

Flipped Classroom with Whiteboard Animation to Promote Communication Skill: A Mixed Method Study

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ARTICLE INFO

Article history:

Received September 03, 2023

Revised September 10, 2023

Accepted December 13, 2023

Available online December 25, 2023

Kata Kunci:

Flipped classroom, whiteboard animation, keterampilan komunikasi.

Keywords:

Flipped classroom, whiteboard animation, communication skills.



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ABSTRAK

Keterampilan komunikasi adalah salah satu keterampilan yang penting dimiliki oleh guru dan calon guru, namun kenyataannya keterampilan guru belum memadai. Tujuan penelitian ini adalah untuk menganalisis pengaruh implementasi Flipped Classroom dengan Whiteboard Animation terhadap keterampilan komunikasi mahasiswa. Metode yang digunakan dalam penelitian ini adalah Convergent Mixed Methods Design, dimana data kuantitatif dan kualitatif diambil bersamaan lalu dianalisis secara terpisah untuk mengkonfirmasi hubungannya. Partisipan sebanyak 83 mahasiswa yang merupakan guru SD pada Mata Kuliah Pembelajaran IPA di SD. Data kuantitatif keterampilan komunikasi dikumpulkan dengan kuesioner ICCS sedangkan secara kualitatif data diperoleh dari hasil observasi, pengisian lembar kerja mahasiswa, dan wawancara. Data kuantitatif dianalisis dengan Anacova dan kualitatif dianalisis dengan analisis deskriptif kualitatif. Hasil penelitian menunjukkan Flipped Classroom dengan Whiteboard Animation mampu meningkatkan keterampilan komunikasi mahasiswa melalui langkah-langkah pembelajaran yang dilaksanakan pada tuweb. Temuan ini menunjukkan bahwa Flipped Classroom dengan media whiteboard animation dapat dijadikan alternatif yang efektif untuk meningkatkan keterampilan komunikasi mahasiswa.

ABSTRACT

Communication skills are crucial competencies for both teachers and aspiring educators. However, the reality is that the skills of many teachers are not yet adequate. This research aims to analyze the impact of implementing a Flipped Classroom with Whiteboard Animation on students' communication skills. The research employed a Convergent Mixed Methods Design, where quantitative and qualitative data were collected concurrently and analyzed separately to confirm their relationship. The participants consisted of 83 students who were elementary school teachers taking the Science Education course. Quantitative data on communication skills were gathered using the ICCS questionnaire, while qualitative data were obtained through observations, completion of student worksheets, and interviews. Quantitative data were analyzed using ANCOVA, while qualitative data underwent qualitative descriptive analysis. The research findings demonstrated that Flipped Classroom with Whiteboard Animation effectively enhanced students' communication skills through the instructional steps during the webinar. These findings indicate that Flipped Classroom with whiteboard animation can be considered an effective alternative for improving students' communication skills.

1. INTRODUCTION

One of the essential 21st-century skills highly demanded of educators and prospective teachers is communication proficiency. An educator must possess the capability to communicate effectively with their students to facilitate their understanding of instructional material (Remacle et al., 2023; Yusof & Halim, 2014). Furthermore, a teacher is also expected to have the ability to communicate with parents or guardians, providing information related to students' academic progress and fostering mutually supportive collaboration in supporting students' education. Beyond interactions with students and parents, educators also require communication skills to engage with fellow professionals and school leaders in order to fulfil their roles and responsibilities optimally.

