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PRIMARY SCHOOL PRE-SERVICE TEACHERS' TECHNOLOGY SELF-EFFICACY IN CREATING E-LEARNING CONTENT USING COURSELAB 2.4

Theresia Yunia Setyawan *
Universitas Sanata Dharma, Jl. Afandi, Depok, Sleman, Yogyakarta 55281, Indonesia
* Corresponding Author. Email: theresiayunia@usd.ac.id
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Abstract

This was descriptive research aiming at providing a general description of primary school pre-service teachers' technology self-efficacy in creating e-learning content using CourseLab 2.4. The main instrument of this research was a self-report questionnaire consisting of both scaled and free-response items. The questionnaire was distributed to 46 sophomores of Primary School Teacher Education Program of Sanata Dharma University taking Media Pembelajaran Berbasis ICT (MPB ICT) course as one of their compulsory courses. The analysis of the data gathered from the questionnaire responses showed that 58.7% of the primary school pre-service teachers of Sanata Dharma University had 'average' technology self-efficacy in creating e-learning content using CourseLab 2.4 while only 41.3% having 'high' self-efficacy in using the same software. The average technology self-efficacy was attributed to their unfamiliarity to the authoring software and their limited experience in course content development as well as in coding in general. The student teachers, however, credited the software for providing them with tools and machinery to create their own tests or quizzes for any learning materials they had previously created.
Keywords: *Pre-service teachers, primary school, self-efficacy, CourseLab 2.4*

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Introduction

Being a teacher in this era of technology requires not only knowledge of what to teach and skills of how to deliver the content but also the knowledge and skills of choosing as well as integrating the right technology to help students learn the content better. Teachers should have a deep understanding of not only the subject matter and what kind of activities will best promote learning but also of what and how technology should be integrated to promote the best learning experiences for their students. This kind of teacher knowledge for technology integration, as Koehler and Mishra (2009) suggested, is known as Technological Pedagogical Content Knowledge (TPACK) framework and, as its name suggested, also entails teachers' confidence in making decisions of whether or not to integrate technology into their teaching based on their knowledge of the subject matter in hand as well as that of pedagogy (Anderson, 2017).

The TPACK framework has become increasingly significant among educators with the rise of generation alpha. As this generation born from the year 2010 and beyond is predicted to be the most technology savvy generation ever (Schawbel, 2014), teachers of this future generation need to prepare and equip themselves with adequate knowledge of technology and its integration. They are also required to more than just integrating tools or technologies in their classes but also to be able to design as well as create their own materials using the tools and technologies so as to provide their generation alpha students with meaningful learning experiences. This means they have to be ready to shift their role from a mediator between their students and any available information in the World Wide Web to a facilitator who assists students in the process of gathering the information while providing supportive learning environments for the students (Priyatma, 2016).

In order to be able to function as a facilitator or mentor for their generation alpha students, teachers should believe and have personal confidence that they can use technology successfully, purposefully, and effectively (Holden & Rada, 2011). They should be self-efficacious in making decisions about what kind of technology to integrate in their teaching and learning processes that can enhance their students' learning and increase learning outcome (Kent & Giles, 2017; Mikusa, 2015). In sum, teachers should have the self-efficacy in putting more effort to integrate technology into their teaching while creating learning opportunities that employ technologies for these students (Menon, Chandrasekar, Kosztin, & Steinhoff, 2017).

CourseLab 2.4 is one of the tools that teachers can use to provide autonomous but safe learning experiences for their future generation alpha students. It is a free authoring software that can assist teachers in creating e-learning content material for the students as well as in creating activities appropriate for this technology savvy generation. Further, through the use of this tool, teachers can assist the students in becoming self-sufficient in developing their roles as 21st century learners who are always eager to collaborate, ready to think critically as well as to take control of their own learning experience (Long, 2013).

As the previous research on CourseLab 2.4 had shown that primary school pre-service teachers of Sanata Dharma University had positive perceptions of CourseLab 2.4 and its attributes (Setyawan, 2017), it will be significant to conduct another research on the self-efficacy of these student teachers in using the free authoring tool to create their own e-learning content. This kind of technology self-efficacy will be able to serve as one of the predictors of their willingness to continue using the technologies in their teaching later (Anderson, Groulx, & Maninger, 2011). It will also get them to come to the idea of effectively incorporate appropriate information and communication technologies (ICT) into their future professional life (Ertmer & Ottenbreit-Leftwich, 2010).

