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Seamolec Training to Improve the Ability of *TPACK* Teachers in Adi Soemro's Space School

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Abstract

Purpose: Traning seamolec is an institution under the auspices of SEAMOE (Organization of Southeast Asian Ministers of Education) which facilitates research, improvement, courses and technology exchange within and outside the field of offline education and distance education (online) throughout Southeast Asia. The Ardhya Garini Foundation (YASARINI) which houses Space Schools throughout Indonesia including Sekolah Angkasa Lanud Adi Soemarmo collaborates with SEAMOE to facilitate teachers in improving TPACK skills through the seamolec training program. This research uses a qualitative research paradigm. In technical data collection using observation, interviews, and analysis. In this study, researchers used source triangulation techniques and trianggulation techniques to obtain valid data results. The result of this research is that seamolec training activities attended by Angksa Lanud Adi Soemamo school teachers succeeded in improving TPACK capabilities in the era of society 5.0. So that in the implementation of learning teachers can integrate pedagogical abilities and content into technology. In this way, it can be seen that the Angkasa Lanud Adi Soemarmo school teachers have qualified professionalism because they are able to keep up with technological developments in the era of society 5.0 through seamolec training.

Introduction

The driving force in the learning process within the scope of the school is none other than the teacher. This is because teachers as educators have a great responsibility for the success of the educational goals that have been set (Wandani, 2022). The era of society 5.0 places demands on education so that it can integrate society with technology (Arifin, 2022), then of course a teacher must be able to integrate pedagogical abilities, professional abilities and technology in learning (Sintawati and Indriani, 2019). Where Koehler, Mishra, & Cain state that these three capabilities are core components of *Technological Pedagogical Content Knowledge (TPACK)* (Koehler and Mishra, 2013).

According to Suryawati, *TPACK* is a relationship between technological knowledge, pedagogy, and content that must be mastered by teachers. The *TPACK* framework defines three new knowledge plus technological elements, namely Technological Knowledge (TK), Technological Content Knowledge (TCK), and Technological Pedagogical Knowledge (TPK) (Suryawanti. dkk, 2014). *TPACK* is very important for a teacher to have because it affects the way of teaching a material in this technological era. But it is not in line with the TPACK capabilities possessed by Indonesian teachers, because it is known from data from *The World Economic Forum Sweden*, Indonesia is not predicated as a leader, far from that, Indonesia is only a technological follower of 53 countries in the world. One of the reasons is the ability of *TPACK* teachers who are still below standard so that there is a gap in education levels, especially between countries in Southeast Asia. This will certainly affect the professional level of work(Garrido.dkk, 2023).

Such teacher problems in Indonesia then result in a level of teacher quality that is not yet good, this is proven by data obtained from Unesco in the Global Education Monitoring Report that in 2016 the quality of teachers in Indonesia was ranked last out of 14 developing countries. So it is not surprising that education in Indonesia is ranked 10 out of 14 developing countries (Utami, 2019).

If analyzed more deeply, the era of society 5.0 as it is today provides many benefits in the world of education, but there are also many problems that then arise. Just like the old generation teachers who have difficulty integrating learning with increasingly sophisticated and diverse technologies, so if they have urgent tasks related to technology, ask for help from other fellow teachers who are more aware of technology. Such a culture is found almost in existing education units, especially in state schools, so that it will result in dependence and the teacher has no encouragement to learn which will certainly have a bad impact on the quality of existing education.

Even though it is known that the number of teachers with the old generation has a considerable percentage as per 2022 according to the Ministry of Education and Culture (Kemendikbud) launched data that teachers aged 50-59 years are

27.31% of the total teachers in Indonesia, namely 2,906,239, then teachers aged 40 to 49 years are 23.79%. Then there are teachers of retirement age (60 to 65 years) who are still serving a total of 51,391.

According to Darling-Hamond & Goodwin (1993) in a job is called professional if it has at least a structured internal mechanism, one of which regulates training for its workforce (Hammond and Goodwin, 1993). As the Ardhya Garini Foundation (YASARINI) which houses space schools throughout Indonesia has a *seamolec training* program for all teachers in their respective education units, whether kindergarten, elementary, junior high, high school or vocational school, both young teachers and old teachers. *Seamolec* training is a technology-based learning media training activity such as digital game-based learning, social media-based learning, digital comic-based learning and so on. Of course, the goal is that teachers in all space schools can master and apply *TPACK* in the learning process.

Past Research

In relation to the research topics raised in the era of society 5.0, there are many developments in the world of education, one of which is related to online learning simulated by the Seamolec platform. Yuly and Pradana conducted research related to the effectiveness of internet of things learning using seamolec through PJJ (distance learning) in Southeast Asia. Then the learning model system used is blended learning. The results of this study show that there is an increase in students' understanding of the internet of things (Yuli. dkk, 2023).

Still related to seamolec, Soekartawati conducted research related to the obstacles in the application of the seamolec system experienced by the center. Through his research, he can detect existing difficulties in the selection of delivery methods, selection and provision of technology, choice of software, provision of infrastructure, preparation of course design, cost-effectiveness of programs and overcoming quality assurance (Soekartawati, 2005).

Various studies that focus on developing teacher competence in applying digital media in their learning are also found, aswell as research conducted by Dandi Sunardi, Eka Sahputra and Agung Kharisma Hidayah whose results are from training activities in making multimedia-based learning media using wondershare filmora very software Function well in developing teachers' digital competencies, where with this training teachers become experienced in good quality image / video shooting techniques, as well as video editing practices (Sunardi.dkk, 2021).

Still with the same research theme, Prima Nucifera1, Muhammad Yakob and Setyoko conducted research related to digital-based learning media training for teachers whose results were through training the existing teachers have 2 digital-based learning media product innovations, namely e-books or digital comics. So it is clear that the trainings make teachers have new innovations in the use of technology-based learning media (Nucifera. dkk, 2022).

Through the presentation of the results of previous research, it can be seen that research related to **"Seamolec Training to Improve TPACK Teacher Ability"** has never been specifically conducted.

Method

By considering the discussion raised, this study uses a qualitative research paradigm. According to Bogdan and Taylor in Moleong qualitative research is research that in obtaining data to analyze the conclusions compiled through words or sentences, not in the form of numbers (Tanzeh, 2022).

The scope of this research is about technology-based education. Then looking at the background taken by the researcher, this research is a field research or filed research which means research conducted in real life (Kartono, 1981), where this study examines objective conditions in the field based on observations and direct interviews about *seamolec training* to improve the ability of *TPACK* in teachers at Sekolah Angkasa Lanud Adi Soemarmo . Then this research method is a descriptive type, this is because the researcher will describe in detail related to the reality that occurs. The descriptive qualitative approach is an approach based on natural object conditions (as opposed to experimental) (Sugiyono, 2016).

This research was conducted at Sekolah Angkasa Lanud Adi Soemarmo both kindergarten, elementary and junior high school involving 1 member of the Ardhya Garini Foundation branch of Lanud Adi Soemarmo as an informant. Then the subjects are 2 Angkasa Lanud Adi Soemarmo Kindergarten teachers, 3 teachers and 1 student of SD Angkasa Lanud Adi Soemarmo, then 3 teachers and 2 students of Angkasa Lanud Adi Soemarmo Junior High School with teacher qualifications over the age of 45 years. This is done to find out how the *TPACK* ability of old teachers through *seamolec training.*

In this study, the type of interview used was an open and structured interview. Open interview means that the subject knows that they are being interviewed, then the interview is structured to mean that the interviewer has set his own problems and questions to be asked to the subject and research informant.

This study uses the data analysis of the Miles and Huberman model, which has 4 stages, namely as follows:

Data Collection, collecting data from interviews, observations and various documentation data based on categorization in accordance with research problems, namely related to *seamolec training* in improving *TPACK* capabilities

Data Reduction, after the data is collected, coding, translating, focusing, and disposing of unnecessary data is carried out so that it becomes a simple pattern and arrangement.

Display Data, summarize and focus the data according to the point studied, then check the adequacy and completeness of the data that has been summarized, after the data is sufficient and complete, further intensive analysis is held, but if the data is still lacking, a search for data is carried out again.

Verification, drawing conclusions is the last step of the data analysis process.

Triangulation of sources and techniques in this research was used to test the validity of the data. Where researchers will compare data obtained from the results of one source with another source. Then the researcher will also compare the data obtained from observation, interviews and documentation so that the suitability of the data from the three data collection techniques will be known, the purpose of which is to produce appropriate and reliable data.

Result and Discussion

Result

The Ardhya Garini Foundation, which houses Angkasa schools throughout Indonesia, including Sekolah Angkasa Lanud Adi Soemarmo, has a special training program for its teachers in improving *their TPACK* competencies. The training is a *teamolec training* program. As of July 8, 202,1 YASARINI began to become Seamolec's partner by signing the existing *memorandum of understanding* (MoU) (Seamolec, 2021).

