wikipedia and other online resources to solve learning problems. Some of the students also considered that online information may not be accurate and they would use them as supplementary materials. Students generally liked teachers to prepare notes, share real-life experiences, demonstrate procedures in a moderate pace and reinforce lessons with videos after classes.

Concerning students' views on learning with technology, the interview questions included: What kinds of support would you wish to have in your classroom lessons and industrial attachment? How can the different technologies be used effectively to help you learn in your classroom or in your revision? A majority of them believed that technology could enhance their learning. They would like to have videos, lecture capture system for timely review of lessons, augmented reality (AR) for simulation practices, online platforms for materials sharing and retrieval, mobile apps, massive open online course (MOOC) for flexible learning and social media for communication with peers. For accessibility, most of the students preferred using personal computers, mobile phones, tablets for online information but they also preferred printed copies for note taking and study.

3.2 Focus Group with 20 Teachers

The focus group comprised 20 teachers teaching Engineering, Design, Information Technology, Building Services, Language, Whole Personal Development, Culinary Arts and Automotive Technology programmes. Nine of them had received teacher training and held in-house training certificates, Postgraduate Diploma in Education or Bachelor of Education. Reflected from responses to the questions of teaching practices and the problems such as 'What problems do teachers generally encounter in teaching the modules or in the discussion of issues with students?', almost all the teachers stressed on classroom management problems, e.g. students are not attentive, unmotivated as well as passive. Teachers mentioned that they would use a range of student-centred approaches to conduct different learning and teaching activities, such as real-life examples, learning games, group discussions, questionings and different assessments to draw students' attentions. In addressing the issues of resources and supports for teachers to teach their modules, half of them said the resources were enough and sufficient while the other half mentioned that there was room to enhance the learning programmes (TLPs), online supplementary materials and subject-related information. Half of the teachers would also like to have training on special educational needs (SEN), pedagogical practices, presentation skills, instructional design, classroom management and technology enhanced learning. When asking if they made use of the Learning Management Platform (LMP) provided by their institutes, 15 teachers said they had been using the LMP for delivering course materials online. In addition to the Moodle platform, the most used technologies in their teaching were videos, PowerPoints and YouTube. They preferred using computers and mobile phones to access internet and online resources. Some of the teachers responded that they did not have time to prepare for the use of technology in teaching. Other teachers also commented that technology was unnecessary because of the specific nature of their courses. Some also said that they did not know which technology was available to be used. When asking the pros and cons of using technology in teaching, most of them believed that technology would motivate students to learn more effectively, as it enabled easy information sharing and material updates, broadened students' visions with abundant resources, provided flexible learning, catered for diverse learning styles, offered better interactions and communication outside school and created multi-sensory attractions. Nevertheless, a few teachers worried about the copyright issues, and their views on using technology in teaching to enhance students' learning effectiveness were still in question.

In response to the questions on teaching with technology (for example, what kinds of support would you expect for industrial attachment for students?), teachers generally agreed that during students' IAs, technology enhanced learning such as interactive course content, lecture capture system, videos, online learning and teaching resources, assessments and discussion forums would help. Half of the teachers considered that social media, AR, virtual reality (VR), video capture system and MOOC would enable teaching effectiveness, while a majority of the teachers asserted that mobile apps would not improve teaching effectiveness. Similar to the views of students, when asking teachers' most preferable learning aids and technology, almost all the teachers chose printed copies as the first choice followed by personal computers and mobile phones. Teachers also suggested to the provision of related hardware (computers in every classroom, cameras, video capture system, projectors) and software (online platforms, learning and teaching resources, mobile apps) by the institutions to facilitate the use of technology and online resources in daily teaching.

3.3 Individual Interviews with Eight Teachers

The eight teachers participated in the individual interviews were from Building Services, Engineering, Culinary Arts, Hospitality and Pharmaceutical disciplines of three different intuitions. Seven of them had received learning and teaching training. In response to the problems and issues in teaching practices, most teachers commented that the students were inattentive, unmotivated and in lack of work experience. These teachers also mentioned that the English standard of some students was poor especially for those who graduated from Chinese secondary school and the student-teacher ratio was high. Because of the above, they adopted different means to motivate the students to learn more effectively, including questioning, group discussions, peer collaborations, role-plays, case studies, demonstrations, visuals, videos, real-life examples, guest speakers and visits. For the question: 'Are the teaching resources/support related to your industry/trade sufficient?' All teachers agreed that the teaching resources provided by their institutions were sufficient but there was room for further enhancement (e.g. TLPs, online references). For training, teachers preferred multimedia production, hardware and software and pedagogy. All teachers except an Engineering teacher used Moodle provided by institutions, but most of them only used the platform to upload and