Technology Self-Efficacy

Technology self-efficacy is derived from the concept of self-efficacy as a construct of Social Cognitive Theory by Bandura (1977, 1994). In its broadest sense, it is defined as one's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy also refers to beliefs in their capabilities to organize and perform actions required to achieve certain goals (Bandura, 1995, p. 261; Chen, 2014). Further, Bandura and Adams (1977, p. 288) noted that self-efficacy affects one's choice of activities and behaviors, e.g. how much effort they will expend and how long they will persist in the face of obstacles and aversive experiences.

In the field of education, self-efficacy exhibited by teachers, known as teacher self-efficacy, has been considered to have significant roles in the process of teaching and learning (Bray-Clark & Bates, 2003; Chan, 2005; Mojahevi & Tamiz, 2012; Paneque & Barbetta, 2006; Pendergast, Garvis, & Keogh, 2011). Still derived from Bandura's work of self-efficacy notion, Gavora (2010, p. 17) generally defined teacher self-efficacy as teacher's belief in their abilities and skills as educators. It encompasses their confidence in making judgment to bring about desired outcomes of student engagement and learning, even among students considered as difficult or unmotivated (Tschannen-Moran, Hoy, & Hoy, 1998). In a nutshell, a self-efficacious teacher is competent in making any instructional decisions and can find the best possible way to carry out the decisions regarding to his or her students' need.

In this technological era, the concept of teacher self-efficacy has inevitably embraces that of technology self-efficacy. In general, the term technology self-efficacy refers to teacher's confidence in using technology for educational purposes (Ropp in Christensen & Knezek, 2014, p. 312). Lawless and Pellegrino (in Ertmer & Ottenbreit-Leftwich, 2010, p. 257) further elaborated it as teacher's confidence in using technology to facilitate meaningful learning which enables students to construct deep and connected knowledge, which can be applied to real situations. In line with the idea, Mikusa (2015, p. 7) noted that a technology self-efficacious teacher should be confident in using technology to enhance student engagement, create collaborative learning environments, and provide them with opportunities for higher-order thinking.

A technology self-efficacious teacher should also be confident in making judgment about what can be done with educational technologies in the future (John, 2013, p. 3). He or she should be capable of making instructional planning and preparation as well as selecting the tools to be used during instructions (Kent & Giles, 2017, p. 10). International Society for Technology in Education (2017) further elaborated the skills as being able: 1.) To learn and collaborate with others to explore promising practices that leverage technology to improve student learning; 2.) to inspire and empower students to contribute responsibly in the digital world while guiding them to be curious, wise, empathetic, safe, and ethical; 3.) To design and create authentic opportunities for students to innovate and solve problems; and 4.) To use data to drive instruction and provide alternate ways for students to demonstrate competency and use assessment data to guide progress.

Studies have shown that technology self-efficacy is closely related to teacher's intention to use technology in their future classrooms and that it affects his or her decision to try integrating new tools in their classroom instructions (Anderson, Groulx, & Maninger, 2011; Hill, Smith, & Mann, 1987; Turel, 2014). It is also noticeable that technology self-efficacy is not only concerned with simple computer skills, such as creating word documents or spreadsheets (Compeau & Higgins, 1995), but also with taking advantage of any available tools or software to enhance learning. Hence, as Evers et. al. (in Tweed, 2013, p. 22) suggested, the higher or stronger teacher's sense of technology self-efficacy, the higher and stronger his or her confidence in finding and trying new ways to integrate and experiment with technology in the classroom.

This research tried to investigate the technology self-efficacy of primary school pre-service teachers of Sanata Dharma University in using CourseLab 2.4. Though the free authoring tool was still relatively new to them, this research would assess their confidence in making use of the available features of the free software as well as in utilizing it to design and create e-learning content material for their future generation students. It would also assess their willingness to put more efforts in learning to use and, eventually, to continue using the program in their future classroom.

