Choosing Relevant Internet-Assisted Approaches for Professional Development Courses

Lili Mutiary* and Christina Lim-Ratnam

***Abstract*—Online teaching and learning for the professional development of workers in service is ever pervasive and continually growing. Yet, studies of learning with technology are mostly conducted in K-12, pre-service, or higher education settings resulting in a lack of attention given to the professional development. In addition, most studies are investigating learners instead of instructors, even though the latter are reportedly struggling in conducting online teaching. One of the struggles instructor faces includes choosing effective technologically enhanced pedagogy that are in line with the learning contents and intents. This study aims to alleviate the issue by investigating online learning in a professional development context, particularly one in a government institution such as the Financial Education and Training Agency (FETA) under the Indonesian Ministry of Finance. By analyzing curriculum documents known as program syllabi of 148 online courses conducted by FETA, informed by a prevailing theory of adopting educational technology known as the Substitution, Augmentation, Modification, and Redefinition (SAMR) model, the study found the majority of courses were under Substitution category for uses of technology, followed by Modification and Augmentation categories. Redefinition category had the least number of courses. Characteristics of each use of technology are explained in the Findings and Discussion section. It is hoped that the uses of technology explicated in this study will be useful for guiding the practice of crafting a defensible curriculum for online learning in professional development contexts.**

***Index Terms*—Online learning, online teaching, professional development, SAMR**

I. Introduction

Since the integration of information and communication technology (ICT) into education decades ago, there have been numerous technologically enhanced pedagogies [1]. Online learning includes various forms of ICT-assisted learning, such as distance, blended, and mobile learning [2]. The prevailing growth of online learning has been complemented by an increasing amount of academic interest in studying it. However, most studies of online learning are situated in K-12, pre-service, or higher education contexts with much less attention given to the Professional Development (PD) context, particularly in a government institution. Such lack of online learning study presents a gap in the field. In this study, PD is defined as the various learning experiences to improve employees' competencies for professional practice [3].

Although PD instructors are required to utilize technology for teaching online [4], there is not much guidance for their practice since not much attention has been given to online learning in a PD context [5]. Online instructors have been reported to struggle in conducting online learning [6]. The difficulties they encounter in adopting technological innovations for teaching online [7] include struggles in choosing effective technologically enhanced approaches for teaching online that are in line with learning contents [1].

To assist instructors in selecting relevant technological tools for online teaching and fill the gap of online learning study in a PD context particularly one in a government institution, this study is conducted at the Financial Education and Training Agency (FETA). FETA is the government agency responsible for providing PD courses for the Indonesian Ministry of Finance (MOF) employees. There are 11 directorate generals (DG) and agencies under MOF, and FETA is one of them. A study conducted at FETA may create a ripple effect to other PD institutions.

This study aims to investigate online learning in a PD context to uncover considerations to guide its practice. These considerations were gathered from the investigation into online PD courses' curricula conducted by FETA. To achieve this purpose, the study poses the following research question:

> *What are the various uses of technology for online teaching and learning in the professional development context of the Indonesian Ministry of Finance's Financial Education and Training Agency?*

By answering this question, considerations regarding the uses of technology for online learning will be explored. The considerations can be used to guide the practice, particularly for a PD context.

II. Literature Review

This section discusses the context where the present study is situated along with relevant theories and research.

A. Professional Development

Professional development (PD) is defined as the many types of educational experience related to improving employees' competencies to conduct their work [3]. It goes by many names, such as in-service education/development/ training [8], professional education/training/learning [9], continuing professional education/training [10], and staff development [11]. In a narrow sense, PD is considered similar to training [12]. In a broad sense, PD is considered as part of lifelong learning [9], a continuous improvement of

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competencies through a variety of means. It implies a constructivist approach to learning in which learners develop their professional knowledge and competence. When these narrow and broad definitions are combined, PD is fundamentally the planned activities or experience designed to promote construction of knowledge arising from a lifetime of professional and personal growth to improve organizational effectiveness. The learning experience in PD includes on- and off-the-job training [13] with informal and formal activities [12]. It ranges from in-class workshops and seminars [3] to collaborative discussions [6] and personal reading [13].

