



## **An Analysis of EFL Teachers' Perceptions on the Integration of TPACK in Teaching English at SMA-Man in Solok**

**Yolanda Andriany<sup>1</sup> and Aryuliva Adnan<sup>2</sup>**

<sup>1,2</sup>English Department, Faculty of Languages and Arts, Universitas Negeri Padang

Correspondence Email: [andrianyolanda381@gmail.com](mailto:andrianyolanda381@gmail.com)

---

### **Article History**

Submitted: 2022-01-30

Accepted: 2022-08-05

Published: 2022-08-05

---

### **Abstract**

*This article deals with the integration of TPACK at SMA-MAN in Solok. The research undertaken aimed to know what are EFL teachers' perceptions about TPACK in teaching English. This study was descriptive qualitative research. The participants of the research were 20 English teachers at five schools in Solok. The instrumentation of this research were collected from questionnaire and interview that have done by the teachers. As for the points to the instrumentations there were aspect of TK, CK, PK, PCK, and TPACK. The findings of this research shows that EFL teachers have good perceptions about the integration of TPACK in teaching English.*

---

### **Keywords:**

TPACK, EFL teachers,  
Teaching English

---

©2022 The Author(s) Publish by Jurusan Bahasa dan Sastra Inggris FBS UNP. This is an open access article under the CC-BY-NC license (<https://creativecommons.org/licenses/by-nc/4.0/>)

How to Cite: Andriany, Y., & Adnan, A. (2022). An Analysis of EFL Teachers' Perceptions on the Integration of TPACK in Teaching English at SMA-Man in Solok. *Journal of English Language Teaching*, 11. (2): pp. 304-313, DOI: [10.24036/jelt.v11i2.116290](https://doi.org/10.24036/jelt.v11i2.116290)

---

## **INTRODUCTION**

In an educational environment, the processes of teaching and learning activities are the serious things that caught government's attention. During this COVID-19 situation, the management systems in education parts were not going too stable until now. As stated by Mukherjee & Das (2020) the decline of education that has occurred in line with the COVID-19 pandemic was a point of discussion. Even, this situation has resulted in so many polemics in education.

In Indonesia, during the COVID-19 pandemic, school closures have left 45.5 million school students and 3.1 million teachers dependent on online teaching and learning (Mailizar et al., 2020). Therefore, to manage this situation, the role of teachers in preparing and conveying the lesson properly is something that much needed because the main factor to support the success of the teaching and learning process are the teachers themselves. Murati (2015), said that a teacher with his professional competencies can be said as a significant factor in training and preparing the lesson to maximize the students' achievement in learning. Furthermore, all subjects in the world of education required to be able to improve their quality in line with technological developments, chiefly for EFL teachers in this context.

According to Khan (2011), teaching English as a Second or Foreign Language was a difficult task, when it came to areas where English serves a very specific purpose, teaching and learning become even more important and time-consuming.

To create a creative and modern teaching performance, EFL teachers have to adjust their teaching skills with some aspects of the curriculum 2013. As stated by Aji & Budiyo (2018) curriculum 2013 implementation was the actualization of the curriculum that is supported by using technological development as a medium in gaining knowledge. To maintain the quality of the learning provided, EFL teachers as the main role in presenting the material have to balance their pedagogic skills with the rapid development of technology. According to Batiibwe & Bakkabulindi (2016) the utilization of ICT in instructional method decidedly affects the educating and learning measure. Likewise, they saw that ICT like PCs, web 2.0 advancements, web, email, and video conferencing give a variety of incredible assets that incite the change of the segregated educator-focused and text-bound homerooms into rich understudy-centered intelligent information conditions.

Besides the important aspects of technology, EFL teachers have to make sure they have enough pedagogical skills to teach their students. Pedagogical skills can be said as teachers' specific knowledge background at the schools. As mentioned by Elas et al. (2019) to be successful educators, teachers need to conduct and develop the three major skills in teaching such as technology, background knowledge and also their pedagogical skill to teach their students. Those components also familiar called as TPACK.

The term of TPACK was a modernization from "PCK" method (*Pedagogical Content Knowledge*) previously proposed by Shulman in 1986. So that, TPACK can be said as an integrated framework of technology to connect the three types of knowledge such as technological knowledge, pedagogical knowledge, and knowledge content. According to Yurdakul, et al. (2012) in Rahimi & Pourshahbaz (2019) TPACK was a structure to portray instructor's information and abilities to coordinate innovation. He likewise said that "It is one of the new structures that consider the two instructors' innovative information and techno-academic information as being similarly significant and substantial originations".

