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Castledown

Incorporating E-portfolio with flipped classrooms: An in-depth analysis of students' speaking performance and learning engagement

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The advent of technology has enabled the implementation of e-portfolio in students speaking performance to collect and store their artifacts online. With the implementation of technology, e-portfolio tends to be incorporated with flipped classrooms. Previous studies, however, failed to consider the implementation of this incorporation, especially in teaching speaking skills. It is thereby leading to a lack of literature on this topic. This research, therefore, aims to examine the effect of e-portfolio in flipped classrooms on students' speaking performance and explore their learning engagement. An explanatory sequential mixed-method approach consisting of speaking test and interview methods was used to obtain data from 63 twelfth grade students, 29 in the experiment group and 34 in the control. The speaking test and interviews data were analyzed using the independent t-test and the qualitative content analysis technique, respectively. The result showed a significant effect of e-portfolio in flipped classrooms on students' speaking performance. Furthermore, students showed active behavioral, cognitive, and affective engagement. In conclusion, this study discussed all three possible implications for English language teaching.

Keywords: e-portfolio, flipped classrooms, teaching speaking with technology, learning engagement

1. Rationale

The recent rapid technological development has enabled more effective and efficient implementation of portfolio assessment. Using technology, portfolio assessment then became a new type called an e-portfolio, which is characterized as digital resources where learners collect course materials, projects, and achievements (Dougherty & Coelho, 2017) and store them in a cloud storage system for easy accessibility as long as there is an internet connection. Furthermore, an e-portfolio also promotes feedback, reflection, and self-reflection (Yastibas & Yastibas, 2015), which helps learners improve their language skills. This new concept is, therefore, fast becoming an important and relevant topic in English language teaching (ELT), considering the implementation of technology by many teachers and the need for effective teaching techniques in formulating instructions.

For almost a decade, there has been extensive research on the application of e-portfolio to teaching writing aspects of English (e.g., Baturay & Daloğlu, 2010; Barrot, 2016; Nicolaidou, 2013; Tonogbanua, 2018), but the only rare effort has been directed towards the speaking part (e.g., Cepik & Yastibas, 2013; Huang & Hung, 2010). For instance, Huang and Hung (2010) researched thirty Taiwanese students on the use of e-portfolio and reported that this technique exerted better speaking performance. These groundbreaking results draw attention to implementing this concept and encouraged other researchers to conduct similar studies.

An E-portfolio is only an assessment technique and still needs content delivery activities as a preceding activity before doing the assignments. The technology tools integrated into the e-portfolio promotes the incorporation of some innovative strategies to teach the speaking aspect. An example is the flipped classrooms which represent an instructional practice requiring students to review materials before coming to the classroom (Jeff Mehring, 2016). Accordingly, its implementation has the ability to provide more time for in-class activities as required by the e-portfolio (Efe, 2016). This means the combination of e-portfolio and flipped classrooms are a perfect match to teach speaking. Up to the present time, only Adnan (2017) has studied this combination, and the students taught by the method were found to have outperformed others in the control group. However, the research was not specifically focused on examining the effect of the combination on students' speaking performance.

Since both e-portfolio and flipped classrooms require technological input, current evidence repeatedly suggested improving students' active participation in the language learning process (Chen *et al.*, 2019; Huang *et al.*, 2019) due to the possibilities of in-class interaction activities (Bowles *et al.*, 2015). Moreover, active learning is often associated with learning engagement (Peng *et al.*, 2017), as observed with flipped classrooms in some studies. For instance, Chen *et al.* (2019) researched the effect of flipped classrooms on students' learning engagement before and during class activities, and some improvements were observed in both activities. Therefore, e-portfolio and flipped classrooms were

found to have the potential to encourage students' engagement while learning a language.

Nevertheless, the effect of e-portfolio on speaking performance and how it affects learning engagement in speaking activities remain unclear as most researchers have not treated these issues in much detail, while studies on the use of e-portfolio for teaching speaking skills in flipped classrooms have also not been discovered. More information is, of course, necessary to improve the implementation of e-portfolio in flipped classrooms. Such information might also be of interest to teachers as regards implementing the e-portfolio in flipped classrooms. Therefore, this study was conducted to examine the effect of e-portfolio in flipped classrooms on students' speaking performance and explore their engagement during the speaking activities. To guide the inquiry, the following overarching research questions are posed:

1. Was there a significant effect of e-portfolio in flipped classrooms on twelfth-grade students' speaking performance?
2. How did the students engage in speaking activities during the implementation of e-portfolio in flipped classrooms?

