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The Impact of Reflective Videos for Learning About Research Methods: A pilot study of a reflective video activity during Covid-19

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Abstract

Teaching research methods has proved to be a very challenging task. Scholars have noted that lectures and exams may not be optimal for teaching students how to conduct proper research (Howard & Brady, 2015; Lewthwaite & Nind, 2016). As research projects can vary greatly, it can also be difficult to teach a clear process and framework that students can reference when conducting their own research projects. Therefore, this article aimed to study the use of reflective videos for teaching research methods, and if it helped students better engage with the course content, reflect on what they learned, and understand how to conduct proper research. The results of the study indicate that peer-to-peer reflective video activities did not lead to a significantly better engagement and understanding of research methods among all participating students, but did lead some students to more critically reflect on their mindsets and attitudes toward research methods. Most of the participants (n =21) reported that the reflective videos were a good way to review and recall what was learned, as to well as discover new ways to look at how to conduct proper research.

Keywords: Teaching/Learning; Research Methods; Reflective Videos; Social Learning

Introduction

Social science research methods have been deemed critical for fields such as public administration and political science (Foster & Gunn, 2017). According to Gunn (2017), teaching research methods is not only for people who want to conduct research for their careers, but also for people who

want to pursue careers that require a fundamental understanding of the information they may receive in their professional careers. This can include scientists, journalists, and many other professions. It was emphasized that these courses teach people not only how to conduct research, but also how to consume research and comprehend information (Gunn, 2017). Although scholars have emphasized the importance of learning research methods (Foster & Gunn, 2017; Gunn, 2017; Nind, Kilburn & Wiles, 2020), several challenges have been identified.

Research methodologies, according to Earley (2014), are complicated and require a combination of steps and concepts without common understanding. Howard and Brady (2015) noted that students generally have a negative view of learning research methods and feel that such courses are irrelevant. Moreover, they can bring about misconceptions and generally poor attitudes towards learning research (Howard & Brady, 2015). Gunn and Foster (2014) also emphasized that engaging students in research methods, particularly quantitative methods, can be particularly difficult. Howard and Brady (2015) first noted that research has largely ignored specific course content and how learning activities might contribute to student disengagement. Lewthwaite and Nind (2016) added that teaching techniques for research methodologies are still developing. A more recent study by Nind and Lewthwaite (2020) has found a significant trend toward student–centered, active, and experiential pedagogies (Nind & Lewthwaite, 2020).

Despite calls for research technique courses to be more interactive, experiential, and student–centered (Nind & Lewthwaite, 2020), there is still much to learn about how to teach research methods and the best teaching approaches toward helping students not only understand proper research practices, but be able to conduct research themselves. Therefore, this research focused on investigating the use of a reflective peer–to–peer video activity in a research methods class with Thai undergraduate students. The objective was to better understand whether reflective video activities discussed among peers could lead to better engagement, reflection, and perceived learning outcomes for students in the research methods class.

Literature Review

Teaching the subject of research methods has proven to be difficult not only in terms of the complexity of the subject matter, but also in terms of student engagement (Howard & Brady, 2015;

Nind & Lewthwaite, 2020). In the face of these challenges, research has investigated how to make the study of these subjects more engaging for students. Boyle et al. (2014), in a review of simulations and games for teaching research methods and statistics, noted several games that utilized narratives while teaching important concepts for research methods. For example, Operation ARA (Acquiring Research Acumen) is a game in which players are provided an interesting narrative about helping the Federal Bureau of Science identify extraterrestrials who are carrying out poor research (Halpern et al., 2012). The study proposed that by playing this game, the players could adopt an evaluative approach to determine whether the research activities in the game were reliable or flawed. The results of the study indicated that the students learned significantly more by playing the game than those who did not (Halpern et al., 2012). Although computer simulations can show how instructors can use different learning activities in teaching research methods, other research has argued that flipped classrooms and reflective video exercises can also be very effective.

