The Application of TPACK (Technological Pedagogical Content Knowledge) in English Teaching Using Schoology

Inggraini Hartono[1], Siti Mina Tamah[2]

[1]*Gloria 1 Senior High School, Jl Raya Sukomanunggal Jaya, Surabaya, Indonesia*
[2]*English Education Study Program, Faculty of Teacher Training and Education, Universitas Katolik Widya Mandala Surabaya, Indonesia*
E-mail: inggraini_hartono@gloriaschool.org, mina@ukwms.ac.id

ABSTRACT

This study aims to find out their application of TPACK (Technological Pedagogical Content Knowledge) using Schoology and explored the impacts Schoology-based English teaching have on teachers and students. The study employed two methods: class observation and interview by involving three English teachers and forty-five students aged 15-17 years old from a private middle school in Indonesia. This study reveals that the positively perceived advantages outnumber the perceived disadvantages, making Schoology still the recommended LMS to be used in schools to implement TPACK. Regarding the application of TPACK in Schoology-based English instruction found in this study, the teacher-centeredness is still present in the delivery of material via PowerPoint and only one learning model is used throughout the lesson. Thus, it is recommended for schools to plan for prior TPACK and Schoology training to maximize the use of TPACK and Schoology features.

1. INTRODUCTION

Teachers need to have the ability to effectively impart knowledge to their students (Maclellan, 2008). English teachers play a crucial role in a country's development and must possess this skill. Moreover, the demands of the 21st century have made it necessary for teachers to incorporate technology in education to help students become tech-savvy. This technology integration in education led Mishra & Koehler in 2008 to extend Shulman's theory of PCK (Pedagogical Content Knowledge) in 1986 by adding technology as a third knowledge base, resulting in the creation of Technological Pedagogical Content Knowledge (TPACK). This framework combines content, pedagogy, and technology to enhance teaching effectiveness (Koehler & Mishra, 2009).

In this study, three teachers and forty-five random students from three levels of middle school who were involved in our study were invited to participate. This study aimed to find out their application of TPACK using Schoology and explored the impacts Schoology-based English teaching have on teachers and students, as mentioned below:

1. How do middle school English teachers implement TPACK using Schoology in their teaching?
2. What impact does Schoology-based English teaching have on English teachers?
3. What impact does Schoology-based English teaching have on the students?

1.1. Technological Pedagogical Content Knowledge (TPACK)

The core of this Pedagogical Content Knowledge (PCK) framework is transforming content using new ways, activities, emotions, metaphors, exercises, examples, and demonstrations to be deeply understood by students. Mishra and Koehler found a theory of effective edtech integration called TPACK (Technological, Pedagogical, Content Knowledge). TPACK was first introduced in 2005. It was known as TPCK and changed into TPACK in 2007 for the sake of a more easily spoken and remembered term (Herring et al., 2016). TPACK is defined as finding the right combination of technology, educational approach, and educational goals. The combination of these three knowledge components forms seven components. Koehler's (2009) seven TPACK domains are explained below.

Original TPACK Framework (3 Domains):

1. **Technological Knowledge (TK):** This refers to an educator's understanding of various technologies and their capabilities. It includes knowledge of hardware, software, applications, and digital tools relevant to their subject area.
2. **Pedagogical Knowledge (PK):** This encompasses an educator's understanding of different teaching methods and strategies. It involves knowing how to create engaging and effective learning experiences for students.
3. **Content Knowledge (CK):** This refers to an educator's deep understanding of the subject matter they are teaching. It includes knowledge of concepts, theories, and factual information within their specific discipline.

Expanded TPACK Framework (7 Domains):
In addition to the original three domains, some researchers propose including the following:

4. **Technological Pedagogical Knowledge (TPK):** This refers to the specific knowledge of how to use technology effectively for teaching and learning. It's the intersection of TK and PK, focusing on the pedagogical applications of technology.
5. **Technological Content Knowledge (TCK):** This domain focuses on the knowledge of how technology can be used to represent and teach specific content within a subject area. It's the intersection of TK and CK.
6. **Pedagogical Content Knowledge (PCK):** This refers to the knowledge of how to teach a specific content area in a way that is engaging and effective for students. It's the intersection of PK and CK.
7. **TPACK Pedagogy (TPACKp):** This is the most comprehensive knowledge domain, representing the intersection of all three core domains (TK, PK, and CK). It encompasses the ability to design and implement technology-based learning experiences that are not only pedagogically sound but also deeply rooted in the specific content area.

