

# *The Evaluation of Remote Teaching Applications for K-6 ESL Students: A Case Study of Schoology*

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**Abstract:** Our generation is currently living in a fast-developing era where modern educational technology has been reshaping our knowledge of teaching and learning to an extent we have never imagined. In this article, we analyse the Piaget's cognitive development theory and ACTFL standards to study the learning habits of K-6 ESL students. We therefore develop a system to evaluate the functional value of online teaching platforms for K-6 ESL classes. Based on TPACK framework, our 6 standards could be interpreted as: a) to what extent can this platform ensure the teaching quality of a given content; b) the difficulty level of operating this platform; c) how flexible the platform is in cooperating with teachers' teaching methods; d) attractiveness to students from classes conducted on the platform; e) interaction among teacher and students promoted by the platform; and f) supervision effect from a teacher with the help of the platform. In the case study these standards are used in our evaluation of "Schoology". It is hoped that this TPACK evaluation system could inspire both teachers and educational technology providers in seeking approaches to ensure class teaching and educational technology could bring out the best in each other.

## 1. Introduction

In recent decades we have seen a massive growth in new technology development, leading to this situation where more and more tools being invented and applied into traditional classroom. In 2019, the total scope of ed-tech investments globally has reached nearly \$18.66 billion [1]. From language apps to video conferencing websites, teachers nowadays have so much more choices for online teaching than ever before. Despite the rapid expanding application scale of online teaching technology, some teachers, especially elder ones, are still unwilling to accept new changes. They believe that turning to technology does not really have much significant impact on achievement in the classroom [2]. Therefore, as they suggest, it is not worth the effort of learning such new and complex technology just to make 'only a little bit' of improvement on teaching result. Many of these teachers, who hold a negative opinion towards online teaching, struggle not only with technical problems but with finding a way to adapt the curriculum to the digital medium as well [3].

The recent COVID-19 has forced everyone, ready or not, to move the instruction online so as to keep the class going from a distance. As a result of this pandemic, schools were shut down all over the world and teaching could only be accomplished remotely on digital platforms [1]. Different from before when remote education mostly happened in colleges and universities where the target students were easier to control over the screen, now even elementary schools have to find a way to survive with the help of internet. Almost 87% of K-12 students in Wuhan attend classes via Tencent K-12 Online School now [1], and nearly 13,000 public school districts in the United States are acting efficiently to cope with the unexpected shift to remote class [4]. Even though the phrase “remote education” has been with us since years ago, completely applying this to everyday teaching practice is still new to both teachers and students, even parents. When it comes to ESL (English as Second Language) classes, this massive surge of remote education in the past few months has reviewed more problems:

- Technological influence on quality and attractiveness of teaching in distance
- Impediment to peer influence and interaction especially in ESL class
- Lack of supervision especially for children in K-6 with less self-control

In this article, we try to construct an evaluation system on how effective an online teaching platform could support remote education for K-6 ESL students.

The first part of this article is going to illustrate some important theories about the psychological state and cognitive level of children in elementary school age, as well as features and rules of ESL learning. Besides, previous work and discussion on implementing online teaching will also be introduced. The second part will explain TPACK (Technological Pedagogical Content Knowledge) framework in detail and utilize its seven domains to describe different types of online-teaching skills required for ESL teachers as well as the useful functions of online teaching platforms. Then we apply our TPACK standards into the evaluation of “Schoology” to see whether it meets with the requirements for a good remote education tool. Finally, we will discuss the result and limitations of our evaluation system.

## 2. Background

### 2.1. Piaget’s Cognitive Development Theory

Table 1: Piaget’s Cognitive Development Theory.

Age Range	Stage	Characteristic
0-2	Sensorimotor Stage	Form understanding mainly by sensing and watching
2-7	Preoperational Stage	Could use symbols like gestures or simple words
7-12	Concrete Operational Stage	Able to form clear and logical rules
11-later	Formal Operational Stage	Ready to become an adult both physically and mentally

Piaget’s cognitive development theory believed that as children mature biologically and socially their mental capability of acquiring knowledge grew steadily thereafter. The Table 1 generally defines children development into 4 stages. The first stage is called sensorimotor stage (0-2 years), when children form understanding of the world mainly by sensing and watching. The second one is preoperational stage (2-7 years). In this stage children could use symbols like gestures or simple words to discover things around them. Concrete operational stage (7-12) is the third stage, in which age period children begin to receive education in elementary school. Though limited on concrete objects, they are able to form clear and logical rules [5]. The final stage is formal operational stage

(11 years -later) where their brain is developed to an extent that is ready for formal operation. They are then ready to become an adult both physically and mentally.

