Analysis of teacher professional development to improve application of TPACK, HOTS, and 21st Century Life Skills Stimulation Concepts

Abil Mansyur [a,1,*], Tiur Malasari Siregar [b,2], Maya Oktora [b,3]

[a] Medan State University, Medan, Indonesia
[b] Medan State University, Medan, Indonesia
[1] abilmansyur@unimed.ac.id*; [2] tiurmalasarisiregar@unimed.ac.id; [3] mayaoktora@unimed.ac.id
* tiurmalasarisiregar@unimed.ac.id

KEYWORDS	ABSTRACT
Teacher Profession Teacher Performance TPACK, HOTS	Teacher Profession is a imperative element in education. Don't ever ignore the teacher in the teaching and learning process, because the teacher can assure the success or failure of a teaching and learning process in the classroom. Therefore, analyzing the teacher profession, teacher performance in the application of TPACK, the concept of HOTS and the stimulation of 21st century life skills in learning are the objectives of this study. Data collection techniques using a questionnaire. Respondents in this research were PPG In Position in 2021 at Medan State University, totaling 1485 teachers consisting of 9 study programs. The data analysis technique used simple regression. The results of this study want to see the development of teachers after going through a series of professional teacher education in positions which is implemented in a online with applying TPACK, the HOTS concept and the stimulation of 21st century life skills in learning.

INTRODUCTION

Professional teachers are teachers who have certain components in accordance with the requirements demanded by the profession of teacher. Professional teachers always mastering the material or subject matter that will be taught in teaching and learning interactions, and always continuous to develop their capability, both in terms of their knowledge and experience. Meanwhile, teacher professionalism is the ability of teachers to carry out their main task as educators and teachers, including the ability to plan, perform, and carry out learning evaluations. Professional teachers are the teachers that we expect to be, we want by increasing the ability of teachers it will improve the quality of education in Indonesia. The opinion above confirms that professional teachers should have four competencies as stated in Constitution No. 14 of 2005 concerning Teachers and Lecturers, where it is explained that pedagogic, personality, professional and social competencies must be owned by teachers, then in clause 8 also explains that teachers must have academic qualifications, competencies, educator certificates, physically and mentally healthy, and have the ability to actualize the aim of national education. This Constitution emphasizes that educator certificates are one of the important requirements that teachers must have as professional educators.

In relation to teacher performance in carrying out teaching and learning activities, there are Tasks of Professional Teacher according to the Constitution of Republic Indonesia Number 14 of 2005 article 20 (a) about Teachers and Lecturers, namely planning lessons, implementing the processes of learning with excellent, and assessing and evaluating learning outcomes. The good performance of teacher is certainly reflected in their appearance both from the appearance of academic ability and professional ability to be a teacher, it means that they are able to manage the process of teaching at the classroom and educate students outside the classroom as well as possible.

Teacher performance is the result, progress and work achievement of teachers in carrying out learning, both in planning, implementing the learning process and evaluating learning outcomes, conducting guidance and training for students, as well as their commitment to carrying out tasks. Whether or not the teacher's performance can be seen from the implementation of the competencies that must be possessed by teachers in addition to having academic qualifications (Lailatussaadah, 2015). In general, teachers can be interpreted as people who have the responsibility of educating. In particular, the teacher can be interpreted as a person who is responsible for the development of students by seeking the development of all their potential, both affective, cognitive,

FKIP
UNIVERSITAS MUHAMMADIYAH MALANG

FKIP
UNIVERSITAS MUHAMMADIYAH MALANG

and psychomotor potential (tafsir, 1992). Efforts to improve teacher performance to develop the teaching profession are very important in improving education in Indonesia. Indonesia, which is now in the stage of a developing country, must have high human resources. So that it can become a developed country (Putri & Imaniyati, 2017)

Teaching is a complex activity that involves various types of knowledge. Teaching activities are based on knowledge about the material to be taught *(content knowledge),* how to teach a material *(pedagogical knowledge),* and knowledge about the use of various technologies *(technological knowledge)* which all three have an intersection to be able to support one another (Mishra, P., & Koehler, 2006). In carrying out the learning process, future teacher candidates must ensure that they have good technological knowledge, skills and competencies, so that they can integrate technology in learning effectively and efficiently(Guzman & Nussbaum, 2009) and (Koehler & Mishra, 2005). From the above opinion it can also be said that technology plays an active role as a tool, process, and at the same time a source for learning and implementing learning (Partnership for 21st Century Learning, 2007).