1.2. Schoology

Schoology is an educational website that can be applied by teachers, parents, and students for collaboration about resources, assessment, and content on a secure and safe learning management platform. It is also one of the major Institute of System Management developments of today and used by many schools. One of Facebook's cutting-edge educational tools is Schoology. It was produced in 2009 in New York. The Institute of System Management, Schoology, facilitates online cooperation between students and instructors as well as between students and parents. Students may be interested in studying with this Schoology application since it is supported by a variety of media, including graphics, audio, and video. Adding materials in the form of a folder, assignment, assessment, file or link, page, discussion, media, package, and importing from resources are among the great services available. In each course, teachers can also make changes. Schoology also has a grade book and the ability to set it up. There are also badges available to encourage students to learn: perfect attendance, good listener, good leadership, most improved student, and other badges that can be added by the teachers.

Schoology is an easy tool to assist students in the classroom management chores. It has several benefits for communicating, posting materials and assignments, and promoting paperless communication. Schoology helps teachers and students for teaching and learning as a whole. It enhances students' learning opportunities, allows them more freedom in terms of when and how they learn, and promotes educational activities in both traditional classroom and remote learning environments (Kasumu & Nwaizugbu, 2023).

Schoology also helps students who struggle academically. Technology helps to simplify the educational process for students, parents, and instructors by providing a range of learning formats that can be rapidly accessible by educators and learners (Iksan et al, 2022). Iksan et al.'s (2022) study found that a large number of student respondents agree that Schoology Learning is essential for learning, especially during pandemic and it made them more eager to study, more active and responsible.

In Indonesia, Schoology has been used widely in many schools and universities. In this study, the use of Schoology has been applied for all school's subjects for about 7 years; before Covid-19 pandemic struck and it is the main Learning Management System used by the teachers and students in this middle school in Surabaya.

Therefore, it is expected that Schoology could be a good tool to implement TPACK in delivering lessons and both teachers and students benefit from it. Since Schoology as a learning management system for teaching and learning in Indonesia's high schools, especially in Surabaya city hasn't been investigated, reported on, or explained much, the researchers put a big interest in studying the TPACK implementation using Schoology and the impacts it has on teachers and students.

2. METHODS

2.1. Research Design

This descriptive qualitative study took place in a private middle school in Surabaya, Indonesia, and described the implementation of the TPACK framework to teach English to middle school students using a specific LMS named Schoology. In addition, the authors examined the impacts of the use of Schoology to teach English using TPACK. The authors employed two methods: class observation and interview. In one semester, the class was observed three times. Then, standardized open-ended interviews were chosen for this study based on Patton's four categories of interviews (Cohen et al., 2017). The purpose of this interview was to determine the impact of TPACK implementation using Schoology on forty-five students and two English teachers (one teacher only gave her consent on the class observation, but not for the interview). The interview was then transcribed before being categorized into the positive and negative impacts and the list of most frequent to the least frequent impacts mentioned by the teachers and students.

2.2. Participants and Contexts

After initial contact to seek approval and support from the school board's head and the school's principal, the authors used two methods: classroom observation and interviews. The observation was conducted on teacher teaching to see how the teacher used her Schoology to implement Technical Pedagogical Content Knowledge (TPACK) in the English classroom. Those classroom observations were conducted three times in one semester to three English teachers with the consent of those three English teachers. The class observations were conducted under their acknowledgment and agreement to be recorded for further observation by signing the letter of consent both for the teachers and the student's parents.

While for the interview, If they agreed to participate in the study, their response in the interview would begin with the word 'agree'. Of the three English teachers in the school, one declined to take part in the interview, but all thirty randomly selected students agreed to participate after their parents gave their consent by signing the letter of consent given to them.

The interviews were then conducted with at least thirty students (rule of thumb) and their two English teachers to evaluate the impact of TPACK implementation using Schoology. Following data collection, the results were then transcribed and classified into two distinct impacts: positive and negative.

This descriptive-qualitative study engaged three English teachers (Ann, Tika, and Septi − all pseudonyms) for the class observation and two English teachers (Tika and Septi) for the interview. For about seven years, all of the English teachers had used Schoology as the school's mandatory LMS. The students [aged 15-17 years old] were in grades ten to twelve at a private middle school in Indonesia.