Research by Chen et al. (2019) and Flores (2016) promoted the potential of flipped classrooms for teaching/learning. They emphasized that giving students more responsibility to lead learning in the class could result in more effective outcomes, and several studies have found that flipped classroom activities involving reflective learning have been well received by students (Chen, Hwang & Chang, 2019; Ross & Call–Cummings, 2020). Chen et al. (2019) suggested that a reflective enhanced learning strategy combined with a flipped learning environment could inspire students to be more responsible while helping them learn their subject matter (Chen, Hwang & Chang, 2019). Nind et al. (2015) also investigated the role of videos and dialogue in the generation of reflective dialogue. The authors found that the videos and the reflective discourse thereafter promoted further learning. The authors concluded that the videos gave the students a shared focus and a reference point (Nind et al., 2015). Several studies, supported by neuroscience, suggest that visual media can increase engagement. Ramsey et al. (2021) explained that watching others' material fosters an internal incentive system and creates ideas, while Maddox & Fitzpatrick (2019) also demonstrated how content, when used in a virtual way, helps students visualize and minimize cognitive resources to increase experiential, cognitive, behavioral, and emotional learning. Therefore, in addition to the use of games, research has also emphasized the value of flipped classrooms, especially with reflective learning activities like videos (Nind, 2020) or written journals (Ross & Call–Cummings, 2020) for teaching research methods. However, there have been some debates on how to evaluate reflection and its value towards learning.

On the topic of reflection, Chen et al. (2019) stated that reflective thinking is often used interchangeably with critical thinking, but reflective thinking can provide learners with a structured opportunity to scrutinize their own learning and is an especially important factor in problem solving. In essence, the argument is that reflective thinking can encourage higher–order thinking. However, Kember et al. (2000) emphasized that little attention has been paid to methods for assessing whether students engage in reflective thinking and to what extent. They highlighted the work of Mezirow (1991), who differentiated reflective actions from non–reflective actions and utilized his theory to create an instrument to further assess and promote reflective thinking. In more recent research, Cheng and Chan (2019) said that reflective writing can be low valued, particularly if students have not been taught to do so or because it has not been emphasized enough. The authors added that although reflection is important, there can be a mismatch between what students are expected to know and what they really know about reflection (Cheng & Chan, 2019).

As a result, educators have now started to focus on how to assess and analyze student reflections. Cheng and Chan (2019) observed that regardless of the evaluation model, students' reflection was basic. The authors noted that more research is needed in this field that encourages reflective writing and reflection, in general. The authors said that custom rubrics for reflection can also improve student reflection and that learning, and it is not simply about students being told to reflect but being taught how to reflect properly. It is believed that this research will help to better understand how students should learn research methods and how reflective learning should be encouraged and assessed with different types of learners through different learning activities for research method courses.

Conceptual framework

From the previous literature, there are clear arguments that research method courses need to be more experiential and collaborative (Nind & Lewthwaite, 2020). One way this could be done is using media, such as pictures and videos, to convert classroom content to real–life application through a series of reflections and peer feedback through observations (Wong et al., 2022). Therefore, a preliminary conceptual framework (Figure 1) was created based on the previous literature and informed the reflective video assignment that was created to better understand how research methods can be taught in an engaging and informative manner to students. In essence, the study investigated the theory that

peer–to–peer reflective videos would not only engage the students with learning research methods, but also help them engage in reflective learning, which would then result in higher perceived learning in a research methods class.

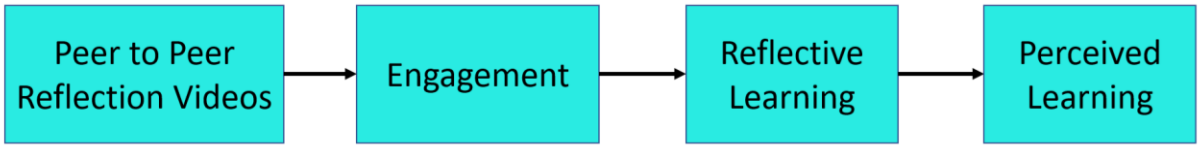

Figure 1 Preliminary conceptual framework

Social learning theory

In terms of why the study chose to utilize reflective videos for this study, Nind et al. (2015) highlighted that learning from reflective videos was not simply students learning from watching the videos, but from having a dialogue about these videos with their peers. This is similar to the social learning theories first conceptualized by Bandura (1963), who mentioned that a person's behavior was shaped by their social environment and could be enforced in positive or negative ways depending on their environment. Previous research on teaching research methods has also emphasized that students need to develop individual competencies to conduct reliable research (Flores et al. 2016; Nind, Kilburn, & Wiles, 2015). Bandura (1997) also argued that watching others can build visual and mental imagery, and individual contributions can enhance collective outcomes. Social networks may be effective in engaging students (Greenhow, 2011), but evidence of their use to learn research methodologies is scarce.