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Communication skills encompass Active Listening, Oral, Written, Assertive and Nonverbal Communication. Active Listening involves attentively comprehending what others are saying and seeking clarification when necessary to grasp the speaker's intentions accurately (Arnold, 2014; Haley et al., 2017). Oral Communication refers to delivering verbal messages constructively and clearly (Colognesi et al., 2023; Kelsen et al., 2022; Liu et al., 2023; Yuditseva, 2023). Written Communication pertains to writing with proper grammar, clarity, and precision (Dursun et al., 2020; Suci et al., 2015). Assertive Communication involves a direct manner of expressing our feelings, needs, or opinions without threatening or belittling others (Mansour et al., 2020; Men, 2021; Omura et al., 2017). Meanwhile, Nonverbal Communication reinforces or complements oral Communication through facial expressions, body movements, and other elements such as tone, technology, and artifacts (Bender et al., 2022; Hess, 2023; MacGillivray et al., 2023), all of which constitute integral parts of interpersonal communication skills in conveying messages effectively and courteously. Among the student population, 37.14% of students exhibit intermediate levels of interpersonal communication skills, 20% fall into the low interpersonal communication skills category and 4.76% are classified as having very low interpersonal communication skills. Another study indicates that the written communication skills of prospective biology teachers are deemed sufficient (Astuti & Suciati, 2017). These findings underscore the need to enhance students' interpersonal communication skills. Factors contributing to this deficiency in communication abilities include low self-confidence (Arslan, 2010; Widyastuti, 2018), insufficient communication practice, anxiety, and comprehension of the content concepts to be communicated (Carroll, 1980; Mercer-Mapstone & Kuchel, 2017; Nurani et al., 2020; Rivers & Ross, 2018).

In the realm of learning processes, various models are employed to promote communication skills, including Project Based Learning (Kurniawati, 2020), Problem-Based Learning (Lee & Son, 2022), STAD (Murtiyasa & Hapsari, 2020; Zakaria & Amidi, 2020), Two-Stray Two-Stray (Suwangsih et al., 2019), Think PairShare (Kew et al., 2022), and flipped classroom (Efendi et al., 2023; Kurniawati, 2020). In this study, various flipped classroom models were implemented, allowing for concept reinforcement and implementation in out-of-class activities, as well as presentations and discussions during in-class sessions. Specifically, the researcher chose to implement the micro flipped classroom model (Humrickhouse, 2021; Latorre-Cosculluela, 2021; Nacaroglu & Bektaş, 2023; Zainuddin et al., 2019), with modifications in out-of-class activities, transforming them into pre-class activities aimed at concept reinforcement with the assistance of whiteboard animation, and post-class activities for concept/theory implementation. The aim of this research is twofold: (1) to comprehend the impact of implementing a flipped classroom tutorial with whiteboard animation on students' communication skills, and (2) to conduct a qualitative analysis of the implementation of the flipped classroom tutorial with whiteboard animation concerning students' communication skills.

2. METHOD

The research methodology employed in this study is the Convergent Mixed Methods Design, where both quantitative and qualitative data were collected concurrently, analyzed separately, and subsequently confirmed for their relationship (Creswell & Clark, 2018). Participants in this research were selected from three classes of elementary school teacher students enrolled in the Bachelor's program in Elementary Education (S1 PGSD), taking the Science Teaching course in primary schools (PDGK 4202) and passing the class equivalency test. The total number of participants was 83 students. The experimental group utilized a Quasi-experimental pretest-posttest with a control group design, where one class served as the negative control group (conventional tutorial webinar), one class as the positive control group (Flipped Classroom Model without whiteboard animation), and one class as the experimental group (Flipped Classroom Model with whiteboard animation).

Communication skills data were collected using the Interpersonal Communication Competence Scale (ICCS) questionnaire, employing a Likert scale ranging from 1 to 5. The implementation process of the model was observed over four sessions, with significant and noteworthy occurrences duly recorded. Student worksheets were gathered as part of the documentation of model implementation activities, and interviews were conducted with select students regarding their experiences with the implemented model. Quantitative data on communication skills were analyzed using ANCOVA, while qualitative data obtained from observations of the model's implementation, student worksheet submissions, and interviews were subject to qualitative descriptive analysis (Cohen et al., 2017). The research process is illustrated in Figure 1.