As the government institution responsible for developing MOF employees' competencies, the focus of FETA's courses is not only the acquisition of technical skills related to public finance (e.g., accounting, budget provision, tax calculation), but also includes a construction of professional competencies in diverse knowledge fields (e.g., communication strategy, policy design, service excellence). Furthermore, in line with the principles for adult learning [14], learning delivery at FETA includes not only teacher-centered lectures, but also learner-centered instructional activities, such as discussion, problem-solving, and student project. Such holistic approach is in line with the notion of PD [15] and needs to be practiced further.

B. Online Learning

There has been an increase in the use of online learning along with its research [16] for the last two decades [17]. One reason was because online learning offers flexibility for learners [18, 19]. Online courses enable learners to join the class from the comfort of their homes and at their own convenient times [20]. This is particularly true for asynchronous online activities, such as a reflexive written discussion in an online forum, in which the activities do not have to be conducted by all participants at the same time [21]. Such flexibility is preferred by adult learners who need to balance family and work responsibilities on top of learning [22]. By delivering courses online, students do not have to travel to and from their locations of study.

By enabling students to learn and work at the same time, online learning has lessened the loss of working time for studying. It also enables students living in another part of the world away from instructors and peers to enroll in online courses. In addition, online learning has been reported to improve learning performance [23] and satisfaction [24] better than its traditional offline learning counterpart [25]. Such benefits have led to an increasing demand for online courses. The surge in demand for online learning was accelerated by the COVID-19 pandemic [26].

In the present study, online learning is defined as learning delivered in an online environment through the use of internet for teaching and learning [2]. Learners are not dependent on their physical or virtual co-location. By this definition, online learning is conceptualized as a motherhood term encompassing the use of all forms of technology for teaching and learning, synonymous to e-learning [5]. It covers various forms of computer and internet-assisted learning, such as distance learning, web-based learning, and blended learning. In the present study, online learning covers all forms of learning with ICT.

There has been a change in the online teaching practice, particularly for adult learners. In the early days, the incorporation of ICT was mostly in the form of a video-recorded lecture for content delivery rendering a one-way teacher-centered knowledge dissemination approach [27]. This approach is similar to the in-class learning conducted through conventional pedagogy. In today's world, ICT is utilized in online learning for various purposes. For example, ICT could be used to enhance interactions between learners and instructors or peers through tools such as discussion forums, chat features, and collaborative project platforms [2]. ICT could also be used to support the flexibility of online learning by conducting asynchronous activity, for instance, by assigning reflective journal or discussion completed at learners' own time [21].

The possibilities offered by ICT is congruent with self-directedness in adult learning [14]. With proper technological assistance, independent adult learners should be able to flexibly set their learning goals, plan learning to reach their goals, and direct themselves in conducting learning activities and experiences to achieve their learning targets [28]. Therefore, it is important to incorporate ICT to support collaborative learning [29], particularly for adult learners [14].

Harnessing the affordances of ICT in encouraging better interactive communication between learners and instructors, however, is challenging as it requires extra work and effort from the instructors [6]. They need to design proper instructional strategies and select the most appropriate tool to support the instruction, particularly for a large class [28]. The issue is exacerbated by the tendency that learners, even the digital natives [30], might be advanced in using social media and chat applications, but could be relatively new to socio-constructive learning and navigating through learning management systems or web-learning features [26, 28]. Providing support for learners requires additional time and effort from online instructors. However, ICT can be utilized to create optimum and meaningful learning experience. An intensive learners' interaction can be created by designing collaborative problem-solving activities in line with adult learning principles [14].