Reflective thinking

Previous research has also emphasized the importance of reflection, with Ross and Call–Cummings (2020) emphasizing that students would learn research methods best through reflections on challenges and failures. Teo (2019) further recommended that dialogic pedagogy, or learners being encouraged to question other people's ideas and opinions, could be an effective way to create community–based learning based on reasoning and logic, two essential elements of learning research methods mentioned by previous literature (Nind, 2020). However, authors have disagreed about how

to nurture this reflective thinking, especially among students who are not accustomed to doing self reflection. Mawasi et al. (2022) emphasized that narratives, where learning content is delivered through stories featuring plots and characters, could help lead students through a progressive and engaging learning experience. The authors also mentioned that narratives could help students reflect on relevant issues to research methods such as ethics and responsibility in a "non–threatening way" (Mawasi et al., 2022). Although narratives may increase student participation in problem solving, they can also create a higher cognitive load (Barab et al., 2010; Adams et al., 2012). Therefore, to avoid any potential cognitive overload, this activity did not include narratives and instead asked the students to simply provide reflective observations on their experiences with their research projects.

Peer Assessment

Another interesting note is the potential role of peer assessment. Past research has emphasized that the dialogue between students can be an invaluable part of learning research methods (Nind, 2020). However, Gielen and DeWever (2015) have stated that while peer assessment can be valuable, it can be hard to determine the quality of peer feedback. While Chen et al. (2019) claimed that the use of reflection can improve critical thinking and learning reflection, Cheng and Chan (2019) asserted that without prior training, the usefulness of reflective learning activities may be minimal. As one of the key parts of learning research methods can be learning from other peers (Howard & Brady, 2015; Ross & Call–Cummings, 2020), peer assessment has also been considered a critical component to effective learning of research methods and was studied further as part of this research.

Concept Development

Although research has talked about the power of social learning and the importance of reflective thinking, there have been several reported issues of students being unable to reflect appropriately (Cheng & Chan, 2019) or disengaged from learning research methods (Howard & Brady, 2015). It has been argued that students may be better able to produce content to reflect on their learning more accurately by seeing peers' observational materials, especially those in video format, and getting help from their peers with feedback (Bandura, 1963; Teo, 2019). However, there is little research on reflective videos for peer learning in research methods, and it is still uncertain if all kinds of students

can share and discuss high–quality reflections from peer–to–peer reflection videos. Although scholars have suggested the efficacy of students learning from each other and not just the instructor (Bandura, 1963; Nind, 2020; Ross & Call–Cummings, 2020), it is not clear whether peer feedback, particularly through reflective videos, might enhance students' perceptions of their learning in a research methods course. Arguments have been made that a shared, common space–based form of experiential learning that is centered on student needs can lead to better learning outcomes (Nind et al., 2015; Nind & Lewthwaite, 2020). Despite this, there is little information and research on how leveraging a social peer–to–peer video sharing area for reflections can help lead to better quality learning outcomes in research–method courses. Therefore, a study was carried out in a research methods course of a reflective video learning activity on a private social media platform. The following research questions were posed:

Research Question 1: How did students use reflective peer to peer videos to document or share their learning experiences?

Research Question 2: Did the students' perception of their learning change because of watching and commenting on their peers' videos?

Research Question 3: Did a student's view of their learning improve because of sharing their reflections in a shared video space for discussion and learning?

Hypothesis Development

Research questions led to the conceptualization of the initial model above (Figure 1) that was used in the pilot testing of a reflective video assignment for a research methods class. Scholars have said that active student–centered experiential learning can be facilitated by peer–to–peer reflection videos that are administered within a shared social environment (Nind & Lewthwaite, 2020; Teo, 2019). According to social learning, in this situation, interaction like watching videos can lead to more introspection (Bandura, 1963). Therefore, this study proposed the following hypotheses:

Hypothesis 1. Reflective videos in a shared social space have a positive effect on learning reflections.

Numerous studies have demonstrated how challenging it is to use reflections to foster effective learning. The findings are inconsistent; with some suggesting advances in learning through reflective

activities, while others discovered decreased levels of critical thinking (Wong et al., 2022; Cheng & Chan, 2019). In this situation, the adoption of dialogic strategies that result in greater reflection may promote greater learning. As a result, it is suggested that a higher quality of reflection may influence how students perceive their learning in the research methods course.

Hypothesis 2. Reflective learning has a positive effect on self–perceived learning performance.

To contribute to previous research on how to teach research methods (Flores et al., 2016, Gunn, 2017; Nind & Lewthwaite, 2020), this study focused on how reflective learning and peer–assessed videos could help students become more engaged in learning about research methods and how to conduct research. Although many have emphasized that reflective dialogue and practice are helpful for learning, there are still some questions regarding how reflective videos and dialogue can stimulate learning, specifically in the research method teaching context.