CourseLab 2.4

CourseLab is one of the software developed by a Russian-based independent software vendor, WebSoft. It comes in two versions, i.e. the commercial CourseLab 2.7 and the free CourseLab 2.4. As the version number suggests, CourseLab 2.4 lacks a number of new features that are only available in the commercial version, e.g. more than one application languages, the ability to play published modules on mobile devices as well as to save slides as images, etc. Besides, compared to its 2.7 version, the free 2.4 version has less number of templates, objects, animated characters, and assessment question types.

As a free authoring software, however, CourseLab 2.4 is still capable of creating high-quality interactive e-learning content without the need of any programming knowledge (Khademi, Haghshenas, & Kabir, 2011). Dağ, Durdu, and Gerdan (2014) considered the free software a comprehensive educational authoring tool which enables course designers to set control parameters for used media objects by means of its own scripting language. Its specific *Event-Action* mechanism also allows virtual utilization of all the tool's functionality depending on user action (Ragasa, 2016).

CourseLab 2.4 also has a number of advantageous features. First of all, it is rich-media support. Course designers can insert different types of media (e.g. images, audios, and videos) in various formats. Next, it provides a *wysiwyg* (what you see is what you get) environment which enables anyone without any knowledge of programming to become designers and create their own e-learning content. Further, CourseLab 2.4 offers an inheritance capability which allows course designers to reuse once inserted objects in the entire module through its module *master slide*. Another advantage of this software is its ability to export its published module to virtual learning environment which can be embedded in learning management system (LMS) platforms, in the form of HTML for website or to a CD-ROM for offline uses (Khademi, Haghshenas, & Kabir, 2011; Košč, Gamcová, Štec, & Kocur, 2011; Ragasa, 2016).

Apart from these advantages, Ragasa (2016) noted that the best affordance of CourseLab 2.4 is its ability to create interactive lessons through navigation buttons where learners can easily choose the slides which they want to explore more at their own learning pace. This feature can facilitate learning by helping the learners to review or replay the lessons until they achieve mastery. Another affordance is the tool's ability to create various types of tests or assessments that give instant and interactive feedback through scoring as well as animated objects.

Besides its advantageous features, however, CourseLab 2.4 still has few limitations. Dağ, Durdu, and Gerdan (2014, p. 895) pointed out its English only application language as one of the limitations that may affect nonnative speakers' understanding when operating the software for the first time. Hence, Dağ, Durdu, and Gerdan further suggested that the software is best utilized by users who have had experience in course content development before. Next, the fact that the exported content can only work well in certain browsers is another limitation noted by Košč, Gamcová, Štec, and Kocur (2011, p. 36). Their study on comparing a number of free authoring tools for multimedia courses development revealed that CourseLab 2.4 published content work well only in Firefox and Microsoft Explorer browsers. This implies that users of other browsers, such as Chrome, Safari, or Opera, may find it a bit hard to adjust the appearance of a published course content in those browsers. Its quality may be reduced, or it may not work smoothly.

Method

This research was a descriptive research trying to describe the technology self-efficacy of the primary school pre-service teachers of Sanata Dharma University in creating e-learning content using CourseLab 2.4. It focused on how the student teachers viewed their own aptitude and confidence in making use of the program to design an interactive e-learning course for their future students. Further, it presented, analyzed, and interpreted details of the student teachers' perceived techno-logy self-efficacy to provide explanation as well as clarification about the existing situation (Best & Kahn, 2006; Gliner, Morgan, & Leech, 2017; Neuman, 2007; Vanderstoep & Johnston, 2009).

As a descriptive research, this study made no formal comparisons or associations among its variables. Therefore, the data gathered through the scaled items of the questionnaire were recorded, tabulated, and, then, analyzed using descriptive statistics. This meant that, as Gliner, Morgan, and Leech (2017, p. 56) pointed out, it only presented descriptive measurements, such as mean, percentage, frequency, range of scores, subscale and total scores, etc. without trying to make any inference about the data. The responses gathered from free response items were coded based on their recurring patterns. The data interpretation phase that followed would, then, include elaborating the characteristics of the student respondents in order to provide 'snapshots' of their perceived self-efficacy of CourseLab 2.4 as well as to propose suggestions about possible causes underlying their current state of self-efficaciousness (Stangor, 2011). The procedure on which this study was conducted was illustrated in Figure 1.