2.3. Data Collection

Class observation notes were employed to address research question number one. Each teacher participated in classroom observations conducted three times and videotaped to allow for multiple, in-depth observations. The English teachers' verbal communication served as the data source for the classroom observation. Every statement made by the teachers in the classroom on TPACK and Schoology was recorded. From these recordings, a descriptive note was made based on what was seen, from pre-activity through post-activity and then a table was also made to classify the pedagogy, technology, and Schoology feature used in the pre-activity to the post-activity. The pedagogy used was coded with (PK), while the technology used was (TK), and the content used was coded (CK). Koehler's (2009) seven TPACK domains (Figure 1) were guidelines for the analysis.

Furthermore, to answer research questions two and three, interviews were used. The information for research question two came from the instructors' and students' interviews. Teachers and students were asked two questions prepared by the researcher. For this study, Patton's (1980) theory on standardized open-ended interviews was chosen.

2.4. Data Analysis

The precise open-ended questions and their sequence were provided for the interviewers in this kind of setting. Teachers and students had various answers to those two questions, though. The questions for teachers were about the use of Schoology in TPACK implementation. The questions for pupils were limited to the benefits and drawbacks of using Schoology in English classes because the pupils did not understand what TPACK was. The following diagram is the flow of the writers' research:

Figure 1
The Research Flow
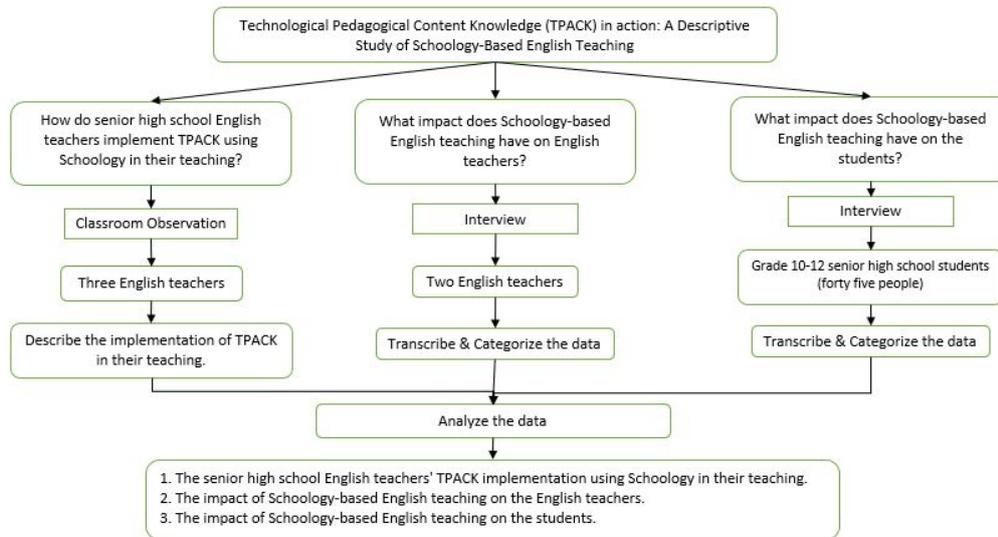
3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. TPACK Implementation by the English Teachers

Each English teacher was observed in the classroom three times and the note on the classroom activity on the verbal language of the teachers was based on what was seen in the classroom meeting recording, from pre-activity through post-activity.

Ann

12 August 2021 – On the topic of writing a formal article (CK), Ann started the exercise by greeting everyone and playing a video from TedTalk (TK) about the power of youth to change the world that she puts in Schoology (TK). A series of triggering questions about youth organizational activities then followed (CK). She then gave a PowerPoint presentation (PK) on how to write an article and some writing advice. The students were then required to submit a draft of one of the five situations provided (CK). At the end of the class, the students were requested to give a brief explanation of their draft/writing (CK) that they have to upload in the Schoology (TK).

9 September 2021 – On the reading passage (CK) about Hellen Keller, Ann used Discovery Learning (PK) to display pictures of famous people and pictures of renowned disabled persons. Ann then used PowerPoint (TK) to explain Hellen Keller's background (CK). The pupils were then instructed to go to Schoology (TK) and skim the reading text before finishing the assignment independently (CK). The students were free to ask questions at any time during the procedure when they encountered any difficulties. Ann reviewed the lesson at the end of the meeting (PK).