Research Method

To better understand how reflective videos and peer evaluation could possibly aid in learning for a complicated subject such as research methods, a quasi–experimental pilot study was done in a class of third–year students studying in a research methods class. All students in the class participated in the reflective video activity as part of the learning in the research methods course, but additional pre–post survey data was only collected from students who consented to participate in the pre–post survey. All students were fully informed about the purpose of the study before they were asked to participate. No students were excluded from participating unless they did not want to participate. All names and other identification information from students was deleted during the data collection process, and data was kept on a password protected folder to avoid any of the participant identities being disclosed. Of the 80 students enrolled in the class, about 21 students (26.25%) did the pre–post survey, which was also analyzed as part of this pilot study.

Prior to the activity, the students had formed small research teams and actively conducted their own quantitative research projects with the guidance of the instructor. The students did not have much experience doing their own research projects, and for many of them, it was their first time working on a longer research report. Although research projects were designed to be student–centered, active and experiential as with other learning activities for research methods (Nind & Lewthwaite, 2020), these

projects usually lacked the reflective component that has also been encouraged by previous research (Ross & Call–Cummings, 2020). Therefore, to help students reflect on their learning experiences in conducting these research projects, all students posted personal reflection videos on a private video platform called Soqqle (Figure 2). With the emphasis on peer dialogue and discussion from past research (Nind, 2020), students were asked not just post reflection videos, but also comment and discuss the reflection videos of their peers.

The students were tasked with posting three reflection videos:

1. Reflection on quantitative research design
2. Reflection on report writing
3. Overall reflection on learning research methods

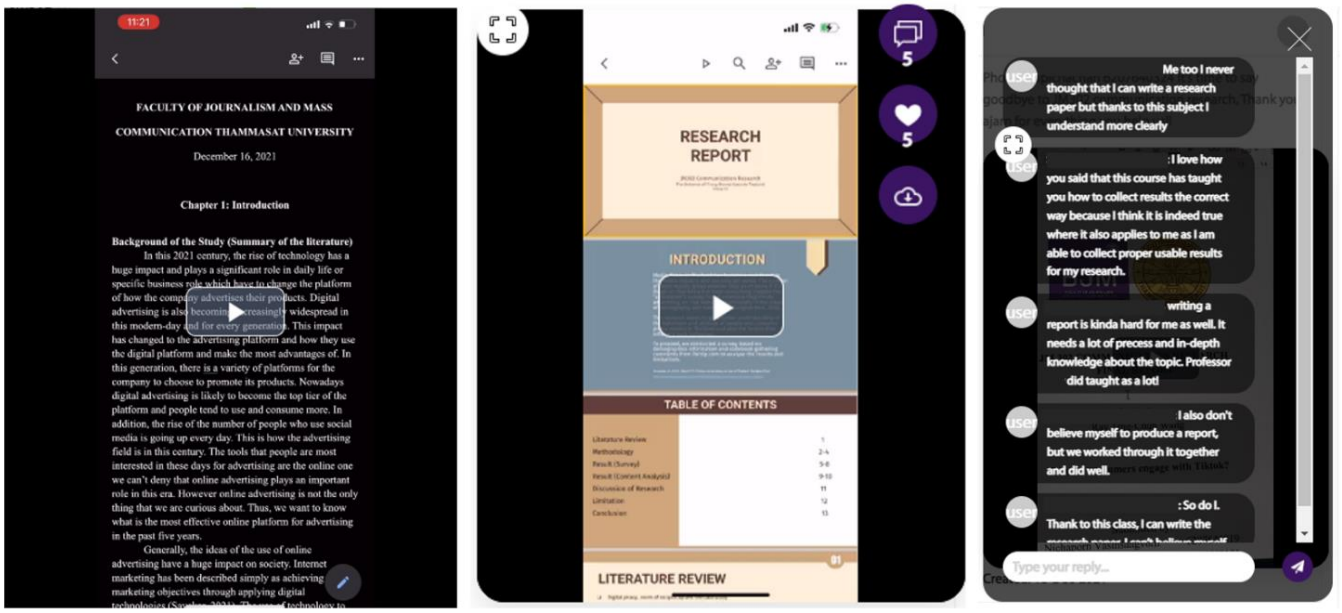

Figure 2 Example Reflection Videos and Comments from the research methods course

For each reflection video, the students discussed their experiences with designing research projects or writing research reports, and then were asked to pose questions they had about research methods that they would get answers to from their peers in the form of comments. All students were required to respond to at least five other reflection videos from their classmates so that there was a community of inquiry formed around a better understanding of how to conduct proper research. Due to the Covid–19 pandemic, the students completed this activity entirely online and had little face–to–face

contact with each other. In essence, this reflective learning activity was one of the few ways that they could have discussions about what they were learning from the class with all their classmates and not just the members of their project group.