The industrial era 4.0 which is marked by rapid changes in the flow of information and information technology that raises various problems massively requires high thinking power for individuals to prepare solutions to new problems that continue to develop. In order for students to be competent and ready to face it, we must make major changes in the way we teach and invite students to learn. One thing that must be prepared, of course, is to prepare students to be trained to think one step ahead and even more in dealing with problems (Thomas & Thorne, 2009). These changes encourage learning in the 21st century to integrate various technological devices in carrying out the entire series of interaction processes between students and teachers with learning resources in a learning environment.

With this change, teachers need to understand that Technological knowledge (TPACK) is a new type of knowledge that must be mastered by teachers to be able to integrate technology well in learning(Mishra, P., & Koehler, 2006). In its development, TPACK has become a *framework* that can be used to analyze teacher knowledge related to technology integration in learning (Koehler et al., 2013). The following is an overview of the TPACK *framework.*
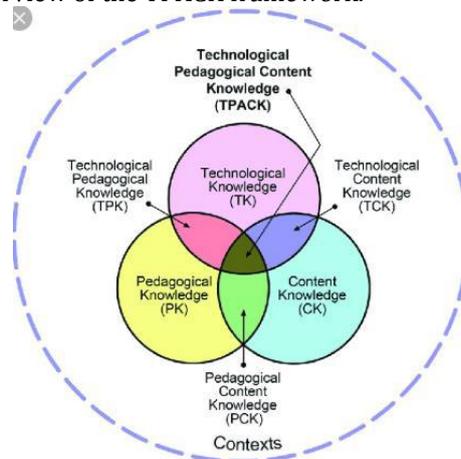

Figure 1. *Technological Pedagogical Content Knowledge* (TPACK) *Framework* (Mishra & Koehler, 2008)

The integration of technology in the learning process can provide questions and create an atmosphere that tests problem solving skills, critical thinking skills, and argumentation skills so as to improve higher order tinking skills (HOTS) (Pasani, 2018)

One of the obstacles in the aspect of competence in the learning process is the difficulty of teachers to encourage students to produce contextual work. So that students can produce these works, it must be balanced with the ability of teachers who always create contextual learning. However, it is becoming one of the problems in the implementation of the curriculum in 2013, as the result of research (Subagiyo & Safrudiannur, 2014), this opinion is also supported (Yee et al., 2011) say that, - higher order thinking is using the thinking Widely to find a new challenge . Higher order thinking demands someone to apply new information or knowledge that he has got and manipulates the information to reach the possibility of answer in new situation". In line with this, (Siswono et al., 2018) also said that HOTS is oriented towards critical and creative thinking skills. This ability is one of the abilities that must be possessed by students in the skills dimension (KEMENDIKBUD RI, 2016). Based on the description above, it is very important to know the teacher's ability to integrate and implement TPACK, HOTS and 21st century learning in the learning process.

Teacher professional education in 2021 prioritizes the application of TPACK, the HOTS concept and the stimulation of 21st century life skills in their learning, students are guided from designing learning devices, practicing field learning in schools to performance exams. This article aims to see the improvement of teacher performance after completion through teacher professional education in the application of TPACK, the HOTS concept and stimulation of 21st century life skills in learning at school .

This study is more focused on observing the development of teacher performance after completing teaching professional education. Can PPG improve teacher performance in developing learning tools, implementing the learning process, implementing evaluations in the learning process itself, especially in the application of TPACK, HOTS concepts and 21st Century skill stimulation (Critical thinking, Creativity, Collaboration, Communication) into learning.