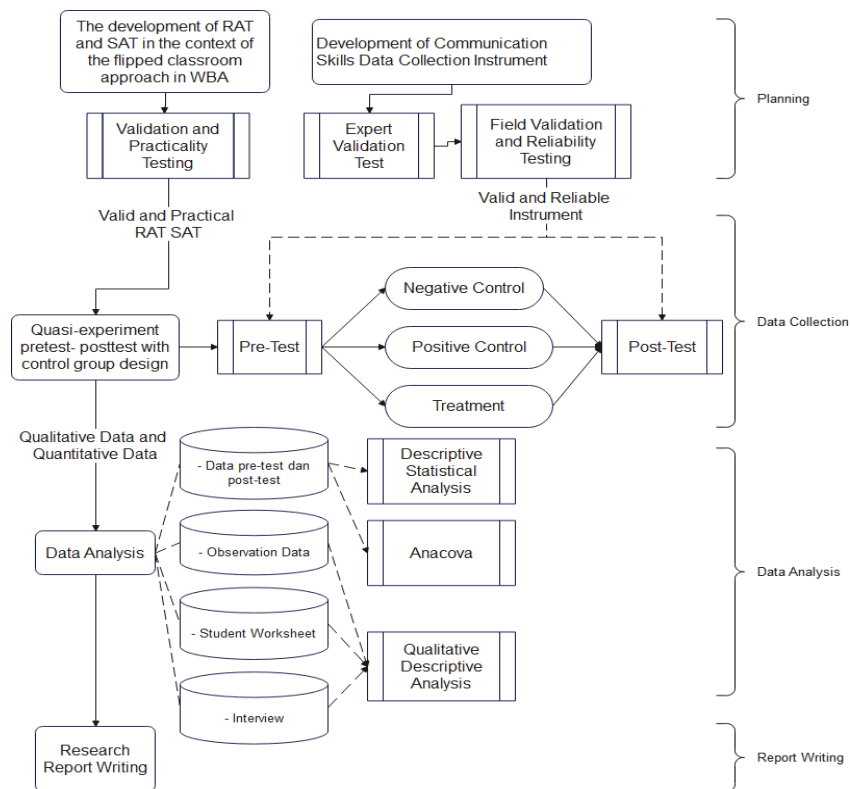


Figure 1. The Workflow of A Mixed Methods Research

3. RESULT AND DISCUSSION

Result

The Influence of Flipped Classroom with Whiteboard Animation Webinar Tutorials on Student Communication Skills

Figure 2 displays the mean scores of communication skills for each treatment group, both in the pre-test and post-test phases.

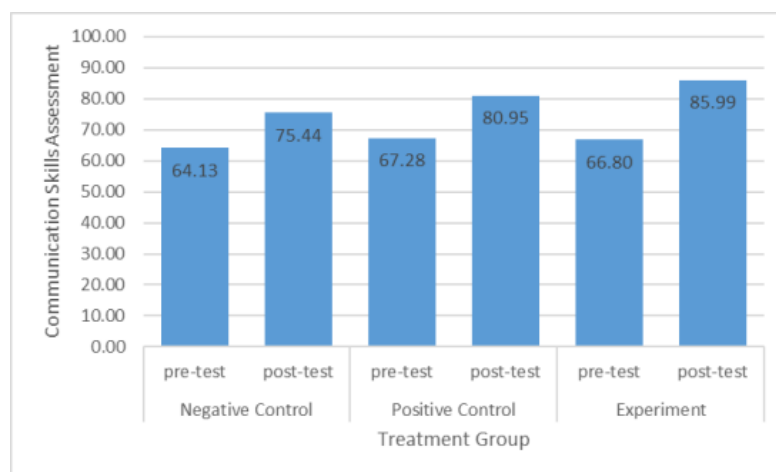


Figure 2. The mean scores of communication skills

The graph illustrates an improvement in communication skills within each group, with varying degrees of change. To determine the significance of these differences, an inferential analysis is conducted. Prior to conducting the inferential ANCOVA test, preliminary prerequisite tests are performed. Table 1 presents the results of the normality assumption tests for data distribution.

Table 1. Results of the Normality Test for Data Distribution

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Negative Control	0.092	28	0.200	0.974	28	0.679
Positive Control	0.100	27	0.200	0.975	27	0.729
Experimental Group	0.109	28	0.200	0.971	28	0.617

Base on Table 1 show the results of the normality tests using Kolmogorov-Smirnov and Shapiro-Wilk indicate that the significance value is > 0.05; this means that the independent variable data in all groups are normally distributed. The results of the homogeneity of variance assumption test showed an F-value of 0.126 with a significance level of 0.882, which is greater than 0.05, indicating homogeneity of variance in the data. Furthermore, the results of the linearity test between the covariate (pre-test) and the dependent variable are presented in Table 2.