Before and after the reflective video assignments, the students were invited to do a pre–post survey on their perception of the research methods course and how confident they were in utilizing different research methods for doing quantitative research. The pre–post surveys both utilized reflective thinking measures developed by Kember et al. (2000). The post–survey featured the same questions as the pre–survey, but also asked students to briefly share how the reflective video assignments impacted their learning of research methods (Table 1).

Table 1 Key Questions from Pre–post Surveys

Perception of learning Research Methods ● Grade the difficulty of Communication Research Methods Course ● I feel Communication Research Methods is an interesting class ● I am excited to join this class every week ● I feel that communication research methods class is useful ● I can see how Communication research methods can help me in the future **Understanding** ● This course requires us to understand concepts taught by the lecturer ● To pass this course, you need to understand the content ● I need to understand the material taught by the lecturer in order to perform practical tasks. ● In this course, you have to continually think about the material you are being taught.	**Reflection on Behavior** ● I sometimes question the way others do something and try to think of a better way. ● I like to think over what I have been doing and consider alternative ways of doing it. ● I often reflect on my actions to see whether I could have improved on what I did. ● I often reflect on my experience so I can learn from it and improve for my next performance. **Critical Reflection on Self** ● As a result of this course so far, I have changed the way I look at myself ● The course so far has challenged some of my firmly held ideas. ● As a result of this course so far, I have changed my normal way of doing things. ● During the course so far, I discovered faults in which I had previously believed to be right

Data Analysis

The number of videos posted were counted as well as the watch time, number of comments, and changes in the pre–post survey results. In total, the students posted 119 videos, and 21 students completed the pre–post surveys on the surveys. As both the videos and the comments were integral to this study, both were analyzed separately. First, the videos were analyzed in terms of editing style and content. The researcher coded whether the videos used any visual effects or were just a simple video explanation without other visuals or graphics used. The comments from the students were then analyzed to evaluate whether they were sufficiently discussion–oriented on what was depicted in the reflection videos or if they were simply repetitive comments posted to complete the assignment.

To address research question two, the total watch time of the students was calculated along with the amount of time the students spent watching each video. This helped determine whether the students watched all reflective videos equally or spent more time watching some reflective videos than others. The study also calculated how many comments each participant posted individually to compare with the observations from research question one along with the pre–post survey on learning research methods.

Correlations were also calculated in terms of whether a longer video viewing time led to a greater perceived learning of research methods. In addition, a Wilcoxon test for statistical differences was conducted on the pre–post surveys of the students to determine if there was any significant difference in the pre–post survey results of the students. As the number of participants was quite small (n =21), it was determined that the Wilcoxon test would be the best way to determine whether there was any statistically significant change in students' perceptions of their learning of communication research methods (Scheff, 2016).

Finally, to address research question three, qualitative data in terms of post–survey comments on Soqqle from the students were also collected to determine if reflective video posting on Soqqle made a significant difference in terms of their learning. The students were allowed to freely comment on whether the activity was helpful in their learning and provide suggestions for improving the activity. These comments were thematically coded to themes mentioned in the literature, such as information recall (Nind, Wiles, & Wiles, 2015; Nind, 2020), analysis (Flores et al., 2016), and online peer–to–peer learning through social networks (Greenhow, 2011).

Results

Research Question 1: Observation of the student reflective videos and comments

In total, students in the class posted about 119 videos on the three different video topics, with most of the students posting the three videos as instructed and commenting on the videos of their peers. There were a few students who forgot to post one video or did not comment on any of the videos. However, most of the 21 students who did the pre–post survey completed the assignment (both videos and comments) as instructed.

The reflective video content was quite basic overall, with very little use of any visual effects or graphics. Students simply recorded themselves talking to the camera with some visuals of their research reports. It is possible that these reflective videos on research methods could have benefitted from having students explicitly directed to tell a story about their challenges or provide more examples of challenges they faced with their research projects in their videos. However, it is also possible that the students would not have recorded the videos as instructed and could have simply posted a reflective video to complete the assignment.

On a related note, there were some slight issues with a few of the students not following directions and not posting appropriate videos or comments. For example, the researcher observed that several of the students, instead of posting a reflection video on research design, chose to post a video discussing their research topic in greater detail and posing a question about the said research topic. Furthermore, some students were also observed posting repetitive comments on videos to 'complete' the assignment without thinking substantively about whether the comment would aid in the understanding and learning of research methods for their peers. For instance, one student posted similar comments about research methods courses being primarily useful for individuals looking to study for a Master or Ph.D. in several of the reflection videos, indicating that some students may have just been posting comments to complete the assignment as opposed to participating in a discussion around how to do proper research. Therefore, in reference to the conceptual model, the activity was successful in engaging some students in learning about research methods, but not all.