C. Use of Technology

The embedded use of technology in online learning necessitates a conceptual and analytical framework to guide its use. Once such framework is the recent, yet prevailing Substitution, Augmentation, Modification, and Redefinition (SAMR) model founded by Puentedura [31, 32]. SAMR is a model to guide instructors in adopting technology into teaching, applicable for online teaching. In this study, technology is broadly defined to include all kinds of knowledge and tools, both analog and digital, including older and newer advances [33]. The model has four development stages [31, 32] as presented in Table I.

The first two stages of integrating technology are Substitution and Augmentation, parts of learning enhancement [31]. In Substitution, technological tools are merely replacing offline instructional tools that would have been used without technology, such as by using Zoom to

replace lecturing in a classroom. The second stage is Augmentation in which functional features of a technological tool are utilized into learning activity [31], such as, following the previous example, by using the breakout room feature in Zoom to divide learners into groups. These two initial stages of technology integration were aimed to enhance learning activities, to help complete work more efficiently and effectively [34].

TABLE I: THE SAMR MODEL

Categories and Descriptions	Examples of Use of Technology
Substitution (S): Tech acts as a direct tool substitute, with no functional change.	• Lectures through Zoom or similar platforms • Discussions in virtual classes • Question and answer sessions with instructors
Augmentation (A): Tech acts as a direct tool substitute with functional improvement.	• Assessing learners (e.g., quizzes) using Kahoot or similar application • Note-taking on Google Sheets or Drives • Using breakout rooms on Zoom for group discussions
Modification (M): Tech allows for a significant task redesign.	• Learning outputs were more than simple writing tasks • Involving peer-discussions • Using Google Drives for group assignments
Redefinition (R): Tech allows for the creation of new tasks, previously inconceivable.	Learning outputs (e.g., video, flyer, article) were uploaded and made available for public. It gave the chance for learners to get feedback from public viewers

The next two stages of integrating technology are Modification and Redefinition parts of transformation in learning [31]. The third stage in the model is Modification in which the technological tools incorporated into the instructional strategy modify the learning activity, such as by requiring students to work on group assignments on Google Drive to enable them to review and edit each other's work. This activity creates collaborative learning experience that can be complicated without technology [34].

The next stage is Redefinition in which technology integration allows a "creation of a new task" [31] unable to be conducted without the integrated technology, such as by requiring learners to post their projects online, enabling the global community to access the work widely and giving them a chance to offer an opinion [32]. By giving a wider exposure to students' work, the instructors are providing chances for students to receive various feedback that can be valuable. These two stages are parts of learning transformation, changing the nature of the learning experience [34]. The key difference between Enhancement and Transformation learning stages which essentially became the distinction between Augmentation and Modification is that transformative learning entails instructional activities that were not practiced before the incorporation of technology into the teaching and learning activities [31].

Although SAMR is a recently launched model relative to the existing models and framework for teaching with technology, it has gained popularity [35] in empirically investigating the educational use of technology [36], particularly in mobile learning [37]. Nevertheless, none of these studies were conducted for online learning courses with adult learners in a PD context as the present study. Regardless, the model has provided a relatively simple guidance in designing and assessing the incorporation of ICT into instructional activities. The model was built on the notion that teachers are more likely to start integrating technology in teaching by incorporating familiar instructional strategy and tools [31]. Therefore, Substitution is a common form of technology integration for beginners. Nevertheless, along with attention comes scrutiny. One common critique about SAMR is its lack of instrument to measure the use of technology [38]. This lack has caused uncertainty in deciding in which category an instructional strategy belongs [35, 39]. In response, recent studies have extended SAMR by providing more descriptive explanation for each category [37]. The present study aimed to extend the field by providing the description in the PD context so as to guide the practice of using technology for internet-assisted teaching and learning in PD contexts.

III. METHODOLOGY

A. Research Design

This study adopted a constructivism paradigm to understand and explore online teaching in a PD context. Constructivist was selected as the reality is subjected to the value-laden context of the people living in and perceiving it [40]. Thus, an exploration is necessary since there is not much known about online teaching particularly in a PD context [17].

The design of the present study is qualitative. The use of qualitative methodology was aimed to uncover the online learning practice in a PD context. As there is not much known about online learning in PD contexts [17], qualitative methodology allows the researcher to construct meaning [40] by exploring online learning in its context.

B. Research Site and Sample

The locus selected was FETA as it provides access to a government institution conducting PD courses. As part of the institution, the researcher has the necessary background knowledge and experience to comprehend the online learning practice and uncover the principles guiding the practice. The adoption of constructivist paradigm coupled with the researcher's background helped the co-construction and interpretation of meanings of the views and experience of people working in the PD context of FETA.

As the agency responsible for providing PD courses for MOF employees, FETA has six Education and Training Centres (ETCs) that cater to different agencies and DGs under MOF. They are: 1) the Leadership and Management (LM) ETC, 2) the Budget and Treasury ETC, 3) the Customs and Excise ETC, 4) the Tax ETC, 5) the State Asset and Fiscal Balance ETC, and 6) the General Finance (GF) ETC. Most of the ETCs are responsible to conduct courses with specific learning contents for one or a few agencies or directorate generals (DG) under MOF. Two ETCs (i.e., LM and GF ETCs) were responsible to conduct courses with general learning contents for all ETCs.

For the purposes of this study, three ETCs were purposively selected based on their various contents of PD

courses that led to the various audiences of these courses. The first ETC selected was the LM ETC which conducts general learning contents, thus caters to all DGs and agencies. The learners of LM ETC's courses comprise of employees coming from various offices at MOF.

The second ETC selected was the Tax ETC which provides specific tax-related learning contents. Due to its specificity, Tax ETC caters mostly to the employees of DG Tax. The small portion of learners that do not work at DG Tax, still joined the courses to learn about tax. Moreover, Tax ETC was chosen among the other specific ETCs since it caters to the biggest institution under MOF. More than half of MOF employees work for DG Tax.

The third ETC selected was the GF ETC as it represents a middle point in the spectrum of general and specific learning contents and audience. GF ETC provides general learning contents for employees working in all agencies and DGs in MOF, such as foreign languages (e.g., English, Mandarin), IT-related skills (e.g., big data analysis, Microsoft Office courses), and performance-related competencies (e.g., service level agreement, performance management). GF ETC also caters to the agencies and DGs not covered by the other specific ETCs and provide specific courses for them. For example, it provides financial and economics-related courses for the DG Budget Financing and Risk Management's employees, public finance-related courses for the Fiscal Policy Agency's employees, auditing courses for the Inspectorate General's employees, communication strategy courses for the Secretariat General's employees, and knowledge management courses for FETA's employees.

To summarize, the course syllabi for the document analysis of this study were purposively sampled from three ETCs: LM, GF, and Tax ETCs. Fig. 1 illustrates the ETCs selected representing different points on the spectrum.

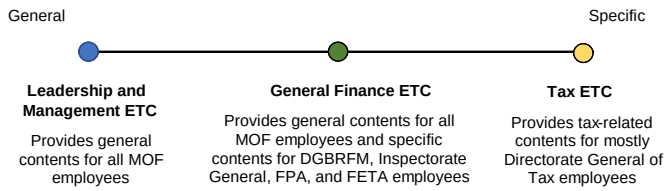

Fig. 1. Spectrum of contents and audiences of the sampled ETCs.

C. Research Method

To ensure the breadth and depth of the study, this study adopts a document analysis method. The analysis was conducted upon curriculum documents of online PD courses. The document selected to be analyzed was the program syllabus as it has the most complete information regarding the course and instructional strategies which includes information regarding the use of technology. To promote relevance of the study, online PD courses conducted throughout 2021 were selected as the sample. Due to the COVID-19 pandemic, all courses in 2021 were conducted online. There was a total of 154 syllabi of online courses collected from the three ETCs. Due to six syllabi being the earlier versions of other syllabi in the sample, they were removed resulting in a final number of 148 syllabi analyzed. These syllabi were coded D01 to D148 for identification with D stands for document.