2. Review of related literature

2.1 E-portfolio

A portfolio is an authentic assessment technique to store students' systematic collection of artifacts (Efe, 2016; Johnson & Johnson, 2002; Kwak & Yin, 2018; O'Malley & Pierce, 1996) in all language skills (Demirel & Duman, 2015). It is also a collection of their works and activities to monitor learning growth (Srikaew *et al.*, 2015). The concept makes it possible to track success through self-evaluation and correction (Safari & Koosha, 2016). The portfolios, therefore, help in determining the strengths and weaknesses of the students as indicators of the learning progress.

The rapid development of technology, such as websites, blogs, Wiki, and Facebook (Babaee, 2012), has made it possible to transform a portfolio into a new form called e-portfolio with several devices to ensure effectiveness and efficiency. E-portfolio denotes digital tools (Dougherty & Coelho, 2017) to collect students' artifacts and personalized collections to show their own learning processes (Cepik & Yastibas, 2013; Huang & Hung, 2010). E-portfolio also enables the students to manage their works effectively (Kwak & Yin, 2018) as they can upload their assignments to cloud storage at a time convenient to them. Moreover, e-portfolio promotes feedback and self-reflection (Yastibas & Yastibas, 2015) as the activities in the e-portfolio consist of peer and self-assessments. Thus, the above definitions may describe e-portfolio as a digital tool that enables students to upload, manage, and store digital artifacts that can be used as reflective activities and demonstrate their learning progress

Regarding implementing e-portfolio in teaching speaking, few studies have been devoting their efforts to implementing this technique in various ways (e.g., Cepik & Yastibas, 2013; Huang & Hung, 2010). Huang and Hung (2010)

implemented e-portfolio using Wretch, a free blogging system, to collect the students' artifacts. Huang and Hung then instructed their students to record their audios and uploaded them on Wretch. To provide the students' with feedback, Huang and Hung also instructed their students to give comments on their friends' audios. In line with this implementation, Cepik & Yastibas (2013) used Lore.com and YouTube as the platforms of e-portfolio. Since Lore.com cannot be used to upload videos, Cepik and Yastibas instructed their students to record and upload their videos on YouTube and pasted the link on Lore.com. Cepik and Yastibas then gave their comments on students' tasks and asked their students to self-reflect. Therefore, it can be seen from the above implementations that e-portfolio in speaking courses include digital platforms for the storage and management of students' digital artifacts and represent activities based on the comments made by their teachers or peers for the development of their speaking skills.

Due to the rare implementation of e-portfolio in teaching speaking (Cepik & Yastibas, 2013; Huang & Hung, 2010), several attempts have been made to investigate its effectiveness (e.g., Cepik & Yastibas, 2013; Dougherty & Coelho, 2017; Huang & Hung, 2010; Kwak & Yin, 2018) but evidence showing statistical analysis is limited. Perhaps Huang and Hung's (2010) study was the only one to employ an experimental design on thirty Taiwanese students. The *ANCOVA* analysis results showed that e-portfolio could improve students' speaking performance in terms of total words and lexical richness. Cepik & Yastibas (2013) continued the discussion by conducting a qualitative study to explore the implementation of e-portfolio on listening and speaking performance. They recruited 17 university students in Turkey to participate and found the method to be effective. Moreover, Kwak and Yin (2018) found that e-portfolio improved students' preparations prior to doing the assignments, motivation, and attitude to learning. Meanwhile, Dougherty and Coelho (2017) employed a different approach by using a descriptive analysis on 71 students of a university in the Middle East and found that the students faced difficulty implementing e-portfolio, but later it became helpful. These studies, therefore, show that e-portfolio has a positive effect on students' speaking performance, but these findings were mainly discovered in qualitative data. The lack of enough quantitative analysis has, however, become an issue in recent times. Therefore, further examination is expected to be conducted to improve the literature on the effect of e-portfolio in teaching speaking.

2.2 Flipped classrooms

Flipped classrooms are the current instructional innovation in teaching, especially ELT (Amiryousefi, 2019), promoting a student-centered approach. This approach was initially known as the classroom flip (Baker, 2000) and inverted classroom (Lage *et al.*, 2000). However, the term flipped classroom was then popularized by Bergmann and Sams (2012). Flipped classrooms are practices requiring students to review course contents before coming to the class (Adnan, 2017; Yeo, 2018), while in-class or Face-to-Face (F2F) activities, such as quizzes,

group discussions, and peer instructions (Roehling, 2018), are used to improve skills and knowledge. For instance, Bergmann and Sams (2012) instructed the students to review the recorded materials at home and did the homework/assignments at school. This implementation has therefore inspired other researchers, including ELT practitioners. For example, Lin and Hwang (2018), by integrating technology during the implementation, asked the students to review video materials and students had to post what they had learned on the Facebook group at home. Then, the activities were continued at school, such as practicing dialog or monolog. In another example, Kusuma (2020) instructed the students in a speaking class to review the online materials on YouTube and websites at home, and it was continued by classroom activities, such as discussion, composing dialogs, and practicing with peers. Then, the students recorded their speaking performance and uploaded the clips online. Thus, such implementations have attracted teachers' attention since this approach enables active learning implementation.

The integration of technology has led to the innovative implementation of flipped classrooms. For instance, the initial version only required students to review teacher's recorded presentation videos before coming to school, but this has changed with the inclusion of several contents such as the TED-ed website (Hung, 2018), online video resources, podcasts, course notes (Adnan, 2017), sitcom videos (Hung, 2017), and YouTube videos (Kusuma, 2020). Moreover, advanced technology tools have also made it possible to implement flipped classrooms with diverse online platforms. For example, Adnan (2017) and Amiryousefi (2019) applied the Telegram and Learning Management System (LMS) to support information sharing and discussion and reported the ability of diversity to improve the implementation of flipped classrooms (McLaughlin *et al.*, 2016). Therefore, technology integration could encourage successful and active learning, which are the characteristics of a student-centered approach. This also means combining flipped classrooms with e-portfolio is possible since they are compatible and have similar characteristics.

Concerning the implementation of e-portfolio in flipped classrooms, to date, only Adnan (2017) had implemented this combination. Adnan, in his research, instructed the students to watch videos and cover course materials before attending their class, while some various activities filled the F2F class activities to foster students' learning and engagement. Then, the students' works were compiled digitally in their e-portfolio. However, the study did not concentrate exclusively on the effects of the combination on students' speaking performance. Thus, the limited information on implementing e-portfolio in flipped classrooms, especially in speaking courses, should get more investigations.

2.3 Learning engagement

Learning engagement is a term proposed by Astin (1984), which represents the involvement of the students psychically and psychologically in the academic experience. Astin (1984) also delineated that active students have communication and interactions with others, and engagement is the key to students'

success. Learning engagement is often associated with three psychological domains: behavioral, cognitive, and affective (Fredricks *et al.*, 2004; Lee *et al.*, 2018). The behavioral aspect refers to the participation of the students in learning (Fredricks *et al.*, 2004); cognitive focus on the willingness to master materials (Huang *et al.*, 2019); affective involves feelings, attitudes, and interests during the learning process (Lee *et al.*, 2018). Therefore, the investigation of these domains is crucial to the students' learning engagement.

Some researchers suggested that technology promotes students' engagement in learning (Chen *et al.*, 2019; Huang *et al.*, 2019) to ensure more involvement in the process. Several technological tools have been identified to have the ability to promote active learning (Bowles *et al.*, 2015). Moreover, active learning is crucial to attaining academic success (Kahu, 2013). To date, some recent studies have been devoted to investigating the factors affecting online learning engagement. For example, Kahu *et al.* (2020) reported that self-efficacy, belonging, emotions, and wellbeing play essential roles in students' learning engagement in teaching with technology. On the other hand, Farrell and Brunton (2020) claimed that psychological factors (such as peer community, an engaging online teacher, and confidence) and structural factors (such as lifeload and course design). Thus, teachers should consider these factors when dealing with the students' learning engagement when teaching their students using technology.

Regarding the flipped classrooms, there is currently a growing body of literature devoted to determining the effect of this approach on students' learning engagement. For instance, Chen *et al.* (2019) researched 19 students using an experimental study and reported the ability of flipped classrooms to enhance learning engagement before and during class activities. Moreover, Huang *et al.* (2019) conducted another experimental study on 48 students to examine the effect of gamification-enhanced flipped learning on students' learning engagement. They found the experimental group outperformed their counterparts in the control group both in the pre and posttest. However, a minor disagreement was shown by Garner and Chan's (2019) findings from a quasi-experimental study on 182 students, which showed the students' learning engagement levels were the same in both experimental and control groups. It is, however, important to note that learning engagement has never been researched pertaining to the implementation of e-portfolio, especially in teaching speaking. This fact has therefore created more opportunities for further studies.

However, prior studies did not profoundly investigate this issue regarding the effect of e-portfolio on students' learning engagement. Besides examining the effect cognitively, Huang and Hung (2010) found that the students liked the e-portfolio and this technique increased learning motivation. Unfortunately, Huang and Hung did not investigate students' behavioral domain to complete the examination of students' learning engagement. Cepik and Yastibas (2013) found that e-portfolio improved the students' affective domains in terms of anxiety, responsibility, and self-confidence. The above studies suggest that the engagement in which students participate in e-portfolio remains unclear. In-depth investigations into all spheres of engagement have never been given

priority. More information on e-portfolio in flipped classrooms, in terms of student engagement, is also required.

3. Research method

3.1 Research design

An explanatory sequential mixed-method design was employed to investigate the effect of e-portfolio in flipped classrooms on students' speaking performance and learning engagement. This approach required collecting quantitative data, which is continued by qualitative inquiry (Creswell & Creswell, 2018). Therefore, we applied a quasi-experimental design to answer the first research question (RQ) while semi-structured interviews were implemented to answer the RQ1 and RQ2. Regarding the experimental design, we employed an alternative treatment posttest-only with nonequivalent groups design, and this led to the creation of experimental and control groups. This design provides the experimental and control groups with different treatments by using existing groups (Creswell & Creswell, 2018), and we tested both groups using the same speaking test. Regarding the treatments, the students in the experimental group received e-portfolio that were incorporated with flipped classrooms. Particularly, the students were taught using the flipped classrooms approach, and the students' work was collected digitally using the e-portfolio technique. On the other hand, the control group did only the conventional portfolio technique without technology integration. In this study, we investigated two variables, such as the implementation of e-portfolio in flipped classrooms as the independent variable while students' speaking performance was the dependent variable.

3.2 Participants

We approached some high schools in Indonesia, but only one school that allowed the students to bring devices to learn at school was selected. Besides, we knew the EFL teachers at this school, enabling easy access to get site approval. We then explained the risks and benefits of the research to the students, and all the twelfth-grade students ranging between 18–19 years old from two classes granted their consent to participate. Moreover, these students had the same proficiency of speaking performance and were homogenous, as indicated by statistical analysis performed in this study. The students' speaking levels, according to ACTFL criteria, belong to novice high in which they could perform several uncomplicated communication tasks. Then, from all twelfth-grade students, only sixty-three of them were sampled – 29 in the experiment group and 34 in the control group. Moreover, we employed a purposive sampling technique to recruit students in the experimental group to collect qualitative data about their participation during the implementation of e-portfolio in flipped classrooms through two semi-interview sessions. However, only five students showed their willingness to participate in the interview sessions because they

never had any experience of being interviewed, and most of them were afraid of talking about the process happening in their classroom. Thus, only five students then showed their willingness after approaching some potential participants and explaining the study in detail.