download notes and teaching materials, and collect assignments. One of the teachers said that the Moodle platform was too slow and students did not like to log into it. They preferred using other online resources or apps for communication. The most commonly used technologies by the teachers were video clips, online resources, Internet, YouTube, Facebook, WhatsApp and other mobile apps. Teachers generally agreed that technology for learning would benefit students and enhance learning effectiveness because online resources provided not just subject materials, but also other related resources, as well as learning flexibility. They also agreed that using technology saved time on updating teaching materials, lessened administrative work, was good for data collection and thus released teachers' workloads. And they continued to express that technology for learning was good for timely review and communication especially when the students were in IAs. A few teachers concerned about the workload of students once imposed technology in learning. When asking what and how technologies could be used effectively to help out teaching, teachers replied that AR/VR would promote interactivities; video capture system could be for lecture reviews; social media could foster connections with students; and MOOC enhanced flexible learning. But one teacher said video capture system may indirectly encourage students to skip classes and teachers and students might not want to be caught on camera. Answers to the question about teachers' most preferred teaching aids revealed that printed copies, personal computers and mobile phones were most commonly used. On the suggestions of using technology and online resources, most of the teachers recommended online platforms and materials, videos, AR/VR and games. They also expressed that a good promotion on the use of technology in teaching was important for teachers and students as potential users.

3.4 Individual Interviews with Ten Workplace Mentors

The ten workplace mentors participated in the individual interviews were from medical, retail, hospitality and entertainment industries. Only two of the workplace mentors did not have formal learning and teaching training. The workplace mentors' work experiences ranged from 1 to 20 years and their roles were clinical supervisor, mentor, demonstrator, tutor, trainer and learning and development director. Responses to the questions on workplace mentors encountered in teaching trade-specific skills and workplace etiquette were the shortage of time for coaching, the readiness, the diverse backgrounds and proficiencies, and the lack of work experiences of the students. Most of the workplace mentors used guidance, coaching, observations, case studies, real-life examples, experience sharing, learning and teaching activities, self-evaluation, target setting and feedback as teaching methods to help students learn more effectively. Videos, case reviews, self-assessments and reflections, hands-on practices, demonstration of procedures and real-life projects were also used to facilitate students' learning in the

workplaces. Most of the workplace mentors had designed or used online resources, guidelines and notes, assessment and feedback forms and reflective logs. Over half of them agreed that the current resources were sufficient but they would like to have train the trainer, coaching skills and mentoring skills courses. Regarding the questions on using technology in mentoring, the workplace mentors in the hospital said they had been using e-learning materials for learning, assessments and evaluations. The workplace mentors in the retail sector did not use any technology in mentoring because of the job nature, while mentor in entertainment industry used internet to retrieve online resources for students for reference in mentoring. The workplace mentors in general asserted that technology was convenient for timely update of teaching materials, provided flexible learning without being bounded by locations, fostered communications via social media and was attractive to young generations. However, they commented that the drawbacks lied on the resources input for development, the unsuitability for hands-on practices and lack of personal care. Half of the workplace mentors believed that technology would benefit students and enhance the effectiveness of mentorship. When asking the questions on teaching with technology and students' supports in IAs, the workplace mentors expressed that interactive course, video capture, online viewing of lectures, instant messages for communications, online assessment and feedback sharing platforms between school instructors, workplace mentors and students were most needed. The workplace mentors in general contended that social media provided better communication and sharing of information; AR/VR served as a supplement to students' hands-on practices which enhanced their learning; video capture system allowed timely and clear review of lectures and demonstrations; MOOC enabled flexible and self-paced learning; and mobile apps were for convenience. The workplace mentors also agreed that the above when used appropriately would enhance mentoring effectiveness. When asking workplace mentors' most preferable learning aids and technology, it may be due to their industrial culture that they mostly chose printed copies as the first choice followed by personal computers and mobile phones. On the suggestions for the use of technology and online resources, most of the workplace mentors suggested that online platforms learning and teaching materials were most needed. Some workplace mentors also suggested the above should be sponsored and developed by the government bodies or recognised organisations, e.g. WHO, CINAHL, MEDLINE.

3.5 Summary of the Responses from the Interviews

A summary of the most salient responses from all the focus groups and individual interviews is mentioned in Table 1.