Further, this research employed a survey method and used a self-report questionnaire as its main data gathering instrument. The questionnaire consisted of 17 five-scaled and 4 free response items aiming at revealing and elaborating the respondents' confidence in using CourseLab 2.4 to design an interactive e-learning content. Further, in line with what Julien (2008) inferred, the questionnaire was constructed in the student respondents' native language (i.e. Indonesian) to obtain

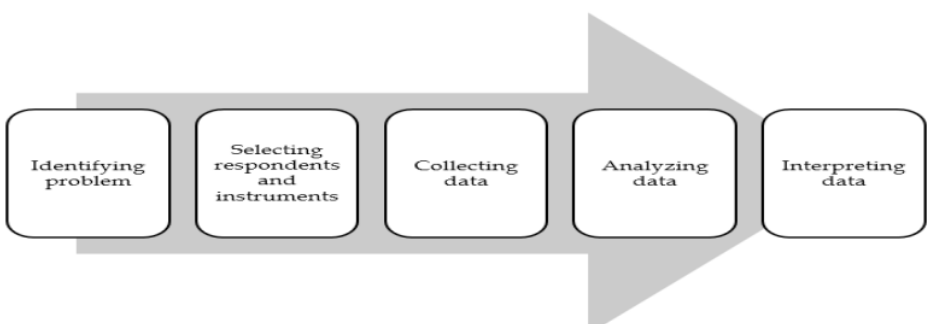

Figure 1 The Steps of Descriptive Research (adapted from Johnson & Christensen, 2012)

valid data as well as avoid misunderstanding about the instruction and interpretation of the items.

In order to reduce ambiguity and misleading statements, the constructed questionnaire had been pretested by asking reviews from a panel of experts (Holyk, 2008, p. 659; Trobia, 2008, p. 655). The panel of experts consisting of two teachers having the expertise of informatics and learning technology had been asked to review and give feedback on the questionnaire items constructed for this research. The questionnaire had been refined and revised based on the result of the review and feedback given by the experts before it was distributed to the student respondents.

As the aim of this research was to describe the primary school pre-service teachers' technology self-efficacy in creating e-learning content using the authoring software in question, data gathered from the scaled part of the questionnaire were scored and categorized using Likert's scale index formula. The responses gathered from its free response items were coded and compared to see their resemblances as well as variances. Analysis on the result of the categorization in the part containing scaled items of the questionnaire as well as patterns of resemblances and variances appeared among answers of the free response items was made to describe the condition of the primary school pre-service teachers' technology self-efficacy in creating e-learning content using CourseLab 2.4.

Result and Discussion

The data gathered from the scaled items of the distributed questionnaire showed that from the total of 46 student respondents, 27 respondents got average scores, 19 got high scores, and there was no student getting low or very low scores. This meant that the portion of the respondents identified as having high technology self-efficacy in using CourseLab 2.4 was lesser (41.3%) than those assumed to have average technology self-efficacy in using the same software (58.7%).

Further analysis revealed that, in general, the student respondents had average technology self-efficacy towards the authoring software in question. The analysis showed that there were only six questionnaire items, or equals to 35.29%, on which the respondents got high score while they only got average score for the rest eleven items, or 64.71% of the total items. The categorized questionnaire items also revealed that the items on which the student respondents only had average score concerned with the features of CourseLab 2.4, such as audio, external files, and insertion of hyperlinks. The average-scored items also covered object customization and animation, slide master usage, transitions between slides, quiz scoring, animated feedback, and publishing the created content. The items receiving high score covered features such as the use of templates and objects from CourseLab 2.4 library, text editing, inserting multimedia (i.e. pictures and videos), and generating word-based feedback for tests or quizzes.

The scored questionnaire items indicated that the student respondents had problems in inserting audios and external files such as portable data format (.pdf) files, and word or spreadsheet documents into their CourseLab content. This might concern with the fact that the free authoring software could only contain limited size of media and external files. They also specified that they had a technical hitch in inserting hyperlinks into their work. This hitch could possibly due to the software's lack of explicit instructions in assigning as well as testing whether or not a hyperlink work.