3.3 The procedure, data collection, & instrumentation

The inquiry started with an experimental study conducted for eight weeks, and the last week was used for the administration of the posttest, as shown in Table 1. During this period, the students were asked to review some online materials at home. To ensure that the students reviewed the materials, they had to post the summaries on the Schoology discussion forum. The online materials (videos or texts) in this study were related to speaking skills such as language expressions, monologs, and dialogs obtained from YouTube and websites containing speaking materials. To support the activities, this study used Flipgrid and Schoology. Both applications were used in this study since Flipgrid is one of the platforms used for speaking activities, especially using videos, while Schoology is one of the very common LMS used by this school's teachers. F2F activities were then used for speaking practices such as composing and practicing conversations individually or with their peers at school for every topic during the experimental study. The students' conversations were based on the videos and texts they had reviewed before attending the class. Sometimes, the students asked for the teacher's comments on the dialog and the performance they were practicing for. Moreover, their speaking performances had to present accuracy, fluency, interaction, and coherence as these domains were involved in the scoring rubrics used in this study, which was adopted from Amiryousefi (2019). Once they had finished practicing, they were told to record their conversation individually or with peers through the use of Flipgrid. This was followed by watching videos by both the teacher and students, after which constructive comments were provided using Schoology (See Figure 3). The comments from the teacher and classmates should provide the students with suggestions for speaking improvements. During school hours, the teacher allocated time to discuss the performance and remind the students to reflect on the comments on Schoology.

On the other hand, the control group did a conventional portfolio strategy without technology integration. The students in the control group had to review the materials and wrote the scripts at school. Because of time limitations at school, they had to continue writing and practiced the scripts at home. Regarding the speaking performance, they performed the scripts at school and took notes on the comments from their teacher and friends after the performance. The students' scripts and comments they had written were then collected and placed into a map they brought home.

Regarding the posttest, it involved developing a speaking task on a specific topic for the students. The topic used for this posttest was the conditional sentence. Even though the students had conditional sentences in their treatment, they were given different speaking situations that they never had in their

treatments. The purpose of providing new situations was to avoid data bias that they could perform the situations because they had practiced them before. There were three situations developed for the posttest, such as what I would do for others if I were (1) a president, (2) a successful businessman, and (3) a rich man. The students were given a lottery containing one of the three situations, and every student had to do a five-minute performance.

After completing the experimental study, qualitative data was continuously collected through in-depth semi-interviews conducted on each participant in Indonesian to obtain more profound data. We conducted the interviews for approximately 30 minutes each session twice a month to explore the students' opinions on their learning engagement during this study. An interview protocol guided this process with some questions on students' participation in the cognitive domain to explore the students' efforts in mastering materials, affective domain to explore the students' feelings during the learning process, and behavioral domain to explore the students' active participation in the learning process. The general procedure of this study is shown in Figure 1.