Participants	Reponses to interview questions
Students	 Like: Students preferred flexible learning while at the same time maintaining peers communication Students used personal computers and/or mobile phones for online information searching and communication with peers Visual images, videos, demonstrations, group discussions, interactive activities, real-life experiences sharing and tutorials were preferred in lessons Long lectures without interactions, rigid teachers, fast teaching pace, unclear explanations and heavily loaded timetables were unfavourable Help sought from peers face-to-face or via social media, online searching for subject information, dictionaries and demonstration videos were popular Students believed that technology could enhance their learning They would like to have videos, lecture capture system for timely review of lessons, AR for simulation practices, online platforms for materials sharing and retrieval, mobile apps, MOOC for flexible learning and social media for communication with peers Unlike: Their most frequently encountered difficulties in class were teachers' fast teaching pace, English vocabulary and jargons, classes involving theories, not being able to ace and ramember domonstrations or well as the
	understanding of lecture notes
Teachers	 Like: Teachers preferred using computers and mobile phones to access internet and online resources Most teachers believed that technology would motivate students to learn more effectively, as it enabled easy information sharing and material updates, broadened students' visions with abundant resources, provided flexible learning, catered for diverse learning styles, offered better interactions and communication outside schools and created multi-sensory attractions Using technology saved time on updating teaching materials, lessened administrative work, was good for data collection and thus released teachers' workloads The most commonly used technology for the teachers were PowerPoints, video clips, online resources, internet, YouTube, Facebook, WhatsApp and other mobile apps Teachers agreed that during students' IAs, technology enhanced learning, such as interactive course contents, lecture capture system, videos, online learning and teaching resources and assessments, and discussion forums would help Teachers considered that social media, AR/VR, video capture system and MOOC would enable teaching effectiveness Student-centred approaches were used to conduct different learning and teaching activities such as real-life examples, learning games, group discussions, questionings and different assessments to draw students' attentions

Table 1 Summary of the responses from the Interviews

(continued)

Participants	Reponses to interview questions
	 Unlike: Some said the current resources were enough and sufficient while the other mentioned that there was room to enhance the TLPs, online supplementary materials and subjects related information Teachers would like to have training on instructional design, classroom management and TEL
Workplace mentors	 Like: Guidance, coaching, observations, case studies, real-life examples, experience sharing, learning and teaching activities, self-evaluation, target setting and feedback were used to help students learn more effectively Videos, case reviews, self-assessments and reflections, hands-on practices, demonstration of procedures and real-life projects were also being used to facilitate students' learning in the workplaces Half of the workplace mentors agreed that the current resources were sufficient The workplace mentors in general asserted that technology was convenient for timely update of teaching materials, provided flexible learning without being bounded by locations, fostered communications via social media and was attractive to young generations Half of the workplace mentors believed that technology would benefit students and enhance the effectiveness of mentorship Interactive course, video capture, online viewing of lectures, instant messages for communications, online assessment and feedback sharing platforms between school instructors, workplace mentors and students were most needed Online platform learning and teaching materials were most needed and the workplace mentors suggested the above should be sponsored and developed by the government bodies or recognised organisations They would like to have train the trainer, coaching skills and mentoring skills courses Unlike: The most common problems the workplace mentors encountered in teaching trade-specific skills and workplace etiquette were the shortage of time for coaching, the readiness, the diverse backgrounds and proficiencies and the lack of work experiences of the students The drawbacks lied on the resources input for development, the unsuitability for hands-on practices and the lack of personal care

Table 1 (continued)

4 Implications and Conclusion

With an aim to identify suitable pedagogical practices and e-learning means by studying VPET's students, teachers and workplace mentors' teaching needs in VPET's workplaces for more effective learning and teaching in VPET, this study used individual interviews and focus groups interviews with a range of VPET stakeholders to collect views for comparison and analysis. With the advancement in technology, it is identified that the current trend in learning and teaching is blending face-to-face teaching with e-learning or mobile learning (Lecture Capture, Live

Broadcasting, Wearable Technologies, MOOC), AR/VR and Instant Messaging (Social Media, Group Chat), Workplace mentors generally regarded that technology would benefit students and enhance the effectiveness of mentorship. Findings also suggested that mobile and flexible TEL would be the appropriate innovative pedagogical practices that would benefit workplace learning and teaching. The result of this study also revealed that flexibility, guidance, collaboration and training would able to accommodate VPET students, teachers and workplace mentors' learning and teaching needs. Implications of this study suggest further examination on instructional design of specific trade-specific learning and teaching materials so as to utilise the suggested mobile and flexible technologies. The well preparation of students, teachers and workplace mentors for the blended mode of learning and teaching using technologies is another hurdle to be solved. Other noteworthy points are the resources and support from training institutions and professional organisations, the feasibility of using mobile and flexible technologies to complement and supplement hands-on practices in authentic workplaces. In sum, this study concludes that TEL would be the most appropriate pedagogical approaches to enhance learning and teaching experiences in workplaces.

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