2 November 2021 – On the topic of informal letters (CK), Ann had the students view a video in Schoology (TK) about writing a letter and then asked them what they had learned from it, such as the structure of an informal letter and what to include in the body paragraph (CK). The pupils were then divided into pairs and assigned to work (PK) on the letter-writing assignment. They were required to explore ideas and create an outline (PK). The students then received feedback from her. At the end of the meeting, the students were expected to give a brief explanation of their draft and writing as well as reflect on the lesson before Ann gave a comment on their writing and informed them of the activity for the next session (PK).

Table 1
Ms. Ann's First Classroom Observation

Topic: Write a formal article		
Teaching Goal:		
In this online learning, students are expected to express their opinion in a formal article about organizations and explain, describe, and suggest information/ ideas/ opinions clearly, accurately, and effectively.		

Pre-Activity		
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Students watch a video and answer the triggering questions from the teacher. Teacher: "so, that would be the video, so basically, if you listen to this video about … (she's summarizing the video). So, we are talking about organization, is there any of you join organization? What makes you feel good about joining an organization? Do you have to make a proposal or a report?"	Video from Ted Talk.	Add materials-Add link to Ted Talk video
Whilst Activity		
Students gain information from teacher and then choose one topic and write draft with their friend (in pairs) using that topic.	PowerPoint, Online Microsoft Words.	Add materials-Add PowerPoint on formal article writing.
Post Activity		
Students present their writing draft.		Submit the draft in Assignment.

Table 2
Ms. Ann's Second Classroom Observation

Topic: Reading passage about Hellen Keller.		
Teaching Goal:		
In this online learning, students are expected to identify and select the relevant information from the reading passage, describe famous people, summarize the reading passage in a form of note-making, and formulate discourse markers to show contrast.		

Pre-Activity		
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Students observe some photos and give opinions on them, before asking the students about someone that will be their topic of that day's reading. Teacher: "Anyone knows who this person is? She's bachelor's degree, got her illness from young, made system of hand signals, practice lip-reading? Yes, she is Hellen Keller."	Several public figure's photos from internet (Google search).	Add materials-Add photos
Whilst Activity		
Students skim the reading passage in Schoology and do the assignment individually.	PowerPoint and Schoology assignment	Add materials-Add reading passage and Assignment
Post Activity		
Students answer some reflective questions about what they can learn from Anne and Hellen. "What can you learn from the story of Hellen Keller?"		-

Table 3
Ms. Ann's Third Classroom Observation

Topic: Informal Letter		
Teaching Goal:		
In this online learning, students are expected to write an informal letter using appropriate language components.		
Pre-Activity		
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Students observe the video to find the structure of the informal letter and what to write in the body paragraph. Teacher: "Anyone knows Jojo Moyes?" (explaining Jojo Moyes). "Ok in the video, what can you learn from it?" " anything that reminds you of what your previous teacher taught you? What do you need to write in informal letter? And what is the tone of informal letter?"	Power Point and Video	Add materials-Add link to the video
Whilst Activity		
Students brainstorm ideas and make outline for making an informal letter. Teacher gives feedback ("so, today we have learned about how to make an informal letter which includes the salutation, body and closing which are different from making the formal letter.")	Google Docs, Microsoft words	-
Post Activity		
Students present their drafts.	Power Point	-

From the three observations, Ann's technological and pedagogical knowledge was seen applied here, followed by Ann's content knowledge (CK) which was demonstrated by her fluent delivery of the content, as well as her mastery of the content by presenting the structure of an article, an informal letter, and the ways to comprehend a reading passage. She could also direct the students (PK) in writing the correct draft of an article and informal letter and tell them if it was correct or incorrect and respond to students' questions during the teaching and learning process. For the technology, Ann used Schoology and one-time presentation through PowerPoint (TK) for reading materials and assigned homework and video from Ted-Talk and Microsoft word or Google docs (TK).

Tika

23 August 2021 – On the topic of the Relative Clause (CK), Tika asked the students about their experiences of being left out, and then invited them to use relative pronouns or adverbs to fill in the blanks in the poem "Kids who are different" that she put in Schoology (TK). Then, using PowerPoint (TK), Tika discussed relative clauses (CK) and asked the students to write using relative clauses about their experiences of being left out. At the end of the discussion, Tika asked why the relative clause was needed and asked the students to make sentences using relative clauses (PK) about how to cope with the sensation of being left out, i.e.: I need to be a person who starts a conversation, I need to find friends who are connected to me in feeling and similarities.