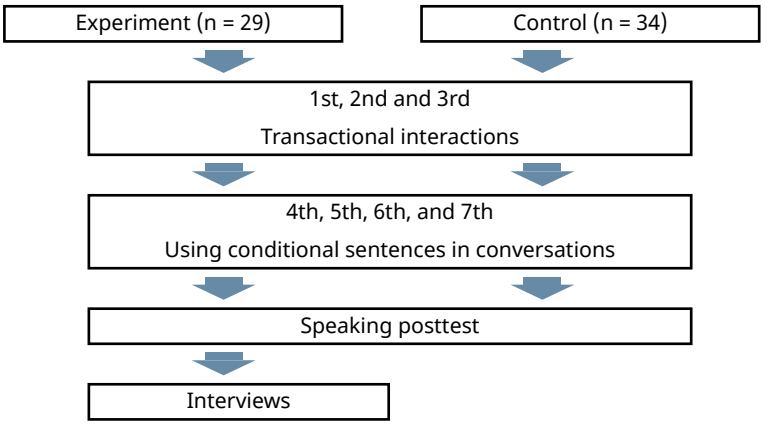

Figure 1. The research procedure

Table 1. Treatments for the experiment group

Meetings	Topic	Activities
1st meeting	Transactional interactions	1. Reviewing the materials 2. Participating in online discussion 3. Classroom discussion 4. Composing dialog with peers
2nd meeting	Transactional interactions	1. Reviewing the materials 2. Participating in online discussion 3. Classroom discussion 4. Practicing the dialog with peers 5. Recording videos via Flipgrid and sharing the links on Schoology
3rd meeting	Transactional interactions	1. Watching friends' videos and giving comments 2. Classroom discussion discussing the performance 3. Reading teacher and friends' comments 4. Rerecording the video via Flipgrid
4th meeting	Using conditional sentences	1. Reviewing the materials 2. Participating in online discussion 3. Classroom discussion 4. Composing monolog for performance
5th meeting	Using conditional sentences	1. Reviewing the materials 2. Participating in online discussion 3. Classroom discussion 4. Practicing the monolog 5. Recording videos via Flipgrid and sharing the links on Schoology
6th meeting	Using conditional sentences	1. Watching friends' videos and giving comments 2. Classroom discussion discussing the performance 3. Reading teacher and friends' comments 4. Rerecording the video via Flipgrid
7th meeting	Using conditional sentences in conversations	1. Composing dialogs with peers 2. Practicing with peers 3. Recording the videos via Flipgrid and share the links on Schoology 4. Watching friends' videos and giving comments 5. Reading teacher and friends' comments 6. Rerecording the video via Flipgrid

3.4 Data analysis

We analyzed the data both quantitatively and qualitatively. First, we analyzed the data from the posttest using the SPSS program to determine the variability – *Mean* (*M*), *Standard Deviation* (*SD*), and *Variance* (*Var*) after they had been confirmed to be homogenous and normal through homogeneity and normality tests. Moreover, the hypotheses were tested using *independent t-test* analysis.

Moreover, we transcribed the interview results into English and analyzed them using the content analysis technique to analyze the contents of the interviews (Krippendorff, 2004). In addition, two annotators were analyzing the transcripts, and then we compared the analysis to find agreements. In particular, we separately analyzed the interview transcripts to generate some possible codes. Then, we compared all the codes present in our individual analyses to reach agreements on which ones should be included, especially the codes that represented learning engagement. Furthermore, from our discussion, three themes such as behavioral, cognitive, and affective engagements were determined, and in-vivo coding technique were implemented to support the themes with the participants' exact words.

Figure 2. Activities in experiment group

Figure 3. Constructive comments on the videos

4. Findings & discussion

4.1 Findings

4.1.1 The effect of e-portfolio in flipped classrooms on students' speaking performance. The data from posttest were analyzed descriptively to obtain initial data of variability for further analysis. Table 2 shows the experiment group had *M* = 80.172, *SD* = 10.198, *Var* = 104.005, minimum score = 50, and maximum score = 97 while the control group had *M* = 73.382, *SD* = 7.951, *Var* = 63.213, minimum score = 55, and maximum score = 85.

Table 2. Variability of experiment and control groups

Groups	Mean	SD	Var	Min	Max
Experiment	80.172	10.198	104.005	50	97
Control	73.382	7.951	63.213	55	85

Table 3 shows the results of *independent t-test* analysis and found t (df = 61) = 2.968, p < 0.004, d = 0.666. This means there was a statistically significant difference between the experimental and control group's speaking scores with a medium effect size. The comparison of these values showed that students in the experimental group performed better in speaking performance. This, therefore, means e-portfolio in flipped classrooms had a significant effect and could improve students' speaking performance.

Table 3. The results of independent t-test analysis

	t	df	Sig. (2-tailed)	d
Speaking scores	2.968	61	0.004	0.666

4.1.2 Students' learning engagement during the implementation of e-portfolio in flipped classrooms. The hypothesis test showed a statistical effect of e-portfolio in flipped classrooms on students' speaking performance. However, this was further subjected to qualitative analysis based on the interviews conducted, especially focusing on the students' learning engagement. The interviews on the students' learning engagement involved the behavioral, cognitive, and affective domains.

The e-portfolio in flipped classrooms started with the students reviewing learning materials before coming to the classroom and, since there is more flexibility with time and place, the students confessed they learned and improved their understanding of the topics by using the pre-activity time to search for supporting materials. To support this submission, student #3 said, "I learned before class time, and I also looked for supporting materials." Moreover, they also found the video materials reviewed to be fascinating and easy to understand because they were easily explained. Also, the videos directly conveyed the important points, which was good for improving their speaking skills. Student #5 said, "I liked the videos because the explanation was interesting and straight to the point." The way the teacher covered the materials using video was reported to have motivated the students to improve their learning intensity. Student #2 said, "The way the teacher covered the materials was exciting, and I liked it."