Research Question 2: Correlations between watch time, comments, and pre–post surveys

21 student participants provided pre–post self–assessment surveys and consented to the data analysis. On average, each student watched 26 minutes of peer–to–peer videos, provided 9 comments each, watched 48 videos, and watched 2 minutes per video. A correlational analysis was performed but was not statistically significant ($F(2, 87) = 1.467$, $p < .260$, $R^2 = .155$). It was observed that if the number of survey participants doubled, the correlational results would reach statistical significance. There was a positive correlation for the duration of views, but a negative correlation was observed for the number of videos watched.

The negative correlation between the number of videos watched and the self–perceived improvement initially suggests that the more they watch, the less they learn. On average, this was about 47 videos. The positive correlation between the duration of the videos watched suggests that it was the choice of the right content that was critical. As students were asked to post comments on the videos, this could also have resulted in students browsing more. It could also be due to the size of the class (80), as there was a relatively considerable number of videos for students to browse. Sorting through the content would have been a challenge. A possible solution would be for the technology to utilize alternative forms of sorting or rating features.

As the participant sample was quite small and the sample was not normally distributed, a nonparametric Wilcoxon test was performed on the prepost surveys to further investigate whether there were significant changes in the prepost surveys (Table 2).

Table 2 Results from Wilcoxon Test for Statistical Differences between Pre–Post surveys (n=21).

	Average Change for Perceived Competence in Research Methods	Average Change for Perceived Competence in Academic Writing	Average Change for Perceived Competence in Quantitative Research	Average Change for Habitual Action	Average Change in Perceived Understanding of Research Methods	Average Change for Perceived Reflection	Average Change for Perceived Critical Reflection	Overall Change from Pre–Post Survey
Z	–2.068	–3.068	–3.69	–2.487	–1.359	–1.636	–3.174	–3.634
Asymp. Sig (2–tailed)	0.039	0.002	0	0.013	0.174	0.102	0.002	0.00

From the results in Table 2, it appeared that the reflective video learning activity had a statistically significant impact on the students in terms of their perceived competency to use research methods and academic writing. However, the activity did not appear to have an impact on their understanding of the course material or on their own approaches to conducting research. However, the students indicated that the reflective video activity in this case made them think more about their mindsets and changed some of their firmly held ideas on the research methods. Overall, these initial results indicated that reflective learning activities were very useful in terms of questioning their previous attitudes and mindsets towards learning research methods, but did not necessarily impact their own approaches to conducting the actual research or understanding of research methods. Thus, the second hypothesis could not be supported, as the students only felt that the activity improved their learning in certain aspects and not others. This may not have been due to the reflective video activity itself, but rather to the lack of involvement of some students while doing the activity, which was also a key factor in whether the students learned from this activity or not. Therefore, the activity was not quite successful in developing reflective learning or better perceived learning among all students.

Research Question 3: Student feedback to the Soqqle reflective video activity

To better understand why the reflective videos were effective for some students but not others in terms of engagement, reflective learning, and perceived learning (Figure 1), research question three focused on the written feedback provided by the students. In general, many of the students felt that the Soqqle reflective video activity helped them in a variety of ways (Table 3). For example, some students mentioned that the activity helped them improve their communication skills, and others mentioned that the activity did, to some extent, form a reflective discussion–oriented community in which they could pose questions to each other and think of additional questions and answers they might not have thought of had they not done this reflective video exercise with their peers.

Table 3 Key Feedback from the students on the Soqqle Reflective Videos

Recall and Understanding	Analysis	Peer–to–Peer Learning
“It can help me to recall what I did and how it affected me.”	“This is another way to analyze from what you have learnt in the class”	“The answer from classmates that answers the question from each video offer a new way to

Recall and Understanding	Analysis	Peer–to–Peer Learning
"I think it is a good way to keep track of what you are doing. It helps us to think about our performance and check our understanding of the course. We won't be able to talk about something if we don't understand. So, I think it is a good way to make sure that we fully understand the topic." "It helps me recall what I've learnt so far during the course." "It can make us know what we have learned and can help us improve our study by check the understanding of ourselves."	"It helps me reflect myself on what am I doing. But it would be better if everyone gives more effort on [this learning activity]." "I think it is a good way that we can reflect on what we are doing each week. For example, I always come up with a variety of question that I may not think of before."	look into things that was done in class" "I know what I have done and learned. Moreover, I receive the answers [about things] I don't understand and see other questions that I did not think about." "We could find out some answers that we need through Soqqle. Everyone has mutual problems, and we share our solution." "It's given us chances to ask questions that we don't know or [are not sure about]"