Seamolec is an institution under the auspices of SEAMOE (Organization of Southeast Asian Ministers of Education) that deals with research, development, training, technology exchange, and sharing of expertise and resources within and outside the region in the field of open education and distance education (PJJ) throughout Southeast Asia. Then the Director of *SEAMOLEC* explained that the establishment of this partnership aims to make schools learn together remotely by utilizing information technology. In addition, there are other forms of cooperation, namely student exchanges, teacher exchanges and teacher training SEAMOLEC was founded in order to provide programs that are appropriate and cooperative with national needs, especially in the realm of open and distance learning. where it is SEAMOLEC can assist SEAMEO member countries in introducing and supporting open and distance learning as another way to meet education and training demand. (Sunnah, 2014).

This *seamolec training* program is carried out every one to two months. In each implementation, school unit Acan only send two to four teachers, so that in its implementation the principal will schedule together the teacher participants who will take part in the *seamolec training*.

This *seamolec* training program is a training for Angkasa teachers related to the use of technology-based learning media. There are so many learning media taught through this seamolec traning, and the tenu all breathe technology. As well as learning using social media, learning through digital comic media, learning through online games, learning through digital cartoons and so on.

It is known that the purpose of this *seamolec* traning is also so that students do not feel bored in participating in learning activities because it uses innovative media and of course in the interest of children in this digital era. In addition, the teachers will also be trained to develop their *TPACK* skills. It is known that there are three TPACK figures, namely Technological Knowledge (TK), Technological *Content* Knowledge (TCK), and *Technological Pedagogical Knowledge* (TPK). Through one of the informants confirmed that the ability of *TPACK* in teachers has the potential to develop, because the *seamolec* traning program has a sustainable nature, where after the traning is completed the teachers have the task of making learning videos in the classroom using the same media In accordance with the material that has been given when *traning*.

The implementation of this seamolec training was carried out three to four days online using *Zoom Meating*. Usually, the teachers in charge of participating in this *training* will carry out it together, such as what happened at the Adi Soemarmo Space Lanud School, namely kindergarten, elementary and junior high school, the teachers on duty will work together at the ICT Laboratory of SD Angakasa Lanud Adi Soemarmo, this is done to facilitate two-way discussions if there are obstacles or difficulties experienced during the traning process.

Every day at the end of the Seamolec training event, *Seamolec* operators will give tasks related to the material that has been delivered on that day, then will be given a *Google Forms* link to collect ready-made assignments. In the process, participating in this *training* must be done seriously because at the end of the program will get a task that determines whether or not the certificate of *seamolec* activities can be obtained. This *seamolec* certificate has a certificate that depends on the quality of the assignments made by each teacher.

This certificate is very important to have for a career path within the Foundation. Because this certificate can be used to register outstanding teachers in FESA (Space School Education Festival) activities which are held once per year. In addition, teachers who get a high level on their certificates will get a special opportunity to become trainers in *the following month's seamolec* activities. So that this *seamolec* activity will also hone the competitive power of teachers in competing to become digital teachers dreamed of by Angkasa schools.

In addition, this certificate certainly also serves for career advancement outside the foundation, because this *training* breathes technology anywhere in the era of society 5.0 This requires educators who have a lot of experience related to technology-based education.

Then teachers who have participated in seamolec training also have an additional task, namely to socialize the knowledge gained from *seamolec training* activities to all teacher partners in their respective Angkasa schools. Usually, socialization of the results of participating in *seamolec training* is carried out during teacher meetings. Teachers who have attended *the seamolec training* also have the obligation to guide other partners until they can use the knowledge they have

provided. This is done so that all teachers can practice learning activities using technology-based media in accordance with what has been conveyed during the *seamolec training* program. With the aim of the learning process carried out at school is not boring and keeps up with the times.

Through interviews with several research subjects (teachers) who have the age of over 50 years stated that in the learning process almost 90% use technology-based learning media. It is also confirmed by some students that they are always enthusiastic about going to school to learn because they feel that the learning is very fun with various learning media technology that is close to his daily life.

Several subjects and informants also confirmed that the *seamolec training* program was not only taught about the use of technology-based learning media, but also taught how to To choose its use in the right situation and conditions, how to analyze student needs and interests, how to mix and match content, learning strategies and learning media that exists.

Disscusion

In order to become a professional teacher, teachers must be able to adapt to advances that occur, especially in the field of education. It is known that education is currently in the era of society 5.0 which requires teachers to be able to integrate technology both physically and non-physically in the learning process.