On this basis, our target students are right in the concrete operational stage. Therefore teachers, if taking into consideration the thinking ability of children in this phase, could develop suitable instructional behaviors that help students maximally achieve their learning goals [5]. Furthermore, Piaget's cognitive development theory provides us with a crucial insight into how K-6 elementary school students learn in remote classes and a new perspective of evaluating online teaching platforms [6].

## 2.2. Features and Rules of ESL Learning

Different from other subjects, learning a language relies on experiencing, which achieves maximum results through face-to-face interactions. Stephen M. Smith [7] mentioned in his book that to help students experience the language, teachers should provide an effective communicating environment by creating a setting conducive to language practice. According to ACTFL (American Council on the Teaching of Foreign Languages), the World Readiness Standards provide a clear criterion for language teachers to consider, including goal areas of communication, culture, connection, comparison, and communication.

In traditional class, ESL teachers develop various interactive tasks to preparing their students for ACTFL standards. These interactive tasks make language learning a shared social experience by giving students a chance to work with anyone within the classroom collaboratively and cooperatively [8]. To achieve the communicational goal of ACTFL standards, such as interpretive, interpersonal, and presentational, teachers would implement acting projects in class. Drama forces students to interact because acting-out requires "negotiation of meaning" - a process during which students practice listening skills as they pay attention to the sound of the target language and develop oral proficiency while they self-expressing as actors in the play [9].

However, many interactive tasks that used to help students practice their language skills as if they were in real-world settings are now extremely difficult to manage over remote classes.

## 2.3. Previous Work and Discussions on Remote Education

Digital media and internet have reshaped the concept of teaching and learning. With the help of technology, education could happen regardless of the confine of time or space. In the "virtual classroom" instructor creates [10], students could learn within their own room and even in their own pace. However, well-planned courses online and those ones in response to an emergent situation give students very different learning experiences [11]. It is far from enough to just send each student home a laptop and then simply adapt the old model we used for traditional in-person classroom situation before [4]. This means besides paying attention on what they can do to make the most use of technical devices, teachers should also find a way to make up for the inconvenience of what they cannot do but still important in remote class.

"Online teaching" and "remote education" are different. In order to accomplish remote education, teachers choose different platforms and assisting digital devices to conduct the class, among which online teaching is a basic but popular method.

With our teacher predecessors one after another trying different platforms for ESL teaching for years, and new devices still emerging all the time, we now have a better understanding about the benefits and drawbacks of those online teaching platforms. Mulyono [12] claims that "Quipper", as an online platform, works well in supporting L2-input exposure, interaction and linguistic production for students from ESL remote class. "i2istudy", a platform that allows audio and video connections between the participants so that students could learn foreign languages from native speakers, has also

been tested as a potential aid ESL class [13]. On the other hand, those vulnerable students might be the biggest victims of remote class for the lack of supervision over the screen and distance. Curtin even worries that after this COVID-19 pandemic when students finally go back to normal classroom there would be a huge achievement gap among them [14].

### 3. Evaluation Standards

TPACK framework aims to capture some essential qualities of teachers' knowledge of teaching in a technological friendly class [15] with the help of its three core domains and four intersections that comes from them. Figure 1 describes how the seven domains work with each other. As far as our evaluating purpose is concerned, we would redefine TPACK framework to describe the essential qualities of an online teaching platform. By adding educational value to the terms of its seven domains, we form a new system of evaluation standards for estimating an online teaching platform's value.

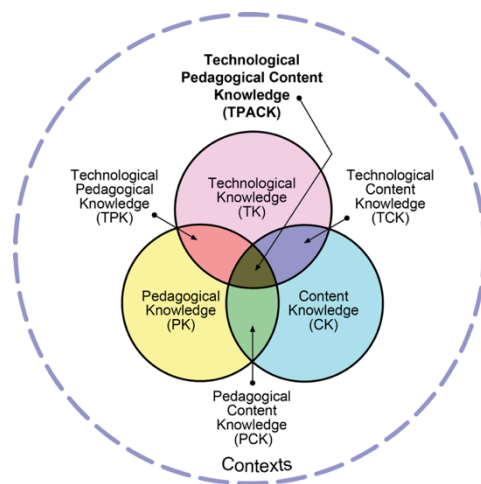


Figure 1: The Seven Components of TPACK.

As Table 2 shows, we can evaluate the applicability of an online teaching platform from perspectives of the three core domains. These features would determine whether a teacher would choose this platform in the first place. Content knowledge (CK) refers to the information of what is being taught [16]. In our evaluation system, it cares about to what extent can this platform ensure the teaching quality of a given content. A good platform maintains the teaching quality of as much content area as possible. Technological knowledge (TK) is the knowledge of applying appropriate technical tools into class [16], which can be interpreted as the difficulty level of operating the platform. A good platform should be friendly to all teacher groups, even those elder ones with little willingness to change or less acceptability to new technology. Pedagogical knowledge (PK) means the ability of using specific teaching methods [16]. In our system it focuses on how flexible the platform is in cooperating with teachers' teaching methods. A good platform would support the teacher in promoting students' engagement when they have to change teaching methods due to the difference between traditional and remote class settings.

Meanwhile, users may inevitably encounter problems in the real-world practice of an online teaching platform. Table 3 lists three more intersections of the three core domains, which reflect features that may determine a platform's capability in solving these problems and benefiting students. PCK is the specific knowledge of pedagogy for a given content [16]. It evaluates the attractiveness to students from classes conducted on the platform. According to Piaget's cognitive development

theory, students in the elementary school of 7-12 years old, can solve problems only relevant to concrete things [6]. Teachers need to best use the platform to create corresponding curriculums for specific content, making sure that the curriculums are apparent and interesting enough to attract their “concrete operational stage” students. This standard would exam a platform’s functions to see how much benefit they can provide for teachers’ curriculum design. TCK cares about the cooperation between technology and a certain content [16]. It evaluates the interaction among teacher and students promoted by the platform. Interaction, explained as “live, person-to-person encounter” by Allwright [17], plays an important role in achieving the goal of “Communicative” language teaching. To guarantee the learning effect of some ESL contents which require interactions among students, teachers should arrange suitable activities for practice on the platform. This standard would exam a platform’s functions to see how much benefit they can provide for teachers’ content activity design. TPK refers to how technology enhances teaching and learning [16]. It evaluates the supervision effect from a teacher with the help of the platform. Because of the distance and technical restrictions, in remote class teachers do not have much capability to supervise their students, who are at the ages of lacking enough self-control. Andrea Parker, a teacher from Chicago, said that during this COVID-19 situation only 60% of her students showed up into remote learning at least once a week for either doing assignments or attending classes [14]. This standard would exam a platform’s functions to see how much support they can provide for teachers’ supervisory tactic design. The overlapping area of all three core domains, though not listed as an independent standard in this study, would still give us some information about the overall outcome of teaching and learning experience with the help of the platform, like how it promotes the immersion effect in class.

Table 2: Standards Based on TPACK Core Domains.

Domain	Original definition	Our definition
CK	information of what is being taught	to what extent can this platform ensure the teaching quality of a given content
TK	knowledge of applying appropriate technological tools into class	the difficulty level of operating this platform
PK	ability of using specific teaching methods	how flexible the platform is in cooperating with teachers’ teaching methods

Table 3: Standards Based on TPACK Intersecting Domains.

Domain	Original definition	Our definition
PCK	specific knowledge of pedagogy for a given content	attractiveness to students from classes conducted on the platform
TCK	cooperation between technology and a certain content	interaction among teacher and students promoted by the platform
TPK	how technology enhances teaching and learning	supervision effect from a teacher with the help of the platform

We now take the TPACK standards as 6 different aspects (quality, attractiveness, difficulty, interaction, flexibility, and supervision) and use a 5-point scale to indicate the value of each. With intervals ranging from 1 (not helpful at all) to 5 (extremely helpful) to represent the platform’s value in each standard’s aspect, the following radar chart in Figure 2 will show our evaluation system visually.

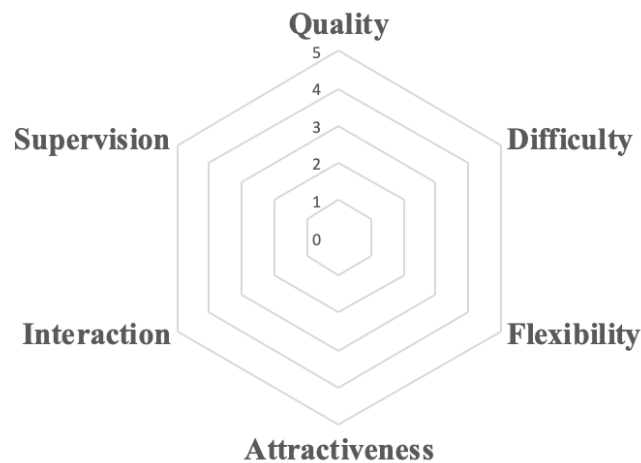


Figure 2: TPACK Evaluation Standards.

#### 4. Case Study

“Schoolology” is a learning management system designed to boost communication and sharing in the classroom especially for K-12 education [18]. It already acquired wide usage in some elementary schools before this unexpected situation.

##### 4.1. Quality (CK)

In remote class setting, students have to sit in front of the screen for hours because other than ESL class they have many other subjects to learn in one single school day. They will feel harder to get fully immersed into the teaching process which will in turn have negative influence on the overall quality of class. However, lack of ways to deal with the eyestrain is a big drawback of “Schoolology” as well as many other online teaching platforms right now.

##### 4.2. Difficulty (TK)

For teachers having problems learning how to operate an online teaching platform, “Schoolology” provides a list of instructional videos focusing on different potential questions users might meet with. Besides, teacher and students could make live chat with the service staff whenever they have difficulties for technical problems. This gives us a hint that an online teaching platform may achieve wider adoption if the company provides more training and supporting for its users.

##### 4.3. Flexibility (PK)

On “Schoolology” virtual classes are accomplished by its “live video group meeting” function, which is the most common form when traditional classes are moved online. Though this popular function provides fundamental support for teachers to successfully convey the teaching content to every single student in the class, it is still a huge change from traditional teaching and learning style. Some teachers complain about the limitations of “Schoolology” for they have to make too many adjusts on both teaching method and class pace to suit this platform.

#### 4.4. Attractiveness (PCK)

Teachers in elementary school usually sit among students so that they could spot frustration or confusion from subtle changes in their students' behavior at a simple glance and make quick adjustments in the teaching contents. They often make colorful concrete materials that could be physically held in hands to support teaching in order to help students understand and prevent them from getting bored. When teachers first use "Schoolology", they find it hard to even make eye contacts with their students through the screen. Therefore, teachers then turn to its other functions to make up for this problem. Some creates after-class groups for in-class assignments, while others invite their students to visit other teachers' virtual classrooms on the same content to something new. On this scale, "Schoolology" does find out a different way to help teachers attract their students.

#### 4.5. Interaction (TCK)

Grammar teaching in ESL class which mainly bases on slide show or blackboard writing is not much affected: teachers using "Schoolology" now can give illustration of knowledge points on shared screen and ask students to send pictures or even videos of their in-class written assignments in the chatroom to make sure if their students have understood the content. However, it becomes a problem when organizing class activities demanding highly on face-to-face interaction among students and teacher. If a teacher wants to create a scenario where a group of students make posters on their favorite movie and introduce to the rest of the class with a little acting of a particular scene, "Schoolology" would show some limitations in ensuring the whole process. What's more, walking among students and giving immediate feedback while they prepare their task in groups are not as easy accomplished as before.

#### 4.6. Supervision (TPK)

Teaching and learning do not only happen during class time. "Schoolology" might lack some in-class support for supervision through screen due to the distance and technical limitations, but it seeks another way to make sure students still keep pace with the teacher's schedule by giving more after-class supports. Teachers can create individual student profiles on "Schoolology" and keep track of students' homework completion status after each class. Together with the class attendance data they could have an overall knowledge of how each student is doing for this class and make plans them accordingly.

### 5. Conclusion

This study was designed to introduce a perspective to teachers when selecting a suitable online teaching platform for themselves from hundreds of ones on the market. We developed an evaluation system based on the TPACK framework so that teachers could use it to compare different platforms by quantifying their function values and decide whether a platform is qualified like how we evaluated "Schoolology".

The evaluation system mainly focuses on the platform functions' friendliness for ESL teaching in elementary school settings. Piaget's cognitive development theory tells us that K-6 students are experiencing a period called concrete operational stage, where they explore the world with clear and logical rules based on concrete objects. The analysis of ACTFL standards guides us to concern on the platform's ability to ensure immediate communication within the class. We hope the development of our TPACK evaluation system will encourage more teachers to build a healthy relationship with educational technology in this new wave of revolution. On the other hand, it is also expected to give



some hints to educational technology providers in launching products that will better meet teacher and students' needs.

One limitation of this study is the accuracy and credibility of scores in our 6 standards must base on a large amount of test data. When people score the values of a platform with our evaluation system, their criteria would vary slightly because of the difference in their understanding of the system. Therefore, in further study we would like to distribute questionnaires about the user experience of a specific online teaching platform in different schools to make sure the amount of data collection. More detailed questions regarding to these TPACK standards would be listed in the questionnaires to guide teachers into a deeper understanding of our evaluation system so that their scoring would be more objective.

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