The analysis of documents was specifically on the descriptions of technology uses in each syllabus, typically in the description of instructional activities. SAMR model was used to guide the thematic analysis [41] of the data. Each course was categorized based on the highest technology uses reached similar to previous studies [37].

A qualitative data analysis software MaxQDA® was used to assist the coding of document analysis. The data coding was conducted in its original Indonesian language to avoid distortion of meaning caused by translation [42]. Interrelationships between codes were also established and code frequency was counted to derive meaningful interpretations [43].

IV. Findings and Discussion

From the analysis of documents, all categories of technology use had courses as presented in Fig. 2. As can be seen, the majority of courses were under Substitution with 115 courses (i.e., 77.7%). The remaining three categories, Augmentation (i.e., 12 courses, 8.11%), Modification (18 courses, 12.16%), and Redefinition (i.e., 3 courses, 2.03%) had much less numbers of courses.

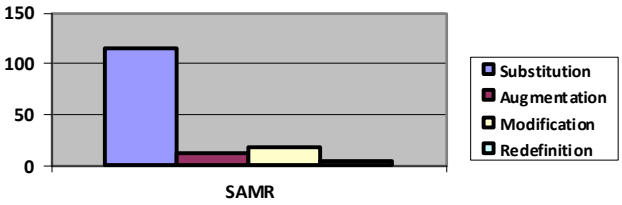

Fig. 2. FETA courses in categories of technology uses.

Substitution was also the dominating use of technology across all ETCs as shown in Fig. 3. It was the dominating use of technology at Tax ETC with only Substitution and Modification uses of technology. Therefore, GF and LM ETCs had relatively more varied uses of technology.

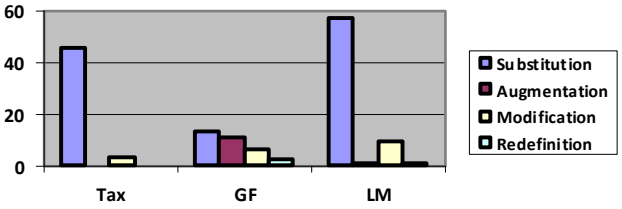

Fig. 3. FETA courses in categories of technology uses by ETCs.

A. Substitution

The majority of FETA courses (i.e., 115 courses, 77.7%) were categorized under Substitution as these syllabi did not indicate any higher uses of technology. It is also the category with the highest number of courses across all ETCs. At the Tax ETC, Substitution had 45 out of 48 courses accounting for 93.75%. At the GF ETC, the category constituted 13 out of 32 courses accounting for 40.63%. At the LM ETC, it

constituted 57 out of 68 courses accounting for 82.82%. Moreover, uses of technology categorized in Substitution were found in all FETA's sampled courses regardless the learning contents.

Most FETA courses were under Substitution category as their uses of technology were only to replace the offline instructional activities. For instance, lectures were becoming online conducted primarily on Zoom to replace the lectures in classrooms during offline learning. The use of Zoom as a platform for online lectures were mentioned in 69 syllabi, constituting more than 60% of the courses under Substitution. The use of Zoom for online classes included other common instructional activities for offline classes, such as class discussions, virtual presentations for assignments, and instructor's feedback on assignments.

Such domination of substitutional use of technology is predictable as it is the category with the easiest and the most straightforward use of technology [31, 32] for online learning. In other words, instructors were using technology for online learning in essentially the same ways they had been teaching offline. For FETA courses, instructors had been conducting lectures and discussions in offline classes. As they transformed to online learning, instructors were still teaching and sharing contents in online classes, the virtual classroom of Zoom.

In addition, there were other use of technology for instructional activities that occurred outside of an online class setting categorized into Substitution. These uses of technology were for submitting assignments and sharing learning contents. In the online learning context, assignments were typically submitted electronically using emails. The use of emails was caused by the physical distance between instructors and learners which made direct submission impractical. Such use of technology for submission of assignments was categorized as Substitution as it was only to replace direct submissions typical in offline classes.

Another substitutional use of technology was the use of a Learning Management System (LMS) known as the MOF Learning Centre. Such use of technology was substitutional as the LMS was only use for storing and sharing learning contents and materials. The contents were typically in a form of reading materials and recorded lectures that learners needed to study on their own. Subsequently, they would be required to complete quizzes to assess their comprehension. Such instructional activity was merely replacing the in-class study and assessment. Another common use of technology categorized into Substitution was the use of a chat application for discussions, such as WhatsApp. The use of WhatsApp was similar to a previous study [44]. It was aimed to replace Zoom to give more flexibility for learners to participate.

B. Augmentation

Continuing from Substitution, Augmentation is the category with the third most course at FETA. 12 courses (8.11%) were categorized into Augmentation as these courses involved using additional features of technological tools to augment learning [31]. Augmenting means that the use of technology improved the online learning practice to become more efficient, effective, or engaging. Table II enlists the courses and their contents.

TABLE II: COURSES IN AUGMENTATION CATEGORY

No.	ID#	Course Title	Contents
1.	D57	DL for the Basic of Input-Output Model	
2.	D60	DL for the Structural Equation Modelling	Economic Model
3.	D61	DL for the Applied International Economics	
4.	D64	DL for the Basic of Research Methodology	
5.	D68	DL for Research Methodology	Research Methodology
6.	D65	DL for Data Governance: Data Management	
7.	D67	DL for Enterprise Service Bus: API Platform	IT related
8.	D69	DL for the Guidance for IT Practitioners	
9.	D71	DL for the Computer-assisted Auditing	
10	D56	Distance Learning (DL) for Speech Writing	As stated in the course title
11	D62	DL for Performance Management	
12.	D103	DL for Strengthening Integrity Framework (LM ETC's course)	

The first 11 courses were GF ETC's while LM ETC had only one course. Tax ETC did not have any course in this category. There were also courses categorized in higher categories with some of their uses of technology categorized as Augmentation.

Fundamental functional improvements were illustrated in the course syllabi categorized into Augmentation. These syllabi stated various forms of using technology which augment or improve the learning experience. These uses of technology include a specific platform for learners' assessments, a web-based online drive for disseminating contents and working on assignments, and a separate room feature of a video conference platform for private sessions between learners and instructors.

The use of a specific platform for learners' assessments was stated in three out of the 12 courses in Augmentation. One of which was D103, the only course from LM ETC. It involved the use of "Quizziz" and "Kahoot" for instructors to assess learners through quizzes. Quizziz [45] and Kahoot [46] are learning engagement platforms designed to create online quizzes and surveys. Through these platforms, learners could check the correct answers by themselves. Instructors were required to provide the correct answers of the quizzes to be shown to learners after answering the questions. Therefore, these platforms provide functional features for self-assessment which may improve efficiency of the assessments rather than having the instructors grading the assignments one-by-one manually before returning them back to the learners. Such use of platforms for formative assessment was suggested [47] to encourage competition

between learners which may increase engagement [45].

The second variety of technology use in Augmentation was using web-based applications to share additional learning contents to enrich the learning experience. The most commonly used application was Google Drive, a two-pronged web-based application provided freely by Google for storing and working on files [48]. The form of the contents might vary, such as video or journal articles taken from the Internet. Learners would be required to learn these materials independently. Subsequently, they were required to complete a quiz or do an assignment related to the contents given. The assignment could be in a form of writing a resume, writing a learning journal report, or listing points needing clarification from the instructors. Learners were required to submit their assignments through the same drive used to disseminate the contents. These assignments would be reviewed by the instructors and given feedback. Alternatively, this instructional activity of disseminating contents, submitting assignments, and providing feedback through the same channel might also be conducted through MOF's LMS. Regardless of the technological tool used, the feedback would only be from instructors to learners instead of peer feedback, as the latter is a form of collaboration that merits categorization beyond Augmentation.