During the F2F time, the students were actively engaged in collaborative activities such as discussions, practicing with friends, composing monologs or dialogs, and recording videos. Their active participation in these activities was associated with the knowledge acquired before the class and the motivation to share what they knew about the topics. To support this phenomenon, student

#4 said, "I become more active in the discussion because I have learned the materials." Student #1 also reported, "I become more motivated to engage in classroom activity because I have prepared myself well by studying at home." Furthermore, the students were found to prefer collaborative activities while practicing with peers and making videos in the classroom. Student #3 said, "I liked practicing with my partners because I could learn from them and their practice." Student #2 said, "When making the videos, I was so motivated because I wanted to show my best." Moreover, the implementation of the e-portfolio in flipped classrooms using F2F activities was reported to have the ability to improve speaking performance. Student #5 stated, "I looked forward to having discussion, practice, and making videos. I think these activities helped me to improve my speaking." Student # 1 said, "I like the prompts of the videos. Besides, making videos encouraged me to be well-prepared to show my best."

As one of the activities in the e-portfolio, watching others' videos and providing constructive comments were reported to have several benefits. Student #4 said, "By watching my friends' videos, I actually learned a few things to improve my speaking skills." Moreover, due to the easy accessibility to the videos, they could watch their performance at any time and conducted self-reflection to determine their strengths and weaknesses. Student #3 said, "I watched my videos to spot what I needed to improve." While student #1 also reported that "I watched my videos over and over again to learn some areas that needed improvements."

Besides self-reflection, students also received comments from their teacher and friends in online and classroom discussions to obtain a second opinion about their performances. Student #2 said, "The one that I loved was when I read my teacher and friends' comments about my performance. I wanted to know how they reacted to my videos." These comments were very constructive and were able to help the improvement of speaking skills. Student #5 confessed, "My teacher sometimes helped me point out the weakness I could not notice." Student #4 also stated, "The comments I got from my friends really helped me know my strengths and weaknesses."

4.2 Discussion

Since the advent of technology has radically changed the implementation of the portfolio in ELT, some studies are necessary. In addition, since none is focusing on applying e-portfolio in flipped classrooms in teaching speaking, this study was conducted to examine the effect of e-portfolio in flipped classrooms on students' speaking performance and learning engagement by using an explanatory sequential mixed-methods design.

RQ1 examined the effect of e-portfolio in flipped classrooms on students' speaking performance, and the results exerted a positive relationship. In addition, the mean scores of both groups indicated that the one taught by e-portfolio in flipped classrooms outperformed the conventional group. This echoes the findings reported by Huang and Hung (2010) that e-portfolio had an effect on students' oral performance. Furthermore, this present study's statistical results

completed the qualitative findings of other proponents (Cepik & Yastibas, 2013; Dougherty & Coelho, 2017; Kwak & Yin, 2018) on improving speaking performance through the implementation of e-portfolio. Therefore, the results in this study and the empirical findings of the others have shown that although e-portfolio was combined with flipped classrooms, the combination still played an essential role in the students' speaking performance.

We surmised that the elements in the e-portfolio played essential roles in improving the students' speaking performance, such as regular practices, peer activities, and self-assessments, as observed in this study. The interview results also indicated that those activities seemed to help them improve their speaking skills. The findings, therefore, repeated Huang and Hung's (2010) results that regular practices provided in the e-portfolio are responsible for the improvement in students' speaking performance. In addition, peer activities were also found to be playing significant roles. It is consistent with the report of Askarzadeh and Mall-Amiri (2018) that students taught using peer assessment outperformed those learning by e-portfolio due to its ability to provide more interactions and reduce anxiety. Moreover, we predicted that the opportunity to reflect on performance and the comments from other students and teachers aided the self-assessment and enhancement of speaking ability. This confirmed Safari and Koosha's (2016) claim that it is possible to improve students' speaking performance by using the opportunities provided by the portfolio for the students to self-monitor and self-assess. Therefore, we speculated that regular practices, peer activities, and self-assessments were responsible for improving students' speaking performance during the implementation of e-portfolio in flipped classrooms.

In addition, we also surmised that flipped classrooms were responsible for the critical outcomes of this study. Before going to class, the students' tasks appeared to allow them to understand the materials better as they had more time to review the materials. Furthermore, F2F exercises are used, as Roehling (2018) claimed, to develop skills and knowledge. Therefore, the students seemed to have better knowledge prior to doing the discussions and assignments. Through this discussion, flipped classrooms, therefore, tend to be a good fit for the e-portfolio and support the use of this technique in teaching speaking courses.