Performance or work performance is one of the most important dependent variables and has been studied for a long decade (Jankingthong & Rurkkhum, 2012),Research on performance is very interesting to do because achieving high levels of employee performance is considered a common goal for many organizations (Yvonne et al., 2014)

METHOD

To achieve the expected goals, this type of research uses a descriptive qualitative approach. The research method uses a survey method. This method is done by collecting factual information using a questionnaire. This research is also a population study. The respondents of this study were 212 PPG teachers in 2020.

Retrieval of data used in the form of a questionnaire consisting of three parts. The first part is a questionnaire to measure respondents' perceptions of the preparation of learning tools which in this case are described into indicators, namely designing learning with clear tools, integrating TPACK, HOTS concepts and Stimulation of 21st century skills into designed learning, whether in the form of RPP, teaching materials, use of models in learning, IT-based learning media, LKPD and HOTS-based learning outcomes assessment in learning. The second part is a questionnaire to measure respondents' perceptions about the implementation of the learning process which is described in several indicators, namely the completeness of learning tools, skills in using learning models, application of TPACK in learning, classroom management skills, use of learning time, ability to integrate critical thinking, creativity, collaboration, Communication in learning, the ability to develop high-level thinking, the ability to use a pleasant learning atmosphere, process assessment skills, skills to assess learning outcomes based on HOTS, the ability to provide reinforcement to the ability to close learning . The third part is the implementation of evaluation in the learning process which is described in several indicators, namely identifying obstacles that occur during the learning process, discrepancies between design and implementation, causal factors, alternative solutions, follow-up designs for learning improvements.

The descriptive survey conducted was a data collection tool in the form of a questionnaire that was created and distributed to PPG teachers in 2020 who were studying at the Medan State University. The sample used was 212 teachers who were used to analyze teacher performance in the application of TPACK, Concept HOTS, and Stimulation of 21st century life skills in learning.

The stages of the process to be carried out in this research are as shown in the following research flow chart:
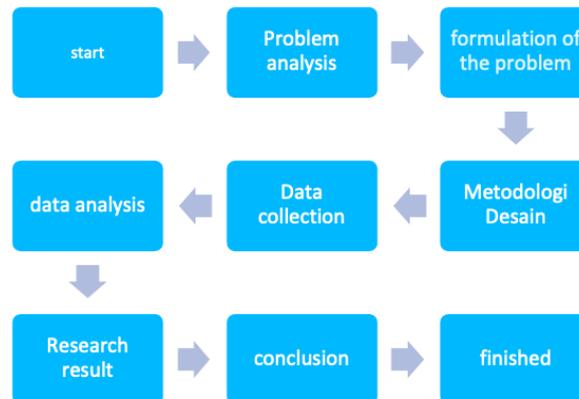

Figure 2. Research Flowchart

RESULTS AND DISCUSSION
Teacher Professional Development

Based on the results of the data analysis of the teacher professional development variables obtained through the calculation of the frequency and percentage of the acquisition of teacher professional development data, the following is a recapitulation of the results of respondents' answers about teacher professional development

Table 1. Teacher Profession Development Variables

Teacher Professional Development Measure	Category Options	Frequency (f)	Percentage (%)
Very Ineffective	1	8	3.77
Ineffective	2	26	12.26
Effective enough	3	67	31.60
Effective	4	98	46.23
Very effective	5	13	6.13
Amount		212	100

From the table above, it can be seen that the teacher's professional development in the table that 46.23% of all respondents studied said it was effective. Thus it is known that the effectiveness of teacher professional development is effective. Based on data processing, the effectiveness of teacher professional development at Medan State University is in the effective category. This is evidenced by the results of the calculation of the answers to the questionnaire from 212 respondents and shows the results of 46.23%. While the calculation results obtained are based on the answers to the questionnaire regarding the development of the teaching profession in which there are indicators. The above data is also supported (Putri & Imaniyati, 2017) which states that there is a significant influence between the development of the teaching profession, with an increase in teachers followed by an increase in teacher performance. Efforts to continue to develop the teaching profession are a matter of concern. Improving the quality of educators will encourage an increase in the quality of education, both in terms of process and results. The same thing was also expressed (Muizzuddin, 2019).There are four strong reasons that encourage teacher educators to develop professionalism, namely: The professionalism of a teacher is absolutely necessary in the teaching and learning process, because the teacher is the lifeblood in the success of the process. Teachers are declared professional if they meet several requirements, these factors include: 1). Professionalism of the Teaching Profession. 2). Teacher Professional Authority, 3). Academic Freedom, 4). Moral Responsibility and Accountability of position, moral responsibility (responsible).
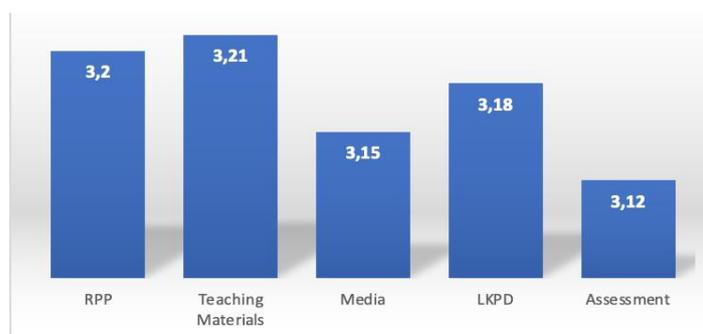

Figure 3. Device Development Indicators

Based on the data obtained, the highest score is on the indicator of the development of teaching materials with a score of 3.21 while the score with the lowest answer is the development of learning assessment with a score of 3.12. On the indicator of the development of teaching materials having the highest score with the facts on the ground, we can conclude that teachers have many references for teaching materials, both in the form of textbooks and in digital form to support learning. As for the indicator of developing a HOTS-based learning assessment, it has the lowest score of 3.12, which means that the reality in the field is that there are still many of our teachers who find it difficult to understand the questions and assessors are in the form of HOTS so that it is reflected in the learning process. The learning implementation indicator data is supported (Fanani, 2018) statement which states that teachers must have the knowledge and expertise to support their work, so that they can develop students' higher-order thinking skills. The assessment developed by the teacher is expected to encourage the improvement of higher-order thinking skills, increase creativity, and build the independence of students to solve problems.

Based on the existing data on the indicators of the implementation of learning, the highest score is on the use of learning time with a score of 3.38 while the score of 3.09 with the lowest answer

is on the indicators of developing HOTS questions. The use of time has the highest score with the facts in the field, it can be concluded that after completing the professional education, the teacher's responsibility in teaching is much better. Including time management in learning, PPG can provide new enthusiasm for implementing their knowledge in learning, especially in the classroom. As for the HOTS question development indicator with a score of 3.09, there are still many teachers who have difficulty developing it, because the teachers themselves are still difficult to understand and still need a lot of practice.
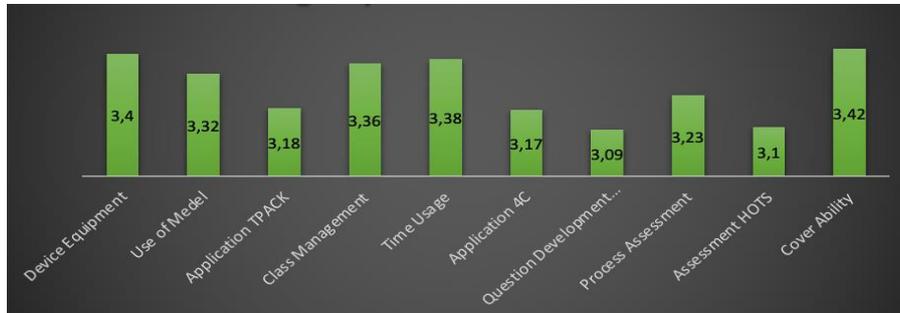