6 September 2021 – On a reading passage (CK) about Hellen Keller, Tika asked the students about Hellen Keller and then instructed them to complete the Schoology Assessment (TK) reading assignment. Once they completed the activity, Tika then asked them what they did as Christian students to overcome the obstacles in life (PK).

7 September 2021 – On the topic of discourse markers showing contrast, Tika asked the students to locate the discourse markers used in Hellen Keller's passage and asked about the meaning of discourse markers and their functions (CK). Closing the class, Tika asked the students about the moral value they could derive from Helen Keller's narrative (PK).

Table 4

Ms. Tika's First Classroom Observation

Topic: Relative Clause		
Teaching Goal:		
In this online learning, students are expected to produce a clear coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience using relative clause.		
Pre-Activity		
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Students express their feelings about their experience in being left out and then fill in the blanks in the poem. Teacher: "How's your feeling when you got into a new school? Do you ever thought that you will be left out? Why do you think some people are left out? Now fill in the blanks of this poem with any relative pronouns"	Poem entitled "Kids who are different" taken from the internet.	Add materials-Add poem
	Whilst Activity	
Students observed the use of relative clause from teacher's explanation and write their experiences in being left out using relative clause. Teacher: "Now, I want you to check your Schoology and write your experience in being left out using relative clause you've learned in three paragraphs."	Power Point and Microsoft Words.	Add materials-Add Power Point and Assignment
	Post Activity	
Students answer some reflective questions about the function of relative clause and use relative clause in making a sentence of how to cope with the feeling of being left out. ("As a Christian student, how should you cope with the feeling of being left out?")		-

Table 5

Ms. Tika's Second Classroom Observation

Topic: Reading passage about Hellen Keller.		
Teaching Goal:		
In this online learning, students are expected to identify and select the relevant information from the reading passage, describe famous people, summarize the reading passage in a form of note-making, and formulate discourse markers to show contrast.		
Pre-Activity		
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Students answer some triggering questions about any obstacles they have come across or seen in others and if they have heard about Hellen Keller before.	-	-
	Whilst Activity	
Students read the passage about Hellen Keller in Schoology and do the reading comprehension question in Schoology individually.	Schoology (adding material for reading passage and Assessment).	Add materials-Reading passage Add Assessment
	Post Activity	
Students answer reflective question on how they will overcome their adversities as Christian students.		-

Table 6
Ms. Tika's Third Classroom Observation

Topic: Discourse markers showing contrast.		
Teaching Goal:		
In this online learning, students are expected to formulate discourse markers to show contrast.		
Pre-Activity		
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
After given PowerPoint about discourse markers, students find 7 examples of discourse markers showing contrast in Hellen Keller's reading passage.	Power Point	Add materials-Add Reading passage
Whilst Activity		
Students answer the questions about the meaning, examples, similarities and differences about discourse markers.		-
Post Activity		
Students find the moral value from Hellen Keller's story and make a sentence about it using discourse markers.		-

From these observations, Tika used photographs from Google search as the trigger, reading passages, and PowerPoint to convey the materials and Schoology Assessment and Microsoft Word to complete the exercises. She also accessed Google Search, Schoology, and PowerPoint (TK) to present the material. She led the students to process the data by themselves by using the Discovery Learning technique (PK) . She finished the lesson by reviewing the material and asking the students questions related to their experience (PK). Implicitly, technological and pedagogical knowledge was employed. Tika's content knowledge (CK) was demonstrated by her fluent delivery of the topic and her mastery of the content by understanding the meaning of relative clauses and discourse markers, their example, and their function and she could identify whether or not the students had used them correctly and when students asked about how to know the main idea of each paragraph, she guided them. Tika used Schoology for material and assessment (TK).

Septi:

3 November 2021 – Teaching the topic of adverbs (CK), Septi gave some questions that asked the students to analyze the structure of adverbs and then explained 'adverbs' in PowerPoint (TK). Next, Septi asked the students to do the exercise in Schoology, and then they did the online quiz via Kahoot (TK). At the end, they were asked to make their sentences using 'adverbs' in Padlet (TK). She closed the meeting by concluding the lesson of the day.

4 November 2021 – Still with the topic of adverbs (CK), Septi asked the students to analyze (PK) some sentences that contained adverbs in a discussion with friends. Then, the students did the exercise about 'adverbs' via Schoology (TK). After that, Septi monitored their work in Schoology, discussed some questions together, and closed the meeting (PK) by concluding the lesson of the day.