Another variety of technology use in Augmentation was the use of the breakout room feature in Zoom for direct consultations or private discussions between learners and instructors, particularly for learners needing further guidance. Such private discussion may also be held through the WhatsApp application, by texting rather than direct verbal communication.

C. Modification

As the third category for use of technology, Modification had the second highest number of courses with 18 courses accounting for 12.16%. Nine courses were LM ETC's, six were GF ETC's, and three were Tax ETC's enlisted in Table III.

TABLE III: COURSES IN MODIFICATION CATEGORY

No.	ID#	Course Title	Contents	ETC
1.	D02	e-Learning for Tax Extension Workers	Socia-lizing tax-related regulation and policy	Tax
2.	D08	DL for Assistant to Tax Extension Workers		
3.	D21	DL for Tax Extension Workers		
4.	D49	e-Learning for Data Analytics (DA)	Big Data Analysis	GF
5.	D50	e-Learning for Data Decision		
6.	D58	DL for DA Specialists		
7.	D51	DL for Acquisition of Digital Evidence (for Mobile Devices)	Forensic Audit	
8.	D55	DL for Composing Service Level Agreement (SLA)	SLA	
9.	D74	Workshop for Implementation of Governance, Risk Management and Compliance	Risk Manage-ment	
10.	D85	e-Learning for Leadership	Leader-ship skills	LM
11.	D108	DL for Improving Transformational Leadership		
12.	D88	DL for Improving Public Speaking	Commu-nication related skills	
13.	D99	DL for Communication Skills		
14.	D101	DL for Negotiation Skills		
15.	D90	DL for Coaching, Mentoring, and Counselling (CMC) Skills	CMC	
16.	D98	DL for CMC for Non-MOF		
17.	D102	DL for Excellent Frontliners	SLA	
18.	D106	DL for Service Excellence		

The use of technology categorized into Modification involved a task redesign [31] which differentiates the new task with what was assigned prior to the incorporation of technology. For example, it involved a transformation of activities and assignments such as role plays (e.g., D102, D106) and community of practice (e.g., D90, D108). The forms of assignments also vary. Some courses required infographic (e.g., D54), video (e.g., D02, D08, D21, D83, D88, D90, D98, and D99), big data analytic project (e.g., D49, D50, and D58), guideline document (e.g., D55 and D74), and project report (e.g., D85) as learners' assignments.

Due to such redesign, the instructional activities and completion of assignments in Modification required deeper thinking process and added competencies by learners. Creating infographic and video required additional competences such as design-related skills, and video making and editing in addition to the content-related (e.g., tax-related) knowledge. Completing a big data analytic project required a complicated computer-assisted data analysis competency in addition to knowledge about the data. Writing a guideline document required knowledge about law, regulation, and effective communication, among others, beyond the knowledge about the content needs guiding. Writing a project report was also complicated as it required a completion of the project in the first place. To illustrate the necessity for additional competencies in completing assignments categorized in Modification, 8 courses (i.e., D02, D08, D21, D83, D88, D90, D98, and D99) were included as these courses required learners to create video as assignments. Such video making assignments required added competencies beyond the learning contents of the courses (e.g., tax, anti-corruption). It requires additional skills such as storytelling, video recording, and video editing. Therefore, the work became more complex. The added complexities necessitated some of the work to be completed collaboratively in groups. Such grouping rather than individualized assignment was another characteristic of technology use categorized as Modification.

D. Redefinition

As the highest category for use of technology, Redefinition had the least (i.e., 3) number of courses accounting for 2.03%. As listed in Table IV, two of the courses were GF ETC's and the remaining one course was from LM ETC. There was not any course from Tax ETC.