Table 2. The Results of the Linearity Test of The Covariate with the Dependent Variable

Statistics		Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)	2414.731	12	201.228	23.912	0.000
	Linearity	2271.857	1	2271.857	269.970	0.000
	Deviation from Linearity	142.874	11	12.989	1.543	0.136
Within Groups		589.066	70	8.415		
Total		3003.796	82			

Table 2 shows the significance values. Deviation from Linearity (0.136) > 0.05 and Linearity (0.000) < 0.05. The R-squared value is 0.756, indicating that the pre-test (initial communication skills) of students accounts for 75.6% of the variance in their post-test communication skills. This suggests that the data is linear and has a significant directional coefficient. Therefore, hypothesis testing using ANCOVA can proceed. The results of the ANCOVA are presented in Table 3.

Table 3. The Results of the ANCOVA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1600.870	3	533.623	69.167	0.000
Intercept	683.732	1	683.732	88.624	0.000
X	42.149	1	42.149	5.463	0.022
A	1222.331	2	611.165	79.218	0.000
Error	609.482	79	7.715		
Total	543964.663	83			
Corrected Total	2210.352	82			

Based on Table 3, the obtained value of F is 79.218 with a significance level of 0.000, greater than 0.05. This implies that, after controlling for the covariate of pre-test scores in communication skills, there is a significant influence of implementing the flipped classroom model with whiteboard animation tutorials on students' communication skills. The results of the pairwise comparisons between the groups show a significance level of 0.000, which is less than 0.05. This indicates a significant difference in the improvement of communication skills between the negative control group (75.44), the positive control group (80.95), and the experimental group (85.99). In other words, the experimental group, which implemented the flipped classroom with whiteboard animation, demonstrated the highest improvement in students' communication skills.

The qualitative analysis of the implementation of the flipped classroom with whiteboard animation webinar tutorial related to students' communication skills

Tables 4, Table 5, and Table 6 summarise the qualitative data obtained during the implementation of the webinar tutorial model in the three groups.

Table 4. Qualitative Data from the Negative Control Group (Conventional Webinar Tutorial)

Observation Data	Student Worksheet Data	Interview Data
<p>Preparation:</p> <ul style="list-style-type: none"> In the first meeting, the process of the upcoming online tutorial webinar (tuweb) was explained. Students were divided into groups of 4-5 individuals, each responsible for presenting the material for one session. Group formation was randomized using the wheelofnames.com application. The student groups assigned to present prepared PowerPoint presentations (PPT) according to the designated schedule. Coordination of tuweb activities was conducted through a WhatsApp (WA) group. <p>In-Class Activities:</p> <ul style="list-style-type: none"> The student groups assigned to present their topics Following the presentation, a classroom discussion on the discussed material takes place. In the third, fifth, and seventh sessions, mandatory assignments were given, which were uploaded to https://silayar.ut.ac.id. 	<p>No student worksheets were used in the tuweb activities.</p>	<ul style="list-style-type: none"> Students enjoyed the tuweb process, especially during the discussion phase. Some students dominated the discussion process. Discussions provided opportunities to develop communication skills. oral Communication.