6 November 2021 – On Teaching the topic of 'Would/Wouldn't', Septi triggered students' background information about pocket money by asking for their thoughts (PK). The students were next asked to read a chapter regarding pocket money, during which Septi explained how to use the 'Would/Wouldn't' function (CK). The students then completed the 'Would/Wouldn't' exercise by discussing it (PK). Septi examined the lesson, provided feedback, and informed the activities for the next meeting at the end of the meeting.

Table 7
Ms. Septi's First Classroom Observation

Topic: Adverbs		
Teaching Goal:		
In this online learning, students are expected to distinguish the uses of adverb (to describe a verb, another adverb, or an adjective) and to construct sentences using adverb+verb, adverb+adverb, or adverb + adjective.		
Pre-Activity		
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Students analyze the structure of adverb.	-	Add materials-Add Power Point
Whilst Activity		

Topic: Adverbs **Teaching Goal:** In this online learning, students are expected to distinguish the uses of adverb (to describe a verb, another adverb, or an adjective) and to construct sentences using adverb+verb, adverb+adverb, or adverb + adjective.		
Students listen to the teacher explanation about adverbs using Power Point and do the online quiz about adverbs	Power Point and Kahoot.	Add materials-Power Point Add link to Kahoot.
	Post Activity	
Students make own sentences using adverbs. Teacher concludes the lesson by reviewing the function and structure of adverbs.	Padlet and Zoom.	Add link to Padlet.

Table 8

Ms. Septi's Second Classroom Observation

Topic: Adverbs **Teaching Goal:** In this online learning, students are expected to distinguish the uses of adverb (to describe a verb, another adverb, or an adjective) and to construct sentences using adverb+verb, adverb+adverb, or adverb + adjective.		
	Pre-Activity	
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Given some sentences which contain adverbs, students analyze them.	Power Point.	Add materials-Add Power Point
	Whilst Activity	
Students do some exercises on adverbs individually.	Schoology Assignment.	Add assignment.
	Post Activity	
Students discuss the answer together and review the function and structure of adverbs.		-

Table 9

Ms. Septi's Third Classroom Observation

Topic: Would/Wouldn't **Teaching Goal:** In this online learning, students are expected to compose a dialogue about asking for something in a polite way (would/wouldn't).		
	Pre-Activity	
Pedagogy/Brief Description	**Technology Used**	**Schoology Feature**
Students gave opinion on how much pocket money teenagers should have and on what things they spend it.		-
	Whilst Activity	
Students read a passage about pocket money and listen to teacher's explanation on the function and structure of "Would/Wouldn't"	Power Point	Add materials-Add Power Point
Post Activity		
Students get feedback on their exercise's result from teacher.		-

From these observations, Septi used reading passages and PowerPoint to convey the material, Schoology to complete the exercises, and Padlet and Kahoot (TK) to review the material. She finished by reviewing the lesson, providing feedback, and announcing the next class meeting's activity. Septi used technology (TK) to access PowerPoint, Schoology, Padlet, and Kahoot, as well as the Discovery Learning technique (PK) to make the students process the data on their own. It can be seen that technological and pedagogical knowledge was employed implicitly. Septi's content knowledge (CK) could be shown in her fluent delivery of the material. She knew the meanings, functions, and examples of 'adverb' and 'would/wouldn't' and could tell if the students had used them properly or not. She explained when some students made mistakes in the quiz. For Schoology, Septi used it only for reading material and assignments.

3.1.2. The Impact on the English Teachers

Two of three English teachers agreed to be interviewed. The interview result which is categorized into positive and negative impacts is presented in Table 10.

Table 10
Positive and Negative Impact (Teachers' View)

Name of Teacher	Positive Impact	Negative impact
Tika	- All activities in one place - Easy and comfortable to use - Easy access to go back and review missed materials - Availability of mobile Schoology in users' cell phone - Availability of feedback on students' assignments for evaluation and improvement	- Difficulty using Schoology for the first time. - Lack of ideas to integrate technology
Septi	- All activities in one place - Easy and comfortable to use - Availability of mobile Schoology in users' cell phone	- Difficulty using Schoology for the first time.