TABLE IV: COURSES IN REDEFINITION CATEGORY

No.	ID#	Course Title	Contents	ETC
1.	D54	DL for Strengthening the Quasi Sovereign Instrument	Market CWLS	GF
2.	D59	DL for Mass Media Writing	Publish Article	
3.	D83	DL for Certification of Anti-Corruption (AC) Extension Workers	Promote AC	LM

Redefinition involved using technology for instructional activities beyond the class itself [31]. It involved learners making the learning outputs available publicly for a wider audience to access. The idea is that such audience might give feedback that could be better than what instructors and peers could offer.

Such is the key difference between Redefinition and the previous categories. In Augmentation, assignments and projects were only sent to the instructors to grade and give feedback. In Modification, assignments were made available for instructors and peers to give feedback. In Redefinition, the chances to provide feedback is not confined within the class, as the learning outputs were published online, thus the general public may respond and give feedback.

The similarity among the three courses categorized in Redefinition was that each course has a learning output made public. D54 required learners to create a publication material (e.g., poster, infographic) posted on their social media to help promote the selling of CWLS[1], a financial instrument issued by the Indonesian government. D59 required learners to write an article published in a mass media to educate people regarding public finance. D83 required learners to create a post to promote anti-corruption. All courses required learners to create outputs based on the learning contents and post them publicly.

Nevertheless, some FETA courses were categorized into Modification even though the syllabi mentioned that the instructional activities involved making the learners' assignments and projects available online. This was because the access was limited to instructors and peers and the uploading was merely use as a proof of submission. The activities were completed as soon as the assignments went public. Furthermore, it made sense that the contents of these courses were related to publicity. It was also probably the reason that there was not any course from Tax ETC as tax-related contents were mostly technical thus for a limited use.

V. CONCLUSION

There were four categories of use of technology: 1) Substitution, 2) Augmentation, 3) Modification, and 4) Redefinition. At FETA, not all ETCs had courses in these categories. GF and LM ETCs had courses across the four categories, but Tax ETC only had courses in Substitution and Modification categories. A course was categorized to a category based on the highest use of technology stated in the description of instructional activities in the syllabi.

Substitution had the highest number of courses with Modification second and Augmentation third. Redefinition had the least number of courses. This was likely due to Substitution being the easiest and most basic way to incorporate technology into instructional activities, which was only to replace what had been done without technology. Most FETA's online courses involved the use of video conference platform to deliver online lectures to replace the in-class lectures in offline courses. This was a response to the COVID-19 pandemic which forced a transformation of teaching from offline to online environments.

Augmentation involved the use of functional feature. One common practice was the use of email to submit assignments due to the physical distance between instructors and learners. Another common practice was the use of chat application or video conference feature (i.e., breakout rooms) for instructor-learner discussions. In Augmentation, feedback was limited to coming from instructors and not yet from learners' peers.

This was different for Modification. The category involved a redesign of task making it different with how it was before the use of technology. One such redesign was by enabling collaboration between learners. For instance, learners were facilitated to work in groups and provide feedback to their peers to improve the group work. Google Drive is the most common tool used for such purpose as it enables collaboration and storage in a single platform.

Redefinition expanded the use of technology beyond the class. It involved making assignments and projects available for public to provide chances for better feedback. Due to such characteristic, all 3 courses in this category were related to publicity. They involved publicizing the contents learned in a form of published media (i.e., video, infographic, article).

The present study was conducted in a PD context for adult learners. It was aimed to provide insights into uses of technology for online learning in contexts other than higher education or schools for young adults or children. Nevertheless, since this study was situated in a government institution, the finding may not be applicable to institutions embedded in corporations with profit-oriented nature. Future research may explore online learning in a corporate PD institution or investigate the practice in another country as a comparison. In addition, since this study incorporated document analysis method, future studies might want to incorporate other qualitative methods such as observation, or quantitative method as an alternative.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

L. Mutiary conducted the research, collected, and analyzed the data, and wrote the paper. C. Ratnam-Lim initiated,

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advised, and supervised the research, provided feedback, and wrote the paper. All authors had read and approved the final version of the manuscript.

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