The students also reported that the activity allowed them to reflect on what they had done and learned not only from conducting the research projects, but also from reflecting on the research projects of the other groups. Some of them also added that this reflection activity allowed them to see the shared problems they all faced and felt more comfortable addressing the challenges they faced in the course. One student did note a general issue that was observed by the researcher, in that the activity did help this particular student to reflect on what was learned, but it would have been better if every student gave full effort to doing the activity. It should be noted that none of the students thought the reflective video activity was a waste of time or was not beneficial to their learning in the research methods class. The most serious critique from one of the students was some technical issues with

posting the reflection videos on the private social networking platform Soqqle, but this student also noted the value of students exchanging ideas and opinions on conducting research methods.

Limitations

As only a limited number of students chose to complete the pre–post surveys, the sample can be considered a bit too small for statistical correlations to be significant. The study was also carried out at a faculty of a Thai university, where most of the participants were Thai students. This means that the results of the study are not necessarily generalizable and that more studies on reflective learning activities should be carried out to determine whether the findings for the study would be true of other university students in Thailand and other cultural contexts.

Discussion

Overall, the study provided some interesting findings that need to be further investigated.

The use of reflective videos in a shared social space can have a positive effect on reflective and perceived learning.

Several participants said that reflective video tasks helped them remember the lessons. It also allowed students to ask questions from a different perspective that was not instructor–led. Participants also reported that the content of their peers helped them look at the learning materials in a new light. As it was previously reported that learning about research methods was challenging, as it may not always be perceived as relevant (Boyle et al., 2014), having peer interactions to discuss ideas seemed to help in this study. The activity did, therefore, have a generally favorable perceived impact on the recall of knowledge, and students who paid attention to their peers' feedback benefited even more. Considering the aspects mentioned above, it may therefore be stated that the use of reflective videos in a group setting is beneficial to learning, particularly when combined with peer feedback.

However, it should be noted that content personalization played a significant role in whether students found the activity engaging and helpful for reflective learning. One limitation of previous research was that several studies assumed that students would be naturally engaged with the reflective learning activity (Ross & Call–Cummings, 2020; Nind, 2020) and did not necessarily depict issues with disengaged learners. However, in this study, it was apparent that not all students were engaged and

therefore were not substantively impacted in terms of change in their engagement with the course, reflection on research methods, or perceived learning outcomes. Based on the participation feedback, it was clear that students who were able to individualize and use the feedback to personalize the learning to meet their own objectives found it most useful. For example, in addition to seeing content in a new light, students could also browse content by their peers and look for the content that was most relevant to them. In this process, the ability of the teaching method to customize and personalize content helped, although it requires students to make the extra effort to browse the reflective videos to find relevant content and discussion. It is possible that technology can be used to introduce more efficient ways of delivering personalized content, but this also depends on students being engaged with the activity from the beginning, and this does not always occur even with a flipped classroom or peer–to–peer learning environment.

However, it was also interesting to note that the students did not seem to learn more by spending many hours watching the reflection videos of their peers. Although there may have been an assumption that there would be a correlation between increased watch time and better perceived learning outcomes among students, evidence indicated this was not true. It appears that merely spending a great deal of time watching the reflection videos of others did not necessarily lead to better perceived outcomes among students, but careful watching and consideration of what was mentioned in the reflective videos followed by appropriate discussions of the reflective video content on the platform. The videos also did not feature much storytelling or narratives from the participants, who simply explained what they did and then asked a question about conducting research to their peers. While it has been previously mentioned that the use of narratives could create more cognitive load (Adams et al., 2012), it is unclear whether the use of narratives in this context could have helped guide students to better link classroom content with reflecting on what they learned. Finally, it should be noted that reflective videos themselves did not provide the key learning content, and future research should study more factors that can link watching of reflective videos with perceived learning outcomes.

Reflective learning did not have a clear positive effect on self–perceived learning performance

Although previous research by Chen et al. (2019) and Flores (2016) was very optimistic about the potential of flipped classrooms for teaching/learning, the findings in this study indicate that there are still some issues that may arise if not all students are fully committed to the flipped classroom activities.