Regarding the negative impacts the teachers mentioned, this study seems to substantiate a study that discussed teacher resilience. Teachers in their early years of teaching experience (less than 5 years) were the most resilient (Tamah & Wirjawan, 2022). Both Tika and Septi who had 9 and 14 years of teaching experience respectively were not the most resilient type of teachers. However, when faced with a challenge to change (challenge to learn something new, in this particular study to learn technology), they are unlikely to respond enthusiastically. They were both yet willing to learn as the force was inevitable. Tika pointed out, "Yes, because it is mandatory for us to use Schoology, well I have to learn how to use it, especially because it is difficult to ask friends who are all at home for WFH.", while Septi asserted, "Since it was the platform the school asked us to use, so ready or not, like it or not, I had to get used to it."

As obtained in this study, the teachers were unfamiliar with Schoology and the interviewed teacher indicated the school gave no training. It corroborated what Knolton (2014) found in his study about the significant link between teachers' confidence in using technology and their capabilities in using it. Hence, he saw the need for teachers to be trained before using technology in their classrooms. Harris and Hofer (2011) further found that after receiving TPACK training, teachers became more attentive, strategic, creative, and student-centered.

This study is likely to support partially what Lie et al. (in press) reported. Of six teachers becoming their subjects, three were ready and motivated to implement blended learning. It could be then our concern in the future as the schools are going to keep moving to blended learning, teacher training which equips teachers to teach utilizing the TPACK framework is inevitable.

3.1.3. The Impact on the Students

Forty-five (45) students were interviewed. It was found most students felt that Schoology was beneficial to them and that they had no difficulty following English lessons through Schoology. Schoology was applauded by teachers and students for its easy and comfortable use, various types of question forms having all activities in one place. These three factors were highlighted by twenty-three, fourteen, and ten students, respectively, and are the first, second, and third most frequently mentioned as positive impacts (See Table 11).

Table 11
Positive Impact (Students' View)

Responses	Frequency
Understandable and enjoyable usage	23
Various options/types of questions	14
One location for all activities	10
Easy access to revisit & review materials	8
Paperless	7
Quick scoring	5

Responses	Frequency
Repeatable listening audio	4
Available Feedback	4
Faster to type	4
Available deadline notification	3
Quick submission	2
Improving skills	1
Motivational badges feature	1
Recorded submission	1
A secure and safe platform	1

Table 12
Negative Impact (Students' View)

Responses	Frequency
Error alternative (inputted) answer	9
Schoology problem	5
Internet problem	2
Individual problem	2
Teachers' problem	2
Laptop problem	1

While Table 11 shows the agreement on the strength of Schoology among students, it is important to acknowledge the most common negative impact experienced by students was error alternative or inputted answer (See Table 12). If their responses in Schoology were not identical to the answer key, such as 'car' instead of 'a car,' they would be marked as incorrect. Even when the alternative solutions were provided by the teachers, the system did not read them. The second problem occurred regarding the size of videos that could be uploaded in Schoology and the method for submitting assignments when students unintentionally pressed the enter button after one number instead of the next, causing the assignment to be considered complete and submitted. Schoology could also go down for maintenance at any time, which might cause stress, especially when a deadline was approaching. Using Schoology, and underlining keywords in the reading material was also tough.

The next issues identified were internet access, individual issues, teacher issues, and laptop issues. Regarding the individual and teacher issues, lack of tutorial and explanation about how to operate Schoology for learning may affect their learning, as what had been found in the previous study conducted on a vocational school by Dendi et al. (2022).

Furthermore, the problem with teachers was highlighted as their failure to provide answer keys and comments at the end of the meeting, causing students to be unable to understand what and why they got their responses wrong and what the proper answers were. This was what Ginting et al. (2020) similarly found in their study that the teachers were seen as powerful figures who provided all the materials, the procedure, and the evaluation. Teachers played a big role in Indonesia's high schools making the students depend on the teachers greatly. Once the teachers fail to provide feedback or explanations, the students would have difficulty learning by themselves (Ginting et al., 2020).

3.2. Discussion

The three-time class observations done on each English teacher revealed that all of the English teachers had a good understanding of the content (CK). They delivered their material confidently and fluently, knew what to say when students asked questions and could tell if the students had used it correctly or not. Their pedagogical knowledge (PK) was also seen. They used discovery learning for pedagogical knowledge, led students to digest data on their own, or made students active by researching information on their own, though certain presentations were still performed by the teacher using PowerPoint. In the teaching-learning process, students were asked a series of questions to observe the content presented by the teachers, and then they were given challenges to apply what they had learned.

The teachers employed other technology in addition to PowerPoint to demonstrate their technological knowledge (TK). They brainstormed using YouTube, TedTalk videos, Photos, Kahoot, Padlet, an example of a poem, and an example of a letter, and then processed and presented the data using Google Docs and Microsoft Words and Schoology for asynchronous meetings. Schoology was used in this TPACK implementation to add materials in the form of files or links to YouTube or videos in Microsoft OneDrive and to submit assignments and assessments to the assignment or assessment folder.

This observation reveals the model of TPACK implementation in English class using Schoology as the LMS as teachers should create and implement TPACK in as many diverse ways as possible to fit a wide range of curriculum and teaching styles (Harris & Hofer, 2011). Harris and Hofer further argued that there is no single technical solution for every teacher, course, or basis of knowledge.

This observation demonstrates how teachers use student-centered methods and computer technology to depict the subject matter in their roles as dispensers of knowledge or facilitators (Gilakjani, 2013). However, when it comes to student-centered teaching strategies, the three teachers in this study only used one. It is called "Discovery Learning." Furthermore, some teachers in the class still used PowerPoint to deliver materials. The three English teachers exclusively used the "Adding material" tool for files and links, as well as the "assignment" and "evaluation" facilities of Schoology. It shows that the teachers did not use Schoology's features optimally. This is in line with what Meirovitz et al. (2022) found among 129 participants who were recruited from various countries where English is taught as a foreign language. They did not use digital tools optimally in their classrooms. The results have shown that there is still a lot of rooms for improvement in terms of technological, pedagogical, and content aspects of teaching skills. Lau (2013) also found in his study that 80% (30 out of 39) of the academic staff did not use ICT in their teaching and learning environments.

Question two and three in this study about the impact of this TPACK framework on the teaching-learning process were also observed through interviews with English teachers and students. These effects were divided into two categories: positive and negative. Schoology was applauded by the teachers and students for having a one-stop shop for all activities, as well as being simple to use and engaging. Its different alternatives or sorts of questions were the second most noted positive influence. The availability of mobile Schoology on students' cell phones was another good influence from the teachers' perspective. Other benefits cited by students included easy access to revisit and review information, paperless scoring, repeatable listening audio, and available feedback from their teachers, as well as the fact that typing is easier and faster than writing. The good impact was also attributed to the quick submission, improved English skills, recorded submission, and secure and safe platform. These positive impacts are consistent with the previous (Kats, 2010; Lin et al., 2017; Lloyd-Smith, 2010; Schlager, 2016).

This research also demonstrated the negative consequences for both teachers and pupils. Due to unfamiliarity with Schoology and the absence of training, the teachers found it challenging to use it for the first time. It corroborated what Knolton (2014) found about the significant link between pedagogical training and appropriate technology selection, as well as between personal technology use and appropriate technology selection. It is important for teachers to be trained before using technology in their classrooms (Knolton, 2014). It was also supported by another study which revealed that learning readiness contributed more to students' achievement than motivation (Muslimin, Cahyono, 2023). It is believed if teachers are ready to teach and handle all the obstacles in teaching, students will get high achievement.

4. CONCLUSIONS AND SUGGESTIONS

The implementation of TPACK in Schoology-based English teaching is indicated in the observed classes in this study, and because there is no perfect technical solution, the application of TPACK in Schoology-based English education in this study is simply a model. From the standpoint of teachers and students, as presented in Tables 10 to 12, the impacts of implementing the TPACK framework in Schoology are of two kinds: negative and positive. This study reveals that the positively perceived advantages outnumber the perceived disadvantages, making Schoology still the recommended LMS to be used in schools to implement TPACK.

Regarding the application of TPACK in Schoology-based English instruction found in this study, the teacher-centeredness is still present in the delivery of material via PowerPoint and only one learning model is used throughout the lesson. Thus, it is recommended for schools to plan for prior TPACK and Schoology training to maximize the use of TPACK and Schoology features. Furthermore, the TPACK lesson plan framework, as exemplified in Tables 1-9, offers a valuable tool for educators to design and analyze instruction. Its emphasis on integrating Content Knowledge (CK), Technological Knowledge (TK), and Pedagogical Knowledge (PK) fosters the development of effective technology-mediated learning experiences.

Although the results of this study indicate that Schoology brings more benefits than bad disadvantages, the sample size of the students may be considered not large enough to show strong enough results. So, it would be better if a larger sample size could be required in future studies.

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