Table 5. Qualitative Data of the Positive Control Group

Observation Data	Student Worksheet Data	Interview Data
<p>Preparation:</p> <ul style="list-style-type: none"> During the first meeting, the tutorial process with the Flipped Classroom model was explained. Groups of 4-5 students each were formed, with each group tasked with presenting one or two topics in each session. The student groups responsible for presentations prepared PowerPoint presentations according to the provided schedule. Coordination of tuweb activities was conducted through a WhatsApp group. <p>Pre-class activities:</p> <ul style="list-style-type: none"> Individually, students were assigned the task of reading the module and filling out the Student Worksheet. On the Student Worksheet, students were tasked with creating a mind map, generating a minimum of two questions and answers using the question words "How" and "Why" related to the material being studied. <p>In-class activities:</p> <ul style="list-style-type: none"> Student groups assigned to presentations delivered the content of the assigned module. Individually, students were responsible for assessing the communication skills of the presentation group on the Student Worksheet. A discussion session was held after the presentations, focusing more on the practical experiences and activities 	<p>Pre-class activities:</p> <ul style="list-style-type: none"> On the student worksheet, students are required to create a mind map. Students generate a minimum of two questions and answers using the question words "How" and "Why" related to the material being studied. <p>In-Class Activities:</p> <ul style="list-style-type: none"> Individually, students are responsible for assessing the communication skills of the presenting group descriptively on their worksheets. Following the presentations, a discussion session is conducted, focusing more on experiences and practical activities related to the discussed material. Students are required to summarize the presentation and discussion outcomes in their worksheets. In meetings 3, 5, and 7, students are assigned mandatory tasks to be completed and uploaded on https://silayar.ut.ac.id. 	<ul style="list-style-type: none"> Mind mapping aids students in grasping the overall concepts within the learned material. They were formulating questions with "How" and "Why," which sharpens critical thinking regarding concepts and their implementation. Creating PowerPoint presentations and completing student worksheets strengthens students' writing skills. Presentations and discussions enhance students' oral and assertive communication skills. Descriptive assessments of the presentation group's communication skills serve as self-evaluations to improve their Communication, particularly assertive Communication. Implementing concepts in their teaching environments helps students apply the

Observation Data	Student Worksheet Data	Interview Data
<p>related to the material covered.</p> <ul style="list-style-type: none"> In meetings 3, 5, and 7, mandatory assignments were given to be completed and uploaded to https://silayar.ut.ac.id. <p>Post-class activities:</p> <ul style="list-style-type: none"> Individual students implemented concepts related to the material studied or observed in classrooms and analyzed concepts related to the material implemented by the teacher in the classroom directly, following the instructions on the Student Worksheet. Students evaluated and planned for the next tuweb learning sessions. 	<p>Post-class activities:</p> <ul style="list-style-type: none"> Students individually implement concepts related to the material studied or observe classes and analyze the concepts related to the material implemented by teachers in the classroom. Documentation and descriptions of the implementation results are attached to their worksheets. Students evaluate and plan for their further web tutorial learning. 	<p>learned concepts and theories while Refinin their communication skills with real students.</p> <ul style="list-style-type: none"> Lesson planning encourage students to reflect on the conducted web tutorial process, identify weaknesses, and devise more effective learning approaches.

Table 6. Qualitative Data of the Experimental Group

Observation Data	Student Worksheet Data	Interview Data
<p>Preparation:</p> <ul style="list-style-type: none"> In the first meeting, the Flipped Classroom tutorial process is explained. Groups of 4-5 students are formed, each assigned to present one or two topics in a single meeting. The student groups responsible for presentations prepare PowerPoint presentations according to the specified schedule. Coordination of the tutorial webinar activities is conducted through a WhatsApp group. <p>Pre-class activities:</p> <ul style="list-style-type: none"> Individually, students are tasked with watching the whiteboard animation videos available at https://silayar.ut.ac.id, reading the module, and filling out the Student Worksheet. On the Student Worksheet, students are assigned to create a mind map and generate a minimum of two questions and answers using the question words “How” and “Why” related to the material being studied. <p>In-Class Activities:</p> <ul style="list-style-type: none"> The student groups assigned to presentations deliver the content from the assigned module. Individually, students are tasked with assessing the communication skills of the groups that give presentations on their Student Worksheets. A discussion session is held after the presentations, focusing more on experiences and practical activities related to the material covered. In meetings 3, 5, and 7, mandatory 	<p>Pre-class activities:</p> <ul style="list-style-type: none"> On the student worksheets, students create mind maps, some using digital applications and some creating them manually. Students generate a minimum of two questions and answers using the interrogatives “How” and “Why” related to the material being studied, as illustrated below: Students compare the concepts presented in the whiteboard animation video with those in the module. <p>In-Class Activities:</p> <ul style="list-style-type: none"> In the Student Worksheet (LKPD) individual students are assigned to assess the communication skills of the presenting groups descriptively on their student worksheets. In meetings 3, 5, and 7, mandatory assignments are given to be completed and uploaded to https://silayar.ut.ac.id. <p>Post-class activities:</p> <ul style="list-style-type: none"> Individual students fill out the Student Worksheet with documents containing the results of implementing concepts 	<ul style="list-style-type: none"> Videos facilitate students’ visual understanding of concepts. Mind maps assist students in grasping the overall picture of the concepts covered in the material. They were formulating questions using “How” and “Why,” which sharpens critical thinking about the concept and their implementation. Creating PowerPoint presentations and filling out student worksheets enhances students’ writing skills. Presentations and discussions strengthen students’ oral communication and assertiveness skills. Descriptive assessments of the communication skills of presentation groups serve as self-evaluations, particularly in assertive communication. Implementing concepts in the classrooms where they teach helps students apply learned concepts and theories and practice communication skills with real students. Evaluation and planning for further learning