The teacher framework that is in accordance with the demands of education in the era of society 5.0 is covered in the *TPACK* concept. *TPACK* is the ability of teachers to integrate content, pedagogy, with technology in the learning process. *This TPACK* ability must be possessed by all teachers, both young teachers and old teachers. This is so that all teachers are able to adapt to the rapid development of society 5.0. So that the professionalism of teachers will be maintained, and of course will affect the progress of education in Indonesia.

As the Ardhya Garini Foundation (YASARINI) which houses space schools in the cells of Indonesia, including the Adi Soemarmo Lanud Angkasa school, held training on the use of digital media for its teachers through the *Kaum Seamolec* traning program. This seamolec tranning is known to be very useful for the development of *teachers' TPACK* abilities. Where the TPACK components that can be mastered by Angkasa Lanud teacher Adi Soemarmo through the seamolec traning program include:

First, Technological Knowledge (TK) (Huang. dkk, 2022), by following the seamolec traning the teachers can then find out the right technologies used for their learning. Where teachers are increasingly active and innovative in practicing their learning using technology-based learning media. In addition, through *seamolec traning*, teachers are also able to develop broader and actual learning materials with daily life that cannot be separated from technological cycles.

Second, *Technological Content Knowledge (TCK)* (Nguyen. dkk, 2019), through *transning seamolec* teachers are able to make new representations in the process of transferring learning materials, for example teachers can deliver material through online games played during the learning process, so as to change the mindset of students that learning can be through the media they like, so that boredom or boredom in learning is no longer heard.

Third, *Technological Pedagogical Knowledge (TPK)* (Guillén. dkk, 2021), through *seamolec training* teachers become wise in analyzing the use of digital media in learning in accordance with the content, situation and conditions. Guru then also has the ability to develop and evaluate various approaches and strategies used in learning. This is because teachers have a lot of experience and information about how to design classes through traning *seamolec*. So that when the teacher delivers the material in the classroom, the students can easily grasp and understand it, because of the teacher's accuracy in designing and sorting out approaches.

The explanation above certainly gives a very clear picture that through *seamolec training* the teachers are then able to develop their *TPACK* abilities. As in Sekolah Angkasa Lanud Adi Soemarmo which proves that teachers with the old generation are able to practice technology-based learning, especially with generation teacher millennials whose technology has been attached to him since childhood so it will be very easy to develop the ability of *TPACK.*

Conclusion

The Seamolec training activity which was attended by Angksa Lanud school teacher Adi Soemamo succeeded in improving TPACK capabilities in the era of society 5.0, which includes technological knowledge, technological content knowledge and technological pedagogical knowledge. Where the TPACK ability is evenly distributed, meaning that not only certain groups of teachers can master it, but all teachers can master the TPACK ability, whether they are young teachers or old teachers. Through this seamolec training, the learning activities at the Angkasa Lanud Adi Soemarmo school are not boring, especially in this era of society 5.0 which links all factors of life with technology, so it is the right step for the YSARINI management to facilitate its teaching staff to take part in seamolec training. In this way, it can be seen that the teachers at Angkasa Lanud Adi Soemarmo school have qualities that are adequate in this era of society 5.0.

Reference

Darling-Hammond, L. & Goodwin, A. L. 1993. *Progress toward Professionalism in Teaching Dalam: G. Cawelti (Ed). Challenges and Achievements of American Education*. Alexandria: ASCD.

Garrido-Abia, R., D. García-Lázaro, and M. A. Marcos-Calvo. 2023. "Virtual Education in University Teaching. Application of the TPACK Model in Quantitative Subjects." *Intangible Capital* 19(1):55–68. doi: 10.3926/ic.2109.

Guillén-Gámez, F. D., M. [a]J. Mayorga-Fernández, J. Bravo-Agapito, and D. Escribano-Ortiz. 2021. "Analysis of Teachers' Pedagogical Digital Competence: Identification of Factors Predicting Their Acquisition." *Technology, Knowledge and Learning* 26(3):481–98. doi: 10.1007/s10758-019-09432-7.

Huang, H., G. J. Hwang, and M. S. Y. Jong. 2022. "Technological Solutions for Promoting Employees' Knowledge Levels and Practical Skills: An SVVR-Based Blended Learning Approach for Professional Training." *Computers and Education* 189. doi: 10.1016/j.compedu.2022.104593.

Imam Arifin, Muh. Nur Rochim Maksum dan Muthoifin. 2022. ", Implementation of the Principles of Islamic Religious Education Curriculum Development at Al Hadi Mojolaban Sukoharjo Islamic Junior High School in 2021/2022." *Jurnal Pendidikan Amartha* 1(2):46–61.

Kartono, Kartini. 1981. *Pengantar Metodologi Riset Sosial*. Jakarta: Gramedia Pustaka.

Matthew J. Koehler, Punya Mishra, And William Cain. 2013. "What Is Technological Pedagogical Content Knowledge (TPACK)?" *Journal Of Education* 1(3):13–19.

Mukti Sintawati & Indriani, F. 2019. "Pentingnya Technological Pedagogical Content Knowledge (Tpack) Guru Di Era Revolusi Industri 4.0. Seminar Nasional Pagelaran Pendidikan Dasar Nasional (PPDN)." Pp. 417–422. in *Pentingnya Technological Pedagogical Content Knowledge (Tpack) Guru Di Era Revolusi Industri 4.0. Seminar Nasional Pagelaran Pendidikan Dasar Nasional (PPDN)*.

Nguyen, V. T., R. Hite, and T. Dang. 2019. "Learners' Technological Acceptance of VR Content Development: A Sequential 3-Part Use Case Study of Diverse Post-Secondary Students." *International Journal of Semantic Computing* 13(3):343–66. doi: 10.1142/S1793351X19400154.

Nucifera, Prima, Muhammad Yakob, and Setyoko Setyoko. 2022. "Pelatihan Media Pembelajaran Berbasis Digital Bagi Guru Di SMPN 1 Rantau Selamat Aceh Timur." *ABSYARA: Jurnal Pengabdian Pada Masyarakat* 3(2):217–25. doi: 10.29408/ab.v3i2.6277.

Seamolec, Staf. 2021. "SEAMOLEC Info." *Seamo Regional Open Learning Centre* XXIII(68):18.

Sinta Diah Ayu Wandani, Dkk. 2022. "Principal's Strategy in Developing Teachers' Pedagogic Competencies in the Distance LearningNo Title." *Jurnal Iqra': Kajian Ilmu Pendidikan* 7(2):226–45.

Soekartawi. 2005. "Constraints in Implementing ?E-Learning? Using WebCT: Lessons from the SEAMEO Regional Open Learning Center." *Malaysian Online Journal of Instructional Technology (MOJIT)* 2(2):97–105.

Sugiyono. 2016. *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. Bandung: Alfabeta.

Sunardi, D., E. Sahputra, and A. K. Hidayah. 2021. "Pelatihan Pembuatan Media Pembelajaran Berbasis Multimedia Untuk Meningkatkan Kualitas Pembelajaran Bagi Guru SMA Muhammadiyah 4 Kota Bengkulu." *Jurnal Pengabdian Masyarakat Teknologi Terbarukan* 1(1):29–34.

Sunnah, Ahlusi. 2014. "Evaluasi Pelaksanaan Program Seamolec Di SMK Daerah Istimewa Yogyakarta." *Jurnal Pendidikan Vokasi* 4(2):140.

Suryawati, E., Firdaus, L. N., & Hernandes, Y. 2014. "Analisis Keterampilan Technological Pedagogical Content Knowledge (TPCK) Guru Biologi SMA Negeri Kota Pekanbaru." *Jurnal Biogenesis* 11(1):68-72.

Tanzeh, Ahmad. 2011. *Metodologi Penelitian Praktis*. Yogyakarta: Teras.

Utami, Sri. 2019. "Meningkatkan Mutu Pendidikan Indonesia Melalui Peningkatan Kualitas Personal, Profesional, Dan

Strategi Rekrutmen Guru." *Prosiding Seminar Nasional Pendidikan FKIP Universitas Sultan Ageng Tirtayasa* 2(1):518–27.

Yuly, A. R., H. Pradana, D. R. Ramdania, D. W. Nurhidayati, and Y. Prihadnyana. 2023. "Effectiveness of IoT Learning Using SEAMOLEC Platform through Distance and Open Education." in *AIP Conference Proceedings*. Vol. 2646, edited by A. A.G., N. A.R., M. D., R. E., T. F., H. M.P., and A. S.D. Department of Informatics and Computer, Politeknik Negeri Jakarta, Jl. Prof. DR. G.A. Siwabessy, Kukusan, Beji District, West Java, Depok City, Indonesia: American Institute of Physics Inc.