Up to a point, the categorization of slides under the labels of title, master, and normal in CourseLab 2.4 also troubled the student respondents. They presumably tended to overlook the functionality of each slide category as they were used to working with Microsoft PowerPoint which had very similar user interface (UI) to CourseLab 2.4. Although the former software also had a similar Slide Master feature located in the Master Views group under the View tab, it was very likely that they were used to creating their material or presentation right along on the normal view of the software. As the slide master had significant functions in CourseLab 2.4, they found it a bit effortful to adapt to the new condition of having to begin with working on the slide title and slide master before proceeding to work on the normal view of the slides.

The gathered data also revealed that the respondents had difficulties in customizing as well as animating objects or agents provided in the library of CourseLab 2.4. This was confirmed by their responses on the second part of the questionnaire pointing out that this animating part was considered difficult because they had to make use of some codes to generate just one animation effect. As Dağ, Durdu, and Gerdan (2014) suggested, this difficulty might due to the students' limited experience in coding for, although operating CourseLab 2.4 didn't entail any specific programming knowledge, its users were still required to choose several consecutive commands from the available list in order to animate an object.

Another difficulty that could be traced back to the students' limited experience in coding was their struggle in scoring quizzes they had created using CourseLab 2.4. While creating written feedback for the quizzes was not a problem for them, scoring them was a different story. Since explicit instructions on how to score quizzes in CourseLab 2.4 were not available, the student respondents found it troublesome to set the right parameters to score their quizzes. In all, for the student respondents, scoring in CourseLab 2.4 was quite an intricate process. Though it did not actually involve coding, nor did it require any programming knowledge from its users, it was presumably still difficult for those with little or limited coding experience to get through all the steps seamlessly in order to get their quizzes scored. This might also due the respondents' limited experience in course content development as well as their inadequate understanding of the available commands when operating the software (Dağ, Durdu, & Gerdan, 2014).

Another problematic issue reported by the student respondents was publishing e-learning content created using CourseLab 2.4. They stated that, although they could publish their work in the browser they used (i.e. Chrome), it didn't work really well. They noted that their created content didn't work smoothly in their browser because some pictures were missing and the animation of some objects were suspended. They, however, did not report whether they had tried to publish it in other browsers, such as Firefox, Microsoft Internet Explorer, or the latest Microsoft Edge. This was in line with Košč, Gamcová, Štec, and Kocur (2011) suggestion stating that the exported content of CourseLab 2.4 could work well only in Firefox and Microsoft browsers.

Further, as described earlier, the student respondents had high scores on items covering things such as using templates and library objects, text editing, multimedia (i.e. pictures and videos) insertion, and textual quiz feedback creation. Similar to Microsoft PowerPoint, CourseLab 2.4 is packed with dozens of ready-to-use templates that users can choose and use in their created contents. As the student respondents had been used to operating Microsoft PowerPoint, it was very likely that they had probed into this feature smoothly and quite effortlessly. The vast variety of objects available in CourseLab Object Library and how they could be easily accessed and used was another feature on which the student respondents had high score. The Object Library contained thirteen different categories of objects that they could use in their created content. They also testified that it was engaging as well as challenging that they could animate any of these objects using event-action mechanism (Ragasa, 2016).

The student respondents also showed high self-efficacy in CourseLab's text editing feature in spite of the fact that it had a different way of editing its texts from its Microsoft PowerPoint counterpart. While they could directly type, edit, or customize their texts in Microsoft PowerPoint slides, CourseLab slides did not allow them to instantly type on them. The respondents were directed to type or edit texts using a text editing box popping up when they double clicked the inserted text box on their slide. As the text dialog box opened, they could type their texts inside it and customize the texts using the commands provided in its toolbars. Having much similarity with Microsoft Office text editing toolbars, however, it was unlikely that the student respondents found difficulties in customizing or editing texts in CourseLab 2.4.

Further, the gathered responses from the questionnaire showed that the student respondents had minor difficulty in adding various types of media, such as images, audios, videos, and animated objects from the CourseLab library. They, however, reported that they could add unanimated objects such as shapes, link, and even url (uniform resource locator) to their created content easily. This high self-efficacy in working with different types of media in CourseLab 2.4. might due to the program's attribute as a rich-media support software (Khademi, Haghshenas, & Kabir, 2011; Košč, Gamcová, Štec, & Kocur, 2011; Ragasa, 2016).