Observation Data	Student Worksheet Data	Interview Data
<p>assignments are given to be completed and uploaded to https://silayar.ut.ac.id.</p> <p>Post-class activities:</p> <ul style="list-style-type: none"> • Individual students implement concepts related to the material they have learned or observed in real classrooms and analyze the concepts related to the material implemented by the teacher, following the instructions in the student worksheets. • Students evaluate and plan for their next web tutorial learning session. 	<p>related to the material studied or the results of observations in the classroom, along with an analysis of concepts related to the material implemented by the teacher in the classroom directly.</p> <ul style="list-style-type: none"> • Students fill out the evaluation column and plan their next flipped classroom learning session on their respective worksheets. 	<p>involve students retrospecting the flipped classroom process, identifying weaknesses, and devising strategies for improved learning.</p> <ul style="list-style-type: none"> • Students find learning demands in the flipped classroom learnings with whiteboard animation to be more complex and challenging than conventional instruction.

Discussion

The Effect of Implementing Webinar Tutorials in Flipped Classroom with Whiteboard Animation on Students' Communication Skills

The quasi-experimental study demonstrated that students' communication skills were most effectively enhanced through the implementation of Flipped Classroom with whiteboard animation media. Prior research has also indicated the effectiveness of the Flipped Classroom model in improving communication skills (Akçayır & Akçayır, 2018; Robbins et al., 2020) as well as the efficacy of whiteboard animation (Achmad et al., 2019; Muhdi et al., 2019; Schneider et al., 2023). In implementing the Flipped Classroom, students independently reviewing whiteboard animation videos and module content before class sessions promote reading, Listening, and active engagement skills as they need to thoroughly understand the video and module content. Additionally, during in-class discussion sessions, students must actively listen to their group's presentations and participate in discussions (Arnold, 2014; Haley et al., 2017). The group of students assigned to deliver presentations must cultivate their oral communication skills (Kutigi et al., 2022; Le Mossa, 1995; Liu et al., 2023; Suwono et al., 2017). They are required to convey the subject matter clearly and effectively to their peers. During discussion sessions, students actively engage in verbal Communication to exchange ideas and perspectives (Dunbar et al., 2006; Men, 2021). Students must complete the Student Worksheet and create PowerPoint presentations according to the specified schedule. This also involves written communication skills, as they must write in a standardized, clear, and precise manner within the documents. Writing skills can be honed through tasks such as composing description assignments, responding to questions, producing papers, drafting reports, delivering presentations, and answering queries (Dursun et al., 2020; Moore & Morton, 2017; Nurakhir et al., 2020). The assessment of group presentation communication skills is conducted descriptively within the student worksheet. This approach assists students in understanding how to express themselves assertively, meaning in a manner that is non-threatening or punitive towards others (Ardita et al., 2019; Chen et al., 2023). Furthermore, this evaluation is a reflective tool for presentation groups to enhance Communication. While the primary focus is oral and written Communication, nonverbal Communication can also occur during classroom discussion sessions (Kuntze et al., 2016; Omura et al., 2018). Body language, gestures, and facial expressions can reinforce or supplement verbal Communication. Additionally, in the classroom setting where students are involved in teaching, they also employ nonverbal Communication in their interactions with fellow students.