If students are not substantially engaged in the learning activity, they may simply participate in the activity superficially and hinder the formation of a reflective learning community that discusses issues and possible solutions. Although Chen et al. (2019) argued that flipped classroom approaches could encourage students to be more responsible and help them learn their subject matter, this was not fully supported by the study. Even with the added responsibility, not all students in this pilot study participated in the reflective video activity or exhibited appropriate reflective thinking. Some students either did not post any videos or posted repetitive comments that were not helpful to their peers. This indicates that teachers may need to consider additional complementary methods or rewards to help students better commit to these more student–centered activities to ensure proper learning for all students.

Furthermore, several students stated that, while the reflective video assignment was beneficial, they were still struggling with the research methods course. Some of the participants admitted that they needed more experience doing research projects before they could reflect more effectively on what they learned. This finding highlights the limitations of reflection, and if students are relatively new to learning about research methodologies, reflection assignments may not be enough to help them learn more about research methods.

Conclusion

In conclusion, the research showed that while peer–to–peer reflective videos could lead to improved engagement and more positive perceptions of learning research methods, this was not true for all students in the course. It should be emphasized that this reflective video activity was, in essence, a "flipped classroom" activity in which students took control of the learning with the teacher as a guide. In these cases, teachers have less control over the quality of 'flipped classrooms' and students need to take on a more proactive role for it to serve as an effective learning environment (Chen, Hwang, & Chang, 2019; Flores, 2016). Additionally, as educators try different innovative learning activities for teaching research methods, they must always consider the role of students in these activities. If students simply receive and input knowledge, they will have less impact on the learning of other students. However, in flipped classroom approaches, students deliver the key content to their peers and need to be sufficiently engaged and motivated to participate. Teachers could play a stronger role in encouraging students to participate, but it can lead to students finding the activity bothersome or, worse, participating

in the activity for a higher grade. As this activity requires significant quality input from the students, it is therefore imperative that future research look at other viable paths for peer–to–peer learning.

What are the other viable paths for peer–to–peer learning in research methods courses that should be studied further?

This research has highlighted the limitations of reflective videos and the emphasis on research projects. The research found that a major potential difficulty with the reflective learning activity was that, like many others, it focused on reflection of student–led projects, which may not elicit high engagement because some students typically perceive them as 'dull and tedious' by some students. As the study yielded results that showed both the potential and limitations of flipped classrooms and video–based peer learning, this study concludes by proposing other ways of teaching research methods to be investigated. While the reflective video activity was both student–centered and active, as suggested by Nind and Lewthwaite (2020), it was not experiential as it was a supporting activity for student–led research projects. As research projects or project–based learning require more time to explore and reflect, introducing simulation methods such as role–play as a research manager in a game–like setting may help students learn the content in a shorter amount of time (Wong et al., 2022). In essence, students would not only be able to engage with research methods in a different way but also be able to simulate the research process in a short amount of time without having to commit many weeks to conducting the research themselves. This kind of learning would also provide another type of experiential learning discussed by Nind and Lewthwaite (2020), in addition to being student–centered and active.

Despite some evidence in this study that reflective learning may improve perceived learning, there are also indications that learning research methods may still require a blend of other pedagogies, such as simulations, to create a larger impact. The study by Halpern et al. (2012) suggested that there is a potential for games with robots or AI avatars to contribute substantially to teaching and learning for research methods, and the delivery of information might be more consistent if delivered by programmed avatars as opposed to disengaged students. As this research showed some potential limitations for flipped classroom or peer learning approaches, it may be best to revisit the potential of narratives to teach complex subjects such as research methods. Hwang and Chien (2022) argued that digital storytelling could promote motivation and awareness while helping to generate new knowledge. Other studies have also emphasized that virtual worlds could increase engagement and motivation (Nah et

al., 2013) and may not necessarily result in excessive cognitive load, as has been argued by other research (Adams et al., 2012).

In summary, teaching of research methods will become more important in the present and future. Reflective learning is just one of several learning activities that can be done to help students learn about research methods. However, reflective learning assignments are most effective when all students are fully engaged and do them not simply to complete a course requirement, but for their own learning. Reflective learning activities may also not be very effective if students do not have enough suitable experiences to reflect on. In this case, the students did not have much experience conducting full research projects and may not have had enough prior experience to reflect effectively for this activity. However, the reflective video activity did help to form a different type of learning environment that involved peer–to–peer learning of research methods. On the basis of these results, more research needs to be conducted on different learning activities to further determine if this type of peer learning is most effective for teaching research methods to different types of learners. This study also recommends further investigation into different activities for teaching research methods such as games, and more studies on what kind of learning activities would be best for students to learn research methods in different educational levels and cultural contexts.

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