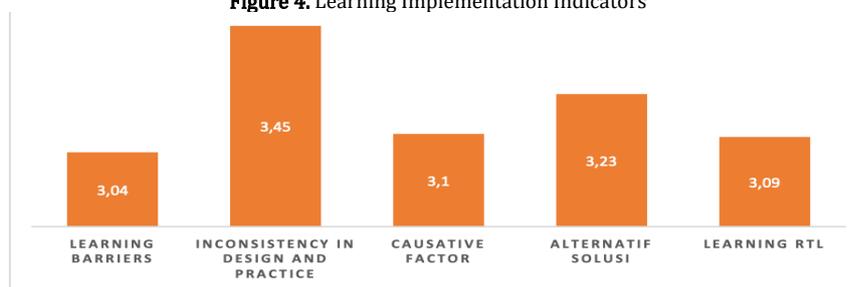**Figure 4.** Learning Implementation Indicators

Figure 5. Learning Evaluation Indicators

Based on the data available on the learning evaluation indicators, the highest score was found in the discrepancy between the learning design and practice with a score of 3.45 and learning difficulties with a score of 3.04. The discrepancy between the learning design and the learning practice that has the highest score, it can be concluded that learning in the classroom is often different from what has been designed by the teacher such as the use of learning models, there are still many teachers who design lesson plans with the application of learning models in it, but in reality the teaching practice of the teacher is more Many explain by continuing to use conventional teaching models where learning is still teacher-centered. As for the learning obstacle indicator, it has a score of 3.04, which means that every learning process carried out by the teacher always has obstacles, but the obstacles faced can be a follow-up plan that can be improved in the next learning process. Through educational evaluation, it can be seen the learning progress that students continue to experience, both regarding what has been obtained or what has been known and also with it can plan what should be done in the next round (Achadah, 2019). This evaluation is the responsibility of teachers and principals. The criteria used to carry out the learning evaluation are (1) consistency with the activities contained in the learning program, (2) implementation by the teacher, (3) implementation in terms of students, (4) attention shown by students to ongoing lessons, (5) activities of students in the learning process, (6) opportunities provided to apply the results of lessons, (7) opportunities and quality of individual guidance provided to students, (8) patterns of interaction between teachers and students, (9) opportunities to get continuous feedback, and (10) free from negative side effects. (Nuriyah, 2014)stated that the implementation of teaching and learning has consequences for teachers to increase their roles and competencies, because the teaching and learning process and student learning outcomes are largely determined by the role of competent teachers. Competent teachers will be better able to create an effective learning environment and will be better able to manage their classes, so that student learning outcomes are at an optimal level. One of the teacher's roles in the teaching and learning process is as an evaluator.

CONCLUSION

Teacher profession development that measured by indicators of learning design with clear tools, integrating TPACK, HOTS concepts and 21st century skills stimulation into designed learning, whether it be RPP, teaching materials, the use of learning models, IT-based learning media, LKPD and Assessment of study outcomes based on HOTS in learning at the effective category.

While the implementation of the learning process is measured by indicators of completeness of learning tools, skills in using learning models, application of TPACK in learning, classroom management skills, use of learning time, ability to integrate critical thinking, creativity, collaboration, communication in learning, ability to develop high-level thinking , the ability to use a pleasant learning atmosphere, the skills to conduct process assessments, the skills to assess learning outcomes based on HOTS, the ability to provide reinforcement to the ability to close learning can provide new enthusiasm for implementing their knowledge in learning, especially in the classroom.

And evaluation in the learning process is measured through indicators of identifying obstacles that occur during the learning process, discrepancies between design and implementation, causal factors, alternative solutions, follow-up designs for learning improvements. All indicators in the evaluation of learning have a high value, this is inversely proportional to the assessment in the field which shows that it is still very necessary to provide training related to making HOTS questions in learning to further improve teacher performance. Efforts to continue to develop the teaching profession need to continue to be a concern because improving the quality of teachers will encourage the improvement of the quality of students.

