**The Development of Working Design through Characterized Technology Pedagogy and Content Knowledge in the Elementary Schools’ Instructional**

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Abstract

ICT-based characterized instructional can lead the learners become more creative and get higher quality output. This study aimed to determine the practicalities and potential effects of the use of characterized technology pedagogy and content knowledge to the learners’ outcome. This study is a development research through characterized TPACK model and the evaluation will use Tessmer’ procedure. The sample of this research is 38 students of the third class of elementary school in Palembang. The steps in doing this study are: 1) emerging, 2) applying, 3) infusing, and 4) evaluating. This model possess a very good validity, the potential effect of this model can be seen from the students’ outcome, that is 65,79% success with good score, which means more than half of the students manage to learn based on this model.

Keywords: Technology, pedagogy and content knowledge, character education

**Introduction**

The instructional process as a vehicle of education and the development of human character cannot be separate from the science ability development, technology and arts as they are defined in the legal foundation of instructional development, which is article 1 paragraph (1) of Law no. 20 year 2003 in Indonesia. The practical meaning in the educational application in this country needs to be reformed and revitalized, so that it becomes an integral part and should be the primary vehicle for the education of children. The instructional process needs to be returned to its goal as the educating process and needs to be built upon the meaning contained in chapters and verses that became the foundation of the instructional application policy, including curricula, instructional materials, instructional media and schooling management system.

The instructional reformation in formal or informal in facing the globalization started from the students-centered instructional process become the important region in supporting the education.of course, the school managerial takes part in sustaining the planned framework for a change. The overall patterns and the changes on the presence of ICT force us to be more serious in facing the technological advances. The changes in students-centered learning will be achieved if followed by innovative and creative instructional model, especially the instructional that is integrated to ICT and integrated by the characterized values, they are: honesty, responsibility, good values​​, discipline, creative, caring, smart, tough, confident,and assertive.

Nowadays, the ICT relevance in the instructinal which was originally only as a tool to increase its role as a learning resource. According Hinostron JE, et al (2008) (Sutrisno, 2012:11) in his paper entitled "Traditional and emerging ICT applications for learning" stated that there are three trends of instructional based ICT, namely: 1) provide opportunities in broadening the learning opportunities in flexible and easy way, 2) teachers can develop their creativity in developing the instructional scenarios, 3) ICT can enhance the instructional process for teachers and students. Teacher readiness in responding ICT integratively in the instructional is the main goal in developing the instructional activity, the ideal and competitive students need creative, innovative, and reflective teachers. to respond the demands, it is needed supporting program: , standardization, assessment, curriculum development, instructional development, professional development and the provision of a conducive learning climate. Especially in the development of teaching programs and profesional teacher, the teacher should be able to use ICT and the develops the instructional by integrating ICT. According to the American Associon Colleges of Teacher Education (AACT 2010) (in Sutrisno, 2012:16) it is stated that 21st century’s teacher must master the competencies that can facilitate the students in accordance the learning outcomes that have been required, so the teacher must: 1) successfully combines the technology with instructional materials pedagogy, 2) incorporate appropriate instructional with specified in the curriculum with 21st century the demands of, 3) the balance of the instructional strategies and problem-based learning method. 4) masters the various assessment models to determine student performance, 5) acts as a mentor and exchange the ideas with the students, 6) always develops his/her professionalism.

Many Various issues that arise in the application of ICT-based instructional: 1) teacher does not have enough time in designing the instructional, even more likely as a burden so he/she choose not to do the learning transformation, 2) many reasons, for example: there is no budget to supplement the instructional being developed, 3) lack of ideas of instructional-based ICTand tend to be reluctant to implement it, 4) lack of understanding of on Technology Pedagogy and Content Knowledge (TPCA).

**The integration of ICT in the instructional**

In 2010, there were three important issues concerning the development of what is called the Technology Pedagogy and Content Knowledge (TPCAK), namely: 1) professional teachers development on strategies, understanding and application of TPACK, namely the relationship analysis with technology (T), pedagogy (P ) and subject matter (C) applied in the instructional process. 2) TPACK focused on learning technologies which are designed in accordance with the stages. 3) designing an observation measurement