Another feature on which the student respondents showed high technology self-efficacy was that which allowed them to generate word-based feedback for their quiz or test items. As mentioned previously, CourseLab 2.4 allows its users to create word-based feedback for their quizzes. Feedback for correct answers will pop up as a green box with the word 'correct' in it while those for incorrect responses will show up as a red box with the word 'incorrect' inside. The respondents' high self-efficacy in generating this kind of feedback might due to the fact that they could use this feature at ease. Word-based feedback was already integrated in the software, so the respondents needed not choose or write any command to make it work. They could generate their textual feedback simply by editing the default feedback using the TE button provided in the dialog box.

All in all, it was safe to assume that the student respondents 'only' had average technology self-efficacy in using CourseLab 2.4 for they still had difficulties in working with important features of the software like generating animated feedback using agents and scoring. This might be the case because it was the first time they worked with the authoring software and got in touch with coding even if it was just in its simple form. With time it was quite possible that they would show greater technology self-efficacy in making use of the authoring software. It was also safe to assume that they did better when they were working with features they were familiar with. As their responses revealed, they showed high technology self-efficacy in features that were also found in the Microsoft PowerPoint software, those that did not require them to do much 'coding', modifying, or editing such as, choosing templates and library objects, editing texts, inserting multimedia (i.e. pictures and videos), and generating textual feedback for their quizzes.

The coded responses from the second part of the questionnaire also indicated that the student respondents necessitated more time to get used to CourseLab 2.4. This situation was revealed when asked about whether or not they would use the software later when they became in-service teachers (Anderson, Groulx, & Maninger, 2011; Hill, Smith, & Mann, 1987; Turel, 2014). The majority of the student respondents (78.26%) stated that they would use it because of its advantageous features. 15.22% stated that they might use the software if they had the facilities in their schools later while the rest 6.52% stating that they would not mentioned the time required to learn to use CourseLab 2.4 as their sole reason for not using the software yet. In that case, given enough time to explore features of CourseLab 2.4, it was very likely that they would later use the software to create e-learning contents to deliver their teaching materials.

Conclussion

The primary school pre-service teachers of Sanata Dharma University had average technology self-efficacy in creating e-learning content using CourseLab 2.4. The average self-efficacy could be attributed to their unfamiliarity to the authoring software and their limited experience in course content development as well as in coding in general. The student teachers testified that they had difficulties in getting around CourseLab 2.4 because it organized its slides in a way different from the one they were accustomed to the Microsoft PowerPoint software. In addition, compared to the latter, the students noted that CourseLab 2.4 had a slightly more complicated way of editing and customizing texts.

It was also found out that, although the pre-service teachers credited CourseLab 2.4 for its ability to create various types of tests or quizzes, scoring and giving animated feedback for the tests and quizzes using agents were still troublesome for them. This might be due to that fact that, unlike word-based feedback which only required the students to edit the default forms to create their own, animated feedback with agents required them to choose appropriate commands to make it work and perform the intended responses. Scoring the tests or quizzes was also problematic because its steps were longer and more complicated than generating animated feedback using agents.

The study, however, revealed that the student teachers had high technology self-efficacy on certain features of CourseLab 2.4. As the data analysis showed, they testified to be self-efficacious in choosing and using templates and objects from the CourseLab's library. They also felt self-efficacious in editing and customizing texts as well as inserting and using various multimedia on their created content. It could also be identified that they were confident in generating word-based feedback for their quizzes or tests by customizing the default written feedback.

Based on the findings, some propositions can be put forward as recommendations of this study. First, the pre-service teachers of the Primary School Teacher Education Program of Sanata Dharma University should be given more time to explore and work with CourseLab 2.4 so that they can be more self-efficacious in using the program. This can be done by adding the number of meetings allocated to learn and work with the program in Media Pembelajaran Berbasis ICT course. Next, it will be advantageous to teach the pre-service teachers to use other free authoring tools, such as Scratch, Snap!, or Blockly, so that they are familiar with the process of coding in general. By means of this process, the pre-service teachers are expected to learn the skills of problem solving through logical and computational thinking for these skills are among other skills needed to thrive in the 21st century.

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