REFERENCES

Achadah, A. (2019). Evaluasi Dalam Pendidikan Sebagai Alat Ukur Hasil Belajar. *An-Nuha : Jurnal Kajian Islam, Pendidikan, Budaya Dan Sosial*, *6*(1), 97–114. https://doi.org/10.36835/annuha.v6i1.296

Fanani, M. Z. (2018). STRATEGI PENGEMBANGAN SOAL HIGHER ORDER THINKING SKILL (HOTS) DALAM KURIKULUM 2013 Moh. Zainal Fanani IAIN Kediri. *JURNAL PENDIDIKAN ISLAM*, *2*(1).

Guzman, A., & Nussbaum, M. (2009). Teaching competencies for technology integration in the classroom. *Journal of Computer Assisted Learning*, *25*(5). https://doi.org/10.1111/j.1365-2729.2009.00322.x

Jankingthong, K., & Rurkkhum, S. (2012). Silpakorn university international journal. *Silpakorn University Journal of Social Sciences, Humanities, and Arts*, *12*(2).

KEMENDIKBUD RI. (2016). Permendikbud RI Nomor 20 Tahun 2016. *Permendikbud*, *53*(9).

Koehler, M. J., & Mishra, P. (2005). What happens when teachers design educational technology? the development of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research*, *32*(2). https://doi.org/10.2190/0EW7-01WB-BKHL-QDYV

Koehler, M. J., Mishra, P., & Cain, W. (2013). What Is Technological Pedagogical Content Knowledge (TPACK)? matthew j . koehler , punya mishra , and william cain , michigan state university. *Journal of Education*, *193*(13).

Lailatussaadah, L. (2015). Upaya Peningkatan Kinerja Guru. *Intelektualita*, *3*(1), 243106.

Mishra, P., & Koehler, M. . (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge Related papers. *The Development of Technological Pedagogical Content Knowledge in a Design Seminar*, *108*(6), 1017–1054.

Muizzuddin, M. (2019). Pengembangan Profesionalisme Guru dan Peningkatan Kualitas Pembelajaran. *Jurnal Kependidikan*, *7*(1). https://doi.org/10.24090/jk.v7i1.2957

Nuriyah, N. (2014). Evaluasi pembelajaran: Sebuah Kajian Teori. *Jurnal Edueksos*, *3*(1). https://doi.org/10.1165/rcmb.2013-0411OC

Pasani, C. F. (2018). TPACK Untuk Mengembangkan HOTS dan Berbagai Literasi. *Senpika I*.

Putri, A. D. K., & Imaniyati, N. (2017). PENGEMBANGAN PROFESI GURU DALAM MENINGKATKAN KINERJA GURU. *Jurnal Pendidikan Manajemen Perkantoran*, *2*(2), 93. https://doi.org/10.17509/jpm.v2i2.8109

Siswono, T. Y. E., Hartono, S., & Kohar, A. W. (2018). Effectiveness of project based learning in statistics for lower secondary schools. *Egitim Arastirmalari - Eurasian Journal of Educational Research*, *2018*(75). https://doi.org/10.14689/ejer.2018.75.11

Subagiyo, L., & Safrudiannur. (2014). Penerapa Strategi Pembelajaran pada Kurikulum 2013 Pada Jenjang Sd, Smp, Sma Dan Smk Di Kalimantan Timur Tahun 2013/2014. *Pancaran*, *3*(4).

Thomas, A., & Thorne, G. (2009). How to increase higher order thinking. In *Metarie, LA: Center for Development and Learning* (p. 264). https://eric.ed.gov/?id=ED421544

Yee, M. H., Widad, O., Jailani, Y., Tee, K. T., Razali, H., & Mimi Mohaffyza, M. (2011). The Level of Marzano Higher Order Thinking Skills among Technical Education Students. *International Journal of Social Science and Humanity*, *1*(2).

Yvonne, W., Rahman, R. H. A., & Long, C. S. (2014). Employee job satisfaction and job performance: A case study in a franchised retail-chain organization. *Research Journal of Applied Sciences, Engineering and Technology*, *8*(17). https://doi.org/10.19026/rjaset.8.1176