The qualitative analysis of implementing the flipped classroom webinar tutorial with whiteboard animation concerning students' communication skills

Implementing webinar tutorials in the Flipped Classroom Model with whiteboard animation media is a highly effective approach for developing students' communication skills. Compared to conventional webinar tutorials and the Flipped Classroom Model without whiteboard animation media, the Flipped Classroom Model with whiteboard animation media excels in comprehensive communication skills development. In the Flipped Classroom Model with whiteboard animation media, students utilize whiteboard animation videos and modules as their primary learning resources. This allows them to effectively develop their reading, Listening, and comprehension skills (Achmad et al., 2019; Chiriacescu et al., 2020; Efendi et al., 2023). During pre-class activities, they further enhance their conceptual understanding by creating mind maps and comparing concepts presented in the videos with those in the modules. Students' mind maps take various forms, including manual creation and digital applications, each

reflecting their creativity. These mind maps assist them in grasping the overall picture of the material and its interconnectedness (Beal & Hontvedt, 2023; Jbeili, 2013; Noonan, 2013), thereby boosting their confidence in communicating the topics they discuss.

Furthermore, during in-class activities, the Flipped Classroom Model with whiteboard animation media continues to promote oral Communication, Active Listening, Nonverbal Communication, and assertiveness skills (Dong, 2021; Li et al., 2019; Tazijan et al., 2016). Writing skills are also developed through the creation of PowerPoint presentations during the pre-class phase and the completion of student worksheets throughout the entire tuweb process (Benken et al., 2023; Joseph & Natarajan, 2022). Assertiveness skills are further reinforced through peer assessment of communication skills. Moreover, during post-class activities, students can apply the concepts and learning theories in a real classroom setting by directly communicating with elementary school students and implementing these concepts and theories while teaching in a classroom promotes students' communication skills (Holstein et al., n.d.; Lang et al., 2005). Additionally, documentation and evaluation of the tuweb process support students in understanding their communication weaknesses and making efforts to enhance them.

The results of this study have several important implications. Firstly, the Flipped Classroom approach with whiteboard animation can be an effective alternative for enhancing students' communication skills. Educators may contemplate incorporating this method into their instructional designs to boost students' communication competencies. Secondly, these results offer a deeper understanding of how learning components such as conceptual understanding, oral and written Communication, and direct practice interact to advance students' communication skills. This can serve as a foundation for developing more effective curricula in the context of communication skill development. Thirdly, qualitative findings indicate that students' learning experiences in webinar tutorials using the Flipped Classroom approach with whiteboard animation are more positive. This implies that this approach can enhance student motivation and engagement in learning, which, in turn, can positively impact their learning outcomes. While this research has provided valuable insights, there are still areas that can be further explored in future studies. Some suggestions for future research include: (1) Using a larger sample size to provide stronger generalizability regarding the influence of the Flipped Classroom approach and whiteboard animation media on students' communication skills; (2) Future research could consider other variables that might affect students' communication skills, such as gender, learning motivation, technological proficiency, AI utilization, or instructor characteristics; (3) Further research could involve long-term monitoring of the development of students' communication skills after participating in webinar tutorials with the Flipped Classroom approach and whiteboard animation media; (4) Expanding this research to encompass various courses and academic programs may offer additional insights into the effectiveness of this approach in diverse learning contexts.

4. CONCLUSION

This research has revealed that implementing webinar tutorials using the Flipped Classroom approach with whiteboard animation media has a positive and significant impact on improving students' communication skills. Data analysis demonstrates that all treatment groups, including the negative control, positive control, and experimental groups, exhibited enhanced communication skills after participating in the webinar tutorials. However, the most significant difference was observed in the experimental group that employed the Flipped Classroom approach with whiteboard animation media. Inferential tests confirmed that the use of the Flipped Classroom approach with whiteboard animation media significantly influenced the enhancement of students' communication skills. These findings align with prior research, indicating that the Flipped Classroom effectively enhances communication skills, and whiteboard animation media is crucial in this process.

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