**Instructional-based ICT framework model**

1. Systematic model based on topic: this model was developed by Wang (in Sutrisno, 2010), it is stated that it is important to design instructional and thinking structure in the instructional and giving the instructional clues offline. Flow of this model is also based on logical flow and designed systematically through process and material order. However, this model does not describe how far the correlation among technology, pedagogy, and instructional material which can be explained qualitatively.
2. ICT integration Model with Microsoft Learning Partner (MLP) (2006): This model offers explorative instructional references, but the amount of materials are huge that give a lot of burden to the students. The instructional was developed off-line or on-line depending on the resources at the school. Interesting impression of this model, namely, 1) this model provides opportunities for teachers to interact and design the draft together, 2) supporting software has been facilitated by Microsoft. 3) materials can be downloaded and easily accessed on the internet.
3. Tecnology Pedagogy, Content dan Knowledge (TPACK) model: this model was developed by Mishra and Kohler, (2008). The focus of this model as a framework for teacher or designer in integrating ICT in the instructional. This model is based on the development of models of Pedagogy Content Knowledge (PCK) proposed by Shulman (1986) (in Sutrisno, 2012). The basic concept of TPACK emphasis more on the relationship among the subject matter, technology and pedagogy. The interaction of the three has the power and appeal to foster active learning focused on students, can also be interpreted that it was teacher-centered learning, and TPACK student-centered learning. TPACK in the model is described as follows:

TPACK

Explanation: TPACK= *Tecnology Pedagogy, Content dan Knowledge*

TPK = *Tecnological PedagogicalKnowledge*

TCK = *Tecnological Content Knowledge*

PCK *= Pedagogy, Content dan Knowledge*

Figure1: *Tecnology Pedagogy, Content dan Knowledge (TPACK)* Model *adopted from Koehler dan Mishra 2008*

It can be explained:

1. Pedagogy Knowledge (PK): describes the in-depth knowledge related to the theory and practical of the instructional, that include: the purpose, process, instructional methods, assessment, strategy, or understanding of the cognitive, affective, psychomotor, social and instructional theory development
2. Tecnology knowlegde (TK): is a technology base that can be used for transporting the instructional, therefore teacher must master ICT
3. Pedagogy Content Knowledge (PCK): there is an interaction part/slice between pedagogy (P) and learning materials (C), PCK is an instructional concept that deliver instructional material contained in the curriculum.

**The Form of Character Education in School**

The implementation of character education in all life aspects, especially school life, refers to the basic form of character education that writer can explain based on the configuration of elements of character education. Therefore, school is asked to embed and make all subjects oriented to the basic value of character, namely: honest, smart, tough, caring, discipline, confident, independent, assertive, responsible, creative, and critical. Can be seen in the following table:

Table 1, value and material proposed by teacher in subject and material taught

|  |  |
| --- | --- |
| Basic value of character | Instructional material |
| Honesty | The concept of self-knowledge, self-motivation, self-control, relationship with God, self righteousness, self-value system, sincerity, and sincerity, self-sacrifice, giving and sharing |
| Smart | Self concept as an achiever, analyzing ability, decision making ability |
| Tough | The concept of environmental influences destructive or constructive, working ability, resilience |
| Caring | Realize a wide range of interests, the community concept, understand social ethics, the concept of the common goodness, the concept of tolerance |
| Discipline | Consistent, clear, paying attention to self-esteem, praise reward, punishment, being supple, be firm, not be emotional |
| Self confident | Giving compliments to every achievement, teaching students to be responsible, teaching students to be friendly, glad to help others, do not reprimand in front of many friends, support something that interests the students, not coddle students |
| Independent | Forming students’ independent attitude, allowing students to organize their own time, students are given the responsibility, implementing a healthy body condition and strong, giving freedom to the students to define their own goals, students realize that teachers are parents who are always at their side |
| Firm | Giving the students opportunity to express their opinion, giving a freedom to be creative, giving a chance to make decision. |
| Responsible | Giving tasks and reprimand, amends when doing wrong, consequent, discussing about the importance of responsibility |
| Creative | Learning beyond the facts, learning the correct way of thinking, constructing learning new facts |
| Critical | Explaining about the forbidden cause and effect thinking, thinking about something that happens for some reason. |

Widely, the application character education in school can be classified into three events, namely: the development in instructional from each subject, the development in extracurricular activities and in school culture development, strategy development of character education in school subject of elementary school included in sport, religious, Indonesian, science, math and social studies. Ahmad Tafsir (2009:85) states that the process of integrating the character education in the instructional can be done in several ways, among them: (1) instructional material, (2) selecting material, (3) selecting instructional media integration.

Reserch problem:Tecnology Pedagoy, Content dan Knowledge (TPACK) model which is developed suit to the indonesian society, namely: technology pedagogy model, content and characeterized knowledge. The research question is: do Tecnology Pedagoy, Content dan Knowledge (TPACK) model have practical character and have potential effect to the learners’ learning, while the objective of this research: to find out the potential effect of the use Tecnology Pedagoy, Content dan Knowledge (TPACK) model to the learners’ outcome.

Research methods: the initial apporach is by using survey, observationa, interview and documentation, then proceed by research and development proposed by TPACK theoretical framework developed by Mