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Teacher's Implementation Capability: The TPACK-Based Curriculum Learning Model with Countenance Evaluation

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The teachers should implement curriculum in learning activities. Teacher must follow the learning process during the Industrial era 4.0 based on Technology, Pedagogic, Content, and Knowledge (TPACK). This research aims to examine and describing the teacher's ability to implement the learning process with the assistance of the 'TPACK-Based Curriculum'. The research will focus on countenance evaluation models for the 1) antecedents, 2) transactions and 3) results. TPACK is a method and strategy for teachers to convey knowledge to students – to facilitate student learning. It is useful for planning special content (subject matter) through to pedagogic learning and technology utilisation and development. The research subjects were 45 teachers from 16 Junior High Schools in Banjarmasin. The informants were selected by purposive random sampling techniques. The data was collected by questionnaires, documentation, observation and interviews. The data were analysed by descriptive qualitative analysis to compare and examine the interrelationships between the countenance evaluation models to reveal the goals and expectations of TPACK - based learning activities.

Key words: *Teacher Ability, TPACK, 2013 Curriculum, Countenance Evaluation.*

Introduction

The Indonesian teachers require a new curriculum implementation to master the content, pedagogy and learning technology. Teachers should utilise and applying an information learning technology process in their classroom. The latest learning challenge comes from Industrial era 4.0. It requires Indonesian teachers to have the ability to use curriculum packages such as Technological Pedagogical and Content Knowledge abbreviated as TPACK. TPACK requires knowledge about how to facilitate student learning from certain content through pedagogical and technological approaches (Cox, S., & Graham, C. R, 2009; Mishra & Koehler, 2006; Shulman, 1986). TPACK has potential to provides new directions for teachers to solve problems related to ICT integration into teaching and learning activities in the classroom (Chai, C. S., Koh, J. H. L., Tsai, C. C., & Tan, L. L. W. 2011). Li et al. (2020) and Dastile et al. (2020) stated that ICT integration into learning activities should facilitate the teachers to answer the learning challenges in Industrial era 4.0.

The challenge for teachers in Industrial era 4.0 is curriculum adaptation and literacy. The curriculum adaptation can improve student comprehension. Industrial era 4.0 uses future of technology and information to provide billions of knowledge data to anyone who can access it (Irawan, Y. S., & Koesoema, A. P., 2015). The teachers cannot monopoly the value of knowledge. Information technology makes people live in the world where the knowledge can be accessed by anyone.

Teachers need digital, scientific, cultural and citizenship, and critical literacy in industrial era 4.0. The communication space on social media is so broad and easy. Various patterns and issues need clarity to understand. The depth of analysis and clarity of mind facilitates to discuss other aspects of social media development. Otherwise, it is difficult for teacher to determine whether the content is deceptive or inspirational.

This situation certainly calls for the role of teachers as instructors and providers of knowledge to be revitalised. Advances in information access have made teachers lose their jobs. Various interactive learning programs have begun to be designed using pedagogical methods and learning theories that have proven their effectiveness through experiments and field research. Learning activities also began to vary. Learning that is mostly done in classrooms (Synchronous) becomes more flexible so that learning activities can be done anywhere, anytime, and with anything (Asynchronous). The emergence of a Learning Management System (LMS) program and various learning resources creates many learning models. There is blended learning, hybrid learning, distance learning, web-based learning, open and distance learning, and many other models. Everything refers to learning flexibility.

This condition requires holistic thinking. It is enough to see a patchwork of curriculum policies change into bad experiences in history of educational development. The curriculum

change strategy is not effectively overcoming the problem of education which calls for the equalizing of national education with our neighbours such as Singapore and Australia. The curriculum is not anti-biotic to overcome all educational diseases. In fact, curriculum changes actually add new problems in education, especially for teachers. Moreover, the application of 2013 Curriculum was not evenly applied for years, including in Banjarmasin City. There are many schools starting in 2018, that have not yet implemented changes. For this reason, discourse on curriculum replacement by the Minister of Education and Culture is irrelevant. Moreover, the results of the 2017 research showed that a teacher's ability to implement 2013 Curriculum for assessments and the ability of students to understand activities, especially reasoning and concluding information, was still low (Mansur, H., & Mastur, 2018).

Teachers should be able to present relevant learning under the conditions of the Digital age. Teachers only need to be give an understanding or technological literacy. Technology-literate teachers are not allergic to technological change, and its quick development. The challenges of the Industrial era 4.0 or the teacher's ability to present technology-based learning (TPACK) can be easily addressed.

The above descriptions became the basis on which to do this research with the aim of evaluating the implementation of TPACK-based 2013 Curriculum, and knowing the problems of 2013 Curriculum implementation in Banjarmasin. This study seeks data about the teacher's ability to integrate technology, pedagogy, and content in the learning process. The teacher's ability to implement TPACK-based 2013 Curriculum is analysed by the model evaluation of Countenance Stake.

Research Methods

This research is an evaluation conducted with the Countenance Stake model. The evaluation is done through a descriptive statistical analysis and consideration matrices. Descriptive matrix analysis is performed by observing and comparing between antecedents, transactions, and expected outcomes consistent with initial learning intent and the realisation (observation). The consideration, antecedent, transaction, and outcomes matrix analysis is examined and compared for the conformity with standard (referring to 2013 Curriculum and TPACK guidelines for Developed Learning Design) and gaps between standard and observations results of learning implementation (Mansur, H., 2017).

The research subjects are Junior High School teachers in Banjarmasin each with an Educator Certificate. They were from five Junior High Schools at: North Banjarmasin, South Banjarmasin, East Banjarmasin, West Banjarmasin and Central Banjarmasin Districts. The participants totalled 25 teachers consisting of 10 men and 15 women. All the teachers are

graduates (S1) in Education and none had gone to postgraduate level (S2) at the time of the study.

The data was collected with a questionnaire, documentation and observations. The questionnaire contained 24 statements adapted from an evaluation instrument of 2013 Curriculum and some researchers formulated questionnaires to get the data. The five-point Likert scale is used, starting from 1 for disagree, 2 for rather agrees, 3 for agrees, 4 for agree and 5 for strongly agrees. The second method is documentation, used to observe the teacher's teaching, completeness of documents, curriculum and syllabus, learning implementation schedule, and recapitulation of participants' values. The third method is observation. The researcher made a written record of the learning process in the form of transcripts of observations and recorded the learning process every day. All the three methods are used at the same time to get data triangulation and be able to make a comparison between questionnaires (by participants), observations (by researchers), and document observations (examining the truth and completeness of physical evidence).

The collected data is analysed via a technique used by Miles and Huberman (2002): Data reduction, data presentation, and the drawing of conclusions or verification. Data reduction is done with documents where observations were of learning material preparation skills by a teacher. Then data was collected during the learning process, and data documented observations of the recapitulation of students and teachers after the learning process.

Data presentation uses quantitative data and descriptive description methods. Data from documentation and observation techniques are presented in a narrative descriptive method. The data from questionnaires are presented in a quantitative descriptive method, based on a design research evaluation from the Countenance Stake model. The data presentation process is complemented by an analysis to include an empirical logical analysis. The conclusions or verification is done through consideration or decision as to whether the 2013 Curriculum learning implementations are consistent with the original expected objectives, and criteria based on three research foci (antecedents transaction, and outcomes) were used in a qualitative form to determine the categories of learning process achievement. The range values are presented as follows: Very good: 85% -100%, good: 70% -84.99%, sufficient: 56% -69.99%, and low 0-55.99% (Arikunto, 2010)

Research Results and Discussion

The research results are presented systematically in three components, and divided into seven sub-components. The first component is Antecedents (Baya'a, N & Daher, W., 2015). This component consists of Technology Knowledge (TK) and Content Knowledge (CK) sub-components. The second component is Transaction component, consisting of Pedagogical

Knowledge (PK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK) sub-components. And the third component is the Outcomes component, consisting of Pedagogical Content Knowledge (PCK) sub-component. The descriptions of these components are outlined below.

Antecedents (Learning Planning)

This first component shows the learning plan. The skills and abilities of teachers to prepare learning activities are presented in two sub-components: The first is their understanding of learning technology or Technology Knowledge (TK). The content of TK questionnaire covers a teacher's knowledge to overcome technical problems on computer, ease in using technology, latest technological developments update, the understanding of basic components of a computer, proficiency in the use of word processing, numbers and programs presentation, adept in using equipment (printers, scanners, projectors, and digital cameras), knowledge on storing data on digital media, and internet usage as a communication medium.

The second sub-component is Content Knowledge (CK). The CK questionnaire covers how the teacher understands the concepts, how laws and theories are taught, development history of material taught, designs and implementation of learning, latest sources for material as books and journals, attending a seminar or activity related to science being taught.

a. TK (Technology Knowledge)

A teacher's understanding on learning technology is related to a teacher competence in the 21st century. This century requires teachers to constantly improve their abilities. BSNP (2010) said that one most prominent feature of the 21st century was the higher interconnected world of science. The synergy between them becomes faster. The relationship between education and technology in the 21st century is something that is indeed important and cannot be ignored.

The 21st century is increasingly developing a narrowing of the factors of space and time. One of the constraints in determining speed and success in education is this narrowing. The enormous benefits of technology in education across the world means technology must be utilised by all elements of education, both at the regional and central levels. The Information and Communication Technology (ICT) usage in the education world has been proven to narrow the factors of "space and time" which has been the aspect used to determine the speed and success of science and its mastery by humanity. Of course, it will have a large impact on our ability to improve education quality.

Researchers communicated and met with several junior high school teachers in Banjarmasin. There were eight schools that were successfully visited and 16 teachers that were successfully met. The aim was to determine their ability in terms of Technology Knowledge (TK). Technology Knowledge is a teacher's ability to use learning technology, such as operating computers and relevant software. Interview results showed that teachers' understanding of ICT for learning is very diverse. About 35% of Junior High School teachers in Banjarmasin City have a good ability when using ICT in schools. 20% of teacher have sufficient or moderate skills, and the remaining 45% teachers do not understand or have never used ICT for learning.

Understanding ICT is the ability to design and plan for learning using computers, the internet, e-books, and smart phones. As a result of a lack of understanding and ability to use ICTs, ultimately the use of e-learning is felt to be less applied in learning environments researched (if not said to be non-existent). This was seen based on the results of field observations, and we often found the use of methods and media that are still oriented towards conventional learning (observation in State Junior High School 7, 14, and 8 on November 12, 2018).

Teachers with a good and sufficient understanding of ICT have the ability to make Developed Learning Design. These include the use of internet, computers, smart phones and LCDs for learning media. They also use e-books and internet as learning materials. It can be interpreted that teachers' understanding of ICT usage is very diverse, but overall participants expressed a low level grasp in the use of ICT. This means many teachers used conventional methods and mediums such as full lecture method or drawing and whiteboard media only. This condition occurs because of the involvement of stakeholders who rarely train the teachers. It means teachers have a low understanding in the use of more modern media and methods.

A teacher's Technological Knowledge on average was not good (29.15%) in terms of preparing Developed Learning Design, especially media learning. It illustrates that a teacher's ability to use Information Technology still needs to be developed to improve the other aspects within the framework of the TPACK model. The low ability partly relates to the older age group who have a lack of knowledge around technology. It can be concluded that a teacher only knows about information technology but they do not understand how to use technology, how to go about integrating the web for student learning, or how to use conference software in learning.

b. CK (Content Knowledge)

Knowledge in science continues to grow, as well as teaching 'skills'. The rapid development of science should be anticipated by teachers. Readiness to master science should be achieved by teachers in order to face the challenges of this global era. A teacher's ability should also

continue to improve to face challenges and improve the quality of education. But in reality many teachers, especially elementary school and junior high school teachers, did not receive much training to improve their competence.

The second sub-component for the Antecedent component is the teacher's Content knowledge (CK). CK is knowledge about the subject matter to be taught (for example, earth science, mathematics, language, arts, etc.). The teacher must understand a subject being taught including knowledge of facts, concepts, theories and procedures in a particular field. They require knowledge of a framework that can organise and connect ideas and knowledge about rules, and also provide evidence of content.

There were four questions asked to teachers. They were focussed on female teachers in relation to mastering learning strategies. The research results showed the ability of these teachers to understand learning strategies was quite good. This condition was achieved because their schools have a program of learning strategy development workshops at the beginning and end of a semester. The workshops were conducted to improve a teacher's ability to modify strategies and understand subjects in subsequent learning (Hamalik, O., 2007).

The other CK abilities are the breadth of material, depth of material, suitability of material, and the development of material. About 50% of teachers showed low material preparation. The teacher was able to describe the material consistent with basic competencies that existed in the lesson plan. But the teacher had not been able to develop the material and provide the latest information related to the material. This is believed to be because of the teacher's educational background. Integrated curriculum in 2013 curriculum (2013 Curriculum) removes the separation of cognate subjects and all knowledge is integrated into the same family. This becomes a problem for teachers. The subject matter is related to Biology in the natural science subjects, while the educational background of teachers graduating from a physics-based education degree, makes a teacher lack understanding on the discussion topic.

About 70.8% teachers have good material depth. The majority of teachers have included subject matter in lesson plans, but there are still some teachers who do not include the material in detail. Material presentation can analogise the material in everyday life, so that material will be easily accepted by students. The suitability of material was 70.85% and included in the 'Good' category. Lesson plans that have been made by teachers to show the suitability of material with basic competencies, objectives and indicators, but between the material and time of lesson hours has not been found suitabile. Material development gets 50% results. Developing subject matter needs reference material. Developed Learning Design has included reference material such as LKS books, textbooks and the internet. Overall the

Content Knowledge (CK) ability of teachers gets a percentage of 60.41% which falls into the 'Sufficient' category.

A teacher also does material repetition for slow learner students. It needs to be done because slow learner students need 3 to 5 times the repetition of other students to understand a material and have a need for material simplification. The learning process of ADHD students is better than slow learner children. ADHD students actively ask questions and dare to come forward in class to express their opinions. However, these ADHD students often ask questions outside the material and are less able to accept criticism from other friends (Observations at State Junior High School 13, 5, 15, and 4 on November 27, 2018).

Transaction (Implementation / Learning Process)
A. PK (Pedagogical Knowledge)

The PK questionnaire includes learning variation by teacher, managing and mastering the class well, using various assessment methods and techniques, and taking reflective action to improve the quality of learning. In addition, PK ability covers aspects of learning strategy knowledge, learning media knowledge and evaluation knowledge. The interview, observation and questionnaire show the learning strategies have good results (65%) for sub-aspects of a learning approach. This is because in a Developed Learning Design all teachers list what approaches are used, but not detail. The learning methods and models aspect is included in the 'Good' category (75%). The teachers include what methods are used in lesson plans, namely discussion, problem-based learning, discovery learning, demonstrations and other methods. The learning media aspects are included in the 'Sufficient' category (58.35%) and instructional media is included in the 'Sufficient' category also (66.65%). The teacher has included a number of media in conventional / non-ICT based learning media and electronics such as using video, PowerPoint, e-books and appropriate media such as puzzles and the broader school environment.

Learning evaluation also needs to be done to achieve learning objectives. They can be used as consideration to improve teachers and students. The assessment is included in the 'Sufficient' category (54.2%). Cognitive assessment is included in each teacher's lesson plan, written assessment is often used by teachers by attaching multiple choice questions and descriptions. Affective assessment is done by class journals and psychomotor assessments through performance observation sheets. Overall assessments were not standardised by teachers.

The selection of assessment techniques is in the 'Sufficient' category (58.35%). The lesson plan can be seen in written tests, portfolio assessment techniques and non-written techniques. The written tests are multiple choice and a description for daily tests. The questions are made using bloom taxonomy from C1 to C4 that are suitable for junior high school students. Non-

written assessment techniques are done by observing performances during exploration and practicum activities. Half of the teachers did not make an assessment rubric. There are no definitive guidelines to how they conduct an assessment. The other half of the teachers made an assessment rubric. Short interviews with teachers showed that assessment rubrics become the format for writing a Developed Learning Design (Wahyudin, D., 2014).

Conformity and improvement assessment was in the 'Unfavourable' category (50%). The assessment appropriateness can be seen daily in test questions that are consistent with the material presented. Teachers often do daily tests without accompanying further with actions such as enrichment and discussion of questions. Overall pedagogical knowledge skills were in the 'Quite good' category (68.22%) and still needed to be developed again, especially in terms of appropriateness and improvement assessments that must be adjusted to a student's ability.

A direct observation of the learning process has been made. It showed consistence between the methods listed in lesson plans and learning implementation. The selection of good learning methods were adjusted to student's characteristics. The teachers have a good vocabulary of strategy; it can be seen from observations that learning methods are used that are tailored to the material and condition of students.

b. TCK (Technological Content Knowledge)

The contents of the TCK questionnaire included technology usage to understand concepts, laws, and theories of learning materials, computer applications related to material being taught, knowledge in developing student activities, and assignments that involve the technology usage.

Pedagogical Content Knowledge (TCK) relates to the integration of content knowledge and learning technology. The TCK assessment results are included in the 'Inadequate' category (51.65%). This is because teachers tend to use the worksheet as a medium without ICT-based media usage. Direct observation in class show the teacher seldom uses ICT-based media. Teachers often use blackboard media and the surrounding environment. The teacher includes video and picture media on PowerPoint to deliver the material in a lesson plan. However, lack of LCDs owned by schools forced teachers to continue to teach conventionally (observation 3 December 2018). In addition to the LCD factor, low endurance of electrical energy also triggers the underutilisation of ICT-based learning media. This condition is a serious problem that requires the help of various stakeholders to overcome it. Because LCD is the simplest example of learning media, while in addition to LCD there are still many other ICT-based media that also need to be developed in schools.

The ability to understand learning materials that require media to facilitate students in learning activities is part of the research content. The research results show a teacher's ability to understand content that requires media was in the 'sufficient' category (51%). The teachers basically understand that producing high quality learning activities requires learning media. Limited access and lack of creativity in learning patterns make teachers rely on lectures and group discussions.

c. TPK (Technological Pedagogical Knowledge)

The contents of TPK questionnaires include the computer applications usage such as Microsoft Word and PowerPoint in learning and teaching practice, appropriate technology to learning approach and strategy in teaching practice, and internet facilities such social media or blog for learning media.

The PCK ability was the integration of learning approaches with learning content. Teacher's ability in PCK was in the 'sufficient' category (58.35%). Two teachers had prepared a lesson plan as a guide for teaching. Interviews with teachers showed that lesson plans are not made by a teacher themselves but are the result of MGMP. There are still many discrepancies between the lesson plan and its implementation. Teachers do not make lesson plans that lead to inclusive learning at schools. Teachers do not use lesson plans as a teaching guide, instead they use their teaching experience of more than 20 years that has become a habit. Teachers still make annual programs, semester programs, syllabi and make lesson plans as an administrative requirement for teacher assessment.

The results of the direct observations show the education communication and dialogues between teacher and student. Slow learning students need more physical approaches and teacher contact. Slow learning students tend to be sleepy in class and do not pay attention to the teacher. Teachers often give directions to students with ADHD to prevent them from disturbing other friends during the learning process. Teachers should use learning methods such as games, because hyperactive children tend to be unable to be quiet and concentrate.

d. TPACK (Technological Pedagogical Content Knowledge)

TPACK questionnaire includes learning strategy choice and technology consistence with material in practical learning activities, integrating the knowledge of technology to realise effective learning, and for helping other teachers to understand how to integrate the knowledge being taught, pedagogical knowledge, and technological knowledge.

The TPK's ability includes the integration of technology with learning strategies. The result of TPK ability is included in not good category (25%), this is due to lack of technology usage

in teaching. Teacher A only got 16.7% results, while teacher got B 33.3%. Teacher A cannot integrate technology with learning strategies. This can be seen in lesson plans that are not listed technology-based learning media. The teacher B can integrate technology with learning.

Outcome (Learning Products to Achieve Learning Objectives)
A. PCK (Pedagogical Content Knowledge)

The PCK questionnaire covers approach and learning strategy that is consistent with existing learning material, lesson plans preparation, and students' understanding measurement in relation to material being taught.

The TPACK capabilities include integration of technology, content, and learning approaches. The results of Developed Learning Design assessment for ability to use TPACK show that two teachers are included in the Poor category (41.7%). Adjusting to direct observation shows that that teachers have a low level ability to use technology productively. They need training in technology-based learning. This will work to assist teachers to use technology and explore information about the use of learning technology.

Conclusions and Suggestions

This research examines the teacher's ability to implement TPACK-based 2013 Curriculum learning through Countenance Stake's analysis. It can be concluded that the lowest component among pedagogical, content, and technology components is the ability to use technology. The ability to use technology is lower than other capabilities. Therefore, teachers need to develop the ability to use technology to produce good TPACK-based learning.

The schools should give serious attention to facilities and infrastructure. The main obstacle to implementing TPACK-based 2013 Curriculum is the limited facilities and infrastructure in schools. Therefore, all education stakeholders must work together to realise good school facilities and infrastructure to avoid repetitious learning processes being delivered by teachers that are like those delivered in the previous 20 years.

REFERENCES

Arikunto, S. (2010). Prosedur Penelitian: Suatu Pendekatan Praktik. (Edisi Revisi). Jakarta: Rineka Cipta

Baya'a, N & Daher, W. (2015). The Development of College Instructors' Technological Pedagogical and Content Knowledge. Procedia - Social and Behavioral Sciences, 174: 1166-1175

Chai, C. S., Koh, J. H. L., Tsai, C. C., & Tan, L. L. W. (2011). Modeling primary school pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) for meaningful learning with information and communication technology (ICT). Computers & Education, 57(1), 1184-1193.

Cox, S., & Graham, C. R. (2009). "Diagramming TPACK in practice: using an elaborated model of the TPACK framework to analyze and depict teacher knowledge". TechTrends, 53(5), 60–69.

Dastile, Xolani, Turgay Celik and Moshe Potsane. (2020). Statistical and machine learning models in credit scoring: A systematic literature survey. Applied Soft Computing, Volume 91.

Hamalik, O. (2007). Pengembangan Kurikulum (Dasar-Dasar dan Pengembangannya). Bandung: PT. Remaja Rosda Karya.

Huberman, M., & Miles, M. B. (2002). The qualitative researcher's companion. Sage.

Irawan, Y. S., & Koesoema, A. P. (2015, March). The role of ICT, healthcare investment and eHealth policy in achieving millennium development goals: A cross-country comparison. In 2015 9th International Symposium on Medical Information and Communication Technology (ISMICT) (pp. 112-116). IEEE.

Li, Feixue, Zhifeng Li, Honghua Chen, Zhenjie Chen and Manchun Literacy. (2020). An agent-based learning-embedded model (ABM-learning) for urban land use planning: A case study of residential land growth simulation in Shenzhen, China. Land Use PolicyVolume .

Mansur, H. (2017). Implementasi Kurikulum 2013 Dalam Pelaksanaan Pembelajaran Saintifik dan Tematik Integratif di SD Se-Kota Banjarmasin.

Mansur, H., & Mastur, M. (2018). Implementasi Kurikulum 2013 Dalam Pelaksanaan Pembelajaran Saintifik Dan Tematik Integratif Di SDN Se-Kota Banjarmasin. Jurnal Komunikasi Pendidikan, 2(1), 32-41.

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: a Framework for Teacher Knowledge. Teachers College Record, 108(6), 1017-1054.

Shulman, L. S. (1986). “Those Who Understand: Knowledge Growth in Teaching”. Educational Researcher, 15(2), 4–14.

Wahyudin, D. (2014). Manajemen Kurikulum. Bandung: Remaja Rosda Karya.