RQ2 explored the students' learning engagement during the implementation of e-portfolio in flipped classrooms, and the students exhibited several learning engagements covering the behavioral, cognitive, and affective domains. From the behavioral perspective, we found similar patterns shown by the students, such as active participation in online or classroom discussion, active involvement in making videos, and providing regular comments on the students' videos. We predicted that the elements of flipped classrooms, such as interactive activities during F2F time and the creative tasks provided by the e-portfolio, guided the students' behavioral engagement. Therefore, the students were observed to have the opportunities of becoming more behaviorally engaged during the implementation of the e-portfolio. This is consistent with the claims

that flipped classrooms provide activities for the students (Mehring, 2018) to improve their opportunities to engage the course materials (Roehling, 2018).

Concerning the cognitive engagement, the students also showed similar participation by reviewing materials before going to class, searching for supporting materials, joining online and class discussions, learning from practice with peers, and teacher and friends' comments. This shows that the combined implementation of e-portfolio and flipped classrooms tended to provide meaningful activities for students' cognitive development and more opportunities to participate cognitively. Moreover, it provided them with a higher possibility of developing their cognitive domains than other teaching strategies.

We also surmised that the innovative materials and exciting activities apparently influenced the students to have good affective domains. This is evident with their preference for both the materials and activities provided by the e-portfolio in flipped classrooms. This is in accordance with the claim of previous researchers (Hung, 2015; O'Flaherty & Phillips, 2015) that the activities of flipped classrooms lead to satisfaction and can influence students' feelings and attitudes toward the learning process. Moreover, the findings also showed that good affective engagement influenced the motivation to succeed in behavioral and cognitive engagement. However, this contradicted Lee *et al.*'s (2018) finding that there is no significant relationship between students' behavioral and cognitive engagement and satisfaction. Therefore, further research is required to explain this discrepancy.

The findings showed three implications of the subject of research on ELT. Firstly, due to the availability of some advanced technology tools to store, manage, and share audio or videos online, implementing an e-portfolio is possible. Furthermore, due to its ability to improve students' speaking performance, e-portfolio should be embraced by the teachers in their ELT practices. Moreover, e-portfolio has been an effective and efficient assessment technique to improve assessment as learning rather than facilitate assessment for and of learning (Kwak & Yin, 2018). Therefore, incorporating an e-portfolio into flipped classrooms is encouraged to provide students with more F2F time required for speaking activities, as Garner and Chan (2019) suggested that more practice time provided by flipped classrooms can improve students' communication skills. Secondly, an e-portfolio should provide regular speaking practices involving individual and peer conversations as well as regular reflections on performance. This is necessary considering the effects of consistent speaking practices, peer activities, and self-assessments on performance improvements. Besides, Huang and Hung (2010) revealed that regular practice in e-portfolio is responsible for immense improvement. Thirdly, while incorporating e-portfolio and flipped classrooms, it is essential to note that the materials for both pre-class and F2F should be exciting and innovative to promote active learning engagement as well as affective and, subsequently, behavioral and cognitive participation.

5. Conclusion

The results showed a significant difference in students' speaking performance taught by e-portfolio in flipped classrooms and those taught by conventional techniques. The combination was found to have the ability to improve speaking performance due to its provision of regular speaking practices, individual and peer activities, and self-assessments. Moreover, through the combination of e-portfolio and flipped classrooms, the students seemed to engage behaviorally, cognitively, and affectively with the learning process. Therefore, combining e-portfolio and flipped classrooms provides more opportunities for the students to develop their speaking learning process.

A few limitations and ideas were observed during this study and should be considered by future studies. First, the implementation of Flipgrid as a means of storing speaking videos required another online application to provide the comments, which led to the incorporation of Schoology. Second, the effect of the e-portfolio was not explored on some possible variables affecting speaking performance. Third, the correlation between the three domains of engagement was not explored. Therefore, future studies should address these limitations to enhance the literature of e-portfolio and flipped classrooms and inspire language instructors to embrace this combination in their ELT practices.

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