In English learning process, the implementation of TPACK will be more interested because, firstly, by exploitation technology, teacher will simply realize the media in web for the teaching and learning method. Secondly, they outlined TPACK because the basic of effective teaching through technology, the illustration of idea through technology, education techniques that apply technology and technological use to create new understanding from the prevailing data among students (Putri, 2019). Related to the implementation of the 2013 curriculum, teachers must be able to encourage their students to be more active and independent.

Some researchers believed that TPACK stresses a teacher's comprehension of how to effectively use technology as a pedagogical tool and highlights the substantial overlap between pedagogy, content, and technology knowledge representation. By applying TPACK, of course, teachers expected to be more creative in preparing media and learning materials.

Some studies about TPACK have been carried out. For example, a journal of English Teaching Studies entitled *Teacher's Technological Pedagogical Content Knowledge in Developing Learning Materials* by Wulandari (2019). Subjects of this study were the participants of a two-day in-service teacher training held by the researcher's department as a community development initiative. In this study, the

TPACK structure has given a premise to portray pre-service and in-service teacher's skills in preparing the learning materials. As a result, this study's findings suggest aspects of teachers' knowledge that require additional training and other possible suitable methods for their practice and professional development setup.

On the other hand, another research also conducted by Yulisman et al. (2020) entitled *The Contribution Of Content, Pedagogy, and Technology On The Formation Of Science Teachers' TPACK Ability*. Based on the findings of this study, teachers already have the ability of CK, PK, and PCK, which directly and indirectly contribute to the formation of their TPACK. However, they still required to give attention and direction to improve their technological knowledge (TK). As a result, the government and educational institutions were expected to assist teachers in providing facilities and training in the field.

Another journal also conducts by Martin (2015) titled *Successful Implementation of TPACK in Teacher Preparation Programs*. Pointed to his research, he found many teacher preparation programs are relying on out-of-date technology models and need to be redesigned. He also pointed at the end of the study like, "Perhaps what educators should consider is how we can expect students to grow when we have not grown as instructors?" We cannot expect our students to learn using 19th-century methods."

In West-Sumatera, a research about TPACK has ever conducted by Nofrion et al. (2012) in Solok Regency. The research focused to analyze Geography teachers' TPACK competency in Solok Regency. As a result, the research showed that TPACK competency of Geography teachers in Solok Regency was in the medium category. However, it is still indicated that they still use media presentation which is modify from the internet that has been created by others.

Related to the results above, there still found considerations for teachers in many different subjects to conduct their TPACK better. In fact, during online learning, teachers quite difficult to choose appropriate, fast and efficient media or materials used with ineffective lesson hours, so teachers must be very clever in balancing skills in TPACK that they have. The researcher also ever done a short conversation with some teachers from junior high school and from senior high school in Solok about TPACK, but some of teachers at junior high school were not too considered about TPACK. This condition can be a serious problem for teachers to manage their teaching skills perfectly. Moreover, they said that unstable of the internet access was one of the reasons why their skills were not fully developed. Different with that, teachers from senior high school said they are familiar with TPACK, but they do not know whether they have applied it maximally or not.

Based on the explanation above, the researcher interested to conduct a research in Solok related to the TPACK skills of EFL teachers. Therefore, the researcher conducted the research at five schools of SMA-MAN in there. The researcher focused on analyzing EFL teachers' perceptions on the integration of TPACK in teaching English".

## **METHOD**

This research was a descriptive qualitative research that describes the issue studied. Qualitative descriptive studies are the least theoretical of all of the

qualitative approaches to research (Lambert & Lambert, 2013). By using the descriptive research method it will help to describe a situation, problem, phenomenon, service, or program, or provides information about the current condition of society these days, or describes the thought or perception toward the issue. Hence, the information which was delivered is the EFL teachers' perceptions on the integration of TPACK in teaching English.

## RESULT AND DISCUSSION

### *Research Finding (tentative)*

The findings of this research were divided into the components of TPACK; TK, CK, PK, PCK, TCK, TPK, and TPACK. The data were collected from questionnaire and interview with EFL teachers at those schools.

**Table 1.** Calculation of the questionnaire

No	Components	Percentage of average scores(%)
1	TK	77.67%
2	CK	89.37%
3	PK	85.17%
4	PCK	88.75%
5	TCK	85%
6	TPK	83.25%
7	TPACK	81.96%

### *1. TK (Technology Knowledge)*

The first component is TK that based on the results of the questionnaire, the average of this score is 77.67%. In this result, TK was a component which has lower percentage than the other items. Even though the percentage range was not too bad, but it still needed to improve.

During the interview section, the researcher found some problems that make the Technology Knowledge has lower percentage than others.

Respondent 4: TPACK ini kan maksimalnya digunakan saat Covid-19 ini kan, jadi sebelum ini boleh dikatakan penggunaan teknologi ini belum seberapa tapi karna lebih banyak menggunakan metode yang konvensional kami tetap men-include video pembelajaran. Tapi, selama Covid-19 itu guru dituntut untuk mampu menggunakan teknologi seperti Google Classroom, Video, zoom dan lain-lain.

(This TPACK was maximally used during Covid-19, right, so before it can be said that the use of this technology has not been much because it used more conventional methods but we still include videos while teaching,. However, during Covid-19, teachers were led to be able to use technology such as Google Classroom, Video, Zoom and others).

Respondent 5: kalau untuk teknologi, itu guru senior seperti saya mungkin agak sedikit kesulitan. Karna cukup susah untuk seumuran saya mempelajari teknologi atau media pembelajaran yang canggih-canggih. Tapi untuk WhatsApp sama google Classroom itu saya bisa melakukannya. Mungkin

seperti saya butuh latihan lagi untuk menyeimbangkan pengetahuan teknologi saya dengan aspek lain.

(Technology knowledge, for a senior teacher like me that might be a little difficult because it was quite difficult for my age to learn sophisticated technology or learning media but for WhatsApp and Google Classroom, I can do it. Maybe I need more practice to balance my technological knowledge with other aspects).

## 2. CK (*Content Knowledge*) English

The second component is CK. The data showed that the average of this score is 89.37%. Based on this result, Content Knowledge skill of EFL teachers in those schools was great. They had enough knowledge about English content, better to develop their understanding of English, and also better to create materials for their students.

Respondent 2: ya, jadi saya sangat setuju sekali dengan pendapat ini ya. Karna dengan adanya kemampuan guru memiliki TPACK dalam pembelajaran akan sangat membantu sekali untuk siswa menguasai/mengembangkan kemampuannya dalam bahasa Inggris.

(Yes, so I totally agree with this opinion. Because of the teacher's ability on TPACK, it will be very helpful for students to master/develop their ability in English).

Respondent 3: saya setuju dengan hal ini, karna dengan menerapkan TPACK, guru dapat/ mampu memiliki kemampuan TPACK yang bagus akan sangat membantu guru dalam mengembangkan pembelajaran.

(I agree with this, because by implementing TPACK, teachers can / are able to have good TPACK abilities which will really help teachers in developing learning).

## 3. PK (*Pedagogical Knowledge*)

The data showed that the component of PK was 85.17%. Based on the questionnaire obtained, all statements in the PK category were good enough.

Respondent 6: Oh iya, betul sekali. Karna salah satu komponen ada pada TPACK berpengaruh pada penyusunan RPP guru.

(Oh yes, that's right. Because one of the components in the TPACK has an effect on the preparation of the teacher's lesson plans).

Respondent 2: benar, jika TPACK guru kurang berkembang seperti ilmu pedagogic, tentunya akan kesulitan kita dalam menyusun RPP.

(True, if the teacher's TPACK was less developed like pedagogic science, of course it will be difficult for us to compose lesson plans).

## 4. PCK (*Pedagogical Content Knowledge*)

The next component is PCK. Based on the results of the questionnaire, the average of this score was 88.75 %. This percentage showed that their PCK was really good.

Respondent 1: TPACK tentunya sangat membantu sekali, karena kita dengan mudahnya dalam menyiapkan RPP ini, tidak manual lagi. Disamping waktu

yang dikeluarkan lebih singkat, kemudian jadi lebih banyak pilihan content yang bisa kita masukkan kedalam RPP ini yang dulunya mungkin tidak memungkinkan jadi memungkinkan.

(TPACK was certainly very helpful, because we can easily prepare this lesson plan, no longer manual. In addition to the shorter time spent, there were more choices of content that we can include in this RPP, which previously might not have been possible).

*Respondent 2: ya berpengaruh, karena kita untuk RPP ini kita tidak monoton, missal kalau kita sudah bosan dengan ini, atau ingin pembaharuan seperti RPP yang satu lembar itu, jika kita kurang mengerti kita bisa melihat pada yang pembaharuan.*

(Yes, it has an effect, because we were not monotonous for this RPP, for example, if we felt bored with this, or want an update like the one-sheet RPP, if we don't understand it, we can look at the renewal).

#### 5. TCK (*Technological Content Knowledge*)

TCK was the knowledge of how technology and content (English) affect each other. Furthermore, teachers and prospective teachers need to create multimedia and understanding the concepts in content by applying the specific technologies. Based on the data, TCK score was in good category which has 85%.

Respondent 8: ya, jadi saya sangat setuju sekali dengan pendapat ini ya. Karna dengan adanya kemampuan guru memiliki TPACK dalam pembelajaran akan sangat membantu sekali untuk siswa menguasai/mengembangkan kemampuannya dalam bahasa Inggris.

(Yes, it has an effect, because we are not monotonous for this RPP, for example, if we are bored with this, or want an update like the one-sheet RPP, if we don't understand it, we can look at the renewal).

Respondent 7: Benar sekali pernyataan ini, dengan menerapkan TPACK tentunya guru akan lebih mudah dalam meng-create pembelajaran yang lebih inovatif.

(This statement was very true, by applying TPACK; of course, teachers will find it easier to create more innovative learning).

#### 6. TPK (*Technological Pedagogical Knowledge*)

TPK was knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, as well as knowledge of how teaching may change as a result of using specific technologies. Based on the data above, TPK also has good percentage score at 83.25%.

Respondent 4: Menurut saya dengan adanya ini akan sangat membantu pendidik dalam mengembangkan media pembelajaran, terutama dalam pemanfaatan teknologi.

(I think this will really help educators in developing learning media, especially in the use of technology).

Respondent 5: tentunya perkembangan teknologi sangat berpengaruh dalam memilih media yang lebih modern untuk kegiatan PBM.

(Of course, technological developments were very influential in choosing more modern media for teaching and learning activities).

#### 7. TPACK (*Technology Pedagogy and Content Knowledge*)

The last component is TPACK. TPACK was the understanding needed by the teachers in utilizing technology appropriately into teaching and learning activities in various material contents, as well as teaching materials using appropriate technology and pedagogical methods. Based on the data obtained the average of this score is good at 81.96%.

Respondent 7: Diantaranya TPACK sangat membantu dalam pembelajaran daring/luring. Serta membuat guru lebih mudah dalam meningkatkan kualitas mengajar.

(Among them, TPACK was very helpful in online or offline learning. And make it easier for teachers to improve the quality of teaching).

Respondent 8: dengan TPACK ini kita dengan mudah mendapatkan modul, mendapatkan omedia mana yang lebih, kita dapat memilih mana yang lebih menarik, mana yang lebih cepat tepat. Jadi ada yang apa kita lihat satu materi ada itu yang panjang sekali, susah untuk dimengerti, ha kita cari yang lain. Ada yang lebih tepat, cepat gitu.

(By integrating this TPACK we can easily get modules, media and we can choose which one is more interesting, which one is faster. So what we see for one material that is very long, difficult to understand, ha we are looking for something else. There is something more precise, so fast).

#### **Discussion**

This qualitative data analyzed in this study provided the answer of the research question. In line with the data analysis, the results showed that EFL teachers have positive perceptions about the implementation of all aspects in TPACK skills. Based on the results of this research it was similar with the previous studies about the use of TPACK in teaching English. The findings mostly similar with the research conducted by Mahdum, (2015), (Cahyono et al., 2016) that EFL teachers in the schools had very good category about their perception of TPACK. It was also related to the result of the both questionnaire and interview which done out by the participants. In fact, they felt so aware about the important things about the implementation of TPACK while teaching English.

Besides the good category, there also found some teachers who have a little bit difficulty when applying technology or media when teaching, especially for senior teachers. During the interview section, they said that from all components of TPACK, technological knowledge (TK) is the difficult one. It mostly happened because they do not have good skill to use the new technologies or media in teaching. Furthermore, they need more time to learn to apply the media that will be used such as Google Classroom, Zoom, and also Google Form. Compare to the junior teachers, they said that technology was the important things must be mastered. Of course, the sufficient experience and understanding make them feel easier to apply technology in teaching compared to their senior. This result also in accordance with the findings of research conducted by Nazari et al., (2019) that experienced

teachers significantly got higher scores in terms of PK and PCK different with the novice teachers who significantly get higher scores in terms of TK, TCK, TPK, and TPACK.

In line with that, Aniq & Drajadi, (2019) also stated that teachers rated their domain knowledge higher about CK, PK, and PCK rather than those domains concerned with technological knowledge, i.e., TK, TCK, TPK, and TPACK. Based on the data from interview, this situation happened because of they were not be able to develop their technological skill faster than others. In fact, some senior teachers said they need more practice to learn the latest media that will be used during the learning process. In addition, the less of teaching time also makes it difficult for teachers to use learning media that takes a long time.

Therefore, it can be concluded that TPACK can encourage teachers to be more creative in preparing media or lesson plans, developing their teaching strategies and adjust it with their students' learning style but they have to make sure they can manage their time to teach their students by integrating TPACK. So, TPACK framework can be considered as one of the best alternative framework for EFL teachers in teaching English.

## CONCLUSION

Based on the results of the data analysis and discussion that have been described in chapter IV EFL teachers in schools sample had good perceptions about the integration of TPACK in teaching English. It can be concluded that EFL teachers had good skills in all categories of TPACK; technology, pedagogical, content and also knowledge.

EFL teacher at those schools had positive perceptions because of they have ability and mastering their profession as an EFL teacher. In addition, they believed that all components of TPACK are very useful to apply while teaching. It made the teachers more creative to conduct and manage their students during the class begin. It can reduce students' boredom to the monotonous way of teachers' teaching style by adding some videos or using appropriate media instead of using books.

Meanwhile, for pedagogic aspect and content, all teachers can be said that they had enough knowledge for both aspects. Furthermore, it can help to develop students' interest in learning English. On the other hand, in creating lesson plans, they were also creative in choosing appropriate topics and teaching materials. According to the interview result, they mentioned that TPACK ability was the key for producing lesson plan. Without this ability, teachers felt difficult to produce interesting teaching materials, determine the topics needed to be taught, or choose appropriate media to be used in each topic.

## REFERENCES

- Aji, W. N., & Budiyo, S. (2018). The Teaching Strategy of Bahasa Indonesia in Curriculum 2013. *International Journal of Active Learning*, 58(2), 58–64.
- Aniq, L. N., & Drajadi, N. A. (2019). Investigating Efl Teachers' Perceptions on Their Tpack Development. *Leksika*, 13(2), 95–101.
- Batiibwe, M. S. K., & Bakkabulindi, F. E. K. (2016). Technological pedagogical content knowledge ( TPACK ) as a theory on factors of the use of ict in



- pedagogy : A review of literature. *International Journal of Education and Research*, 4(11), 123–138.
- Cahyono, B. Y., Kurnianti, O. D., & Mutiaraningrum, I. (2016). Indonesian EFL Teachers' Application of TPACK in In-service Education Teaching Practices. *International Journal of English Language Teaching*, 4(5), 16–30.
- Dwinata, E. (2017). Language and Perception. *Journal of English Language Teaching, Linguistics and Literature*, 1(1), 71–77.
- Elas, N. I. B., Majid, F. B. A., & Narasuman, S. Al. (2019). Development of Technological Pedagogical Content Knowledge (TPACK) for English teachers: The validity and reliability. *International Journal of Emerging Technologies in Learning*, 14(20), 18–33.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2017). *Comparison of Convenience Sampling and Purposive Sampling Comparison of Convenience Sampling and Purposive Sampling*.
- Harris, J. B., & Hofer, M. J. (2011). *Technological Pedagogical Content Knowledge (TPACK) in Action: A Descriptive Study of Secondary Teachers' Curriculum-Based, Technology-Related Instructional Planning*. 43(3), 211–229.
- Hobsi, F., Sunaryo, H., & Abs, K. (2019). Prodi manajemen. *Jurnal Riset Manajemen*, 148–162.
- Kassem, M. A. (2018). BALANCING TECHNOLOGY WITH PEDAGOGY IN ENGLISH LANGUAGE CLASSROOM : TEACHERS ' PERSPECTIVE. *International Journal of English Language Teaching*, Vol.6, No.(December), 1–19.
- Khan, I. A. (2011). Challenges of teaching/learning English and management. *Global Journal of Human Social Science*, 11(8), 68–80.
- Knolton, D. V. (2014). *Technological, Pedagogical, Content Knowledge (TPACK): An Exploratory Study of Adjunct Faculty Technology Proficiency*.
- Koehler, M. J. (2006). *Technological Pedagogical Content Knowledge : A Framework for Teacher Knowledge*. 108(6), 1017–1054.
- Koehler, M. J., Mishra, P., Kereluik, K., Shin, T. S., & Graham, C. R. (2014). *The Technological Pedagogical Content Knowledge Framework*. 101–111.
- Mahdum. (2015). Technological pedagogical and content knowledge (TPACK) of english teachers in Pekanbaru, Riau, Indonesia. *Mediterranean Journal of Social Sciences*, 6(5S1), 168–176.
- Mailizar, Almanthari, A., Maulina, S., & Bruce, S. (2020). Secondary School Mathematics Teachers ' Views on E-learning Implementation Barriers during the COVID-19 Pandemic : The Case of Indonesia. *EURASIA Journal of Mathematics, Science and Technology Education*, 16(7).
- Martin, B. (2015). Successful Implementation of TPACK in Teacher Preparation Programs. *International Journal on Integrating Technology in Education*, 4(1), 17–26.
- Mishra, Punya, Matthew J. Koehler, & Zhao, Y. (2007). *Integrating Technology in Higher Education* (Puny Mishra, M. J. Koehler, & Y. Zhao (eds.); Fourth). IAP–Information Age Publishing, Inc.
- Mukherjee, N., & Das, A. (2020). The COVID-19: impact on education. *International Journal of Advanced Education and Research*, 5(3), 13–14.

- Murati, R. (2015). The role of the teacher in the educational process. *The Online Journal of New Horizons in Education*, 5(2), 75–78.
- Nambiar, D. (2020). The impact of online learning during COVID-19: students' and teachers' perspective. *The International Journal of Indian Psychology*, 8(2).
- Nazari, N., Nafissi, Z., Estaji, M., Marandi, S. S., & Wang, S. (2019). Evaluating novice and experienced EFL teachers' perceived TPACK for their professional development. *Cogent Education*, 6(1), 1–26.
- Nofrion, Wijayanto, B., Wilis, R., & Novio, R. (2012). Analisis Technological Pedagogical and Content. *Jurnal Geografi*, 10(2), 105–116.
- Putri, S. E. (2019). *The Implementation of TPACK in Teaching Writing Recount Text in a Senior Highschool Level*. 7(2006), 156–163.
- Qiong, O. (2017). A Brief Introduction to Perception. *Studies in Literature and Language*, 15(4), 18–28.
- Rahimi, M., & Pourshahbaz, S. (2019). *English as a Foreign Language Teachers' TPACK : Emerging Research and Opportunities*. IGI Global.
- Rahmanita, M., & Mukminatien, N. (2019). *Teaching English as A Foreign Language : Making Use of*. 7(1), 26–29.
- Robbins, S. P., & Judge, T. A. (2012). *Organizational Behavior* (15th ed.).
- Sarkol, K. (2016). *STUDENT PERCEPTION OF LEARNING ENGLISH IN SENIOR HIGH SCHOOLS OF KAIMANA, WEST PAPUA*. 146332040.
- Schmidt, D. A., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2014). Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice Teachers. *Journal of Research on Technology in Education*, 42(2), 2531p.
- Soko, H. L. (2017). *Teachers' perceptions of English language teaching media*.
- Surani, D., & Hamidah. (2020). Students Perceptions in Online Class Learning During the Covid-19 Pandemic. *IJoASER (International Journal on Advanced Science, Education, and Religion)* E-ISSN: 2614-8862 & P-ISSN: 2565-0836 Volume 3, Number 3, November 2020 Students, 3(3).
- Wang, W. (2016). *Development of Technological Pedagogical Content Knowledge ( TPACK ) in PreK-6 teacher preparation programs by*. 2016.
- Wulandari, E. (2019). Teacher's Technological Pedagogical Content Knowledge in Developing Learning Materials. *Journal of English Teaching Studies*, 1(1), 29–45.
- Yasin, M. I., & Mustofa, M. (2021). *STUDENTS' PERCEPTION TOWARD THE USE OF ZOOM FOR TEACHING*. Vol 10, No.
- Yulisman, H., Widodo, A., Riandi, R., & Nurina, C. I. E. (2020). the Contribution of Content, Pedagogy, and Technology on the Formation of Science Teachers' Tpack Ability. *Edusains*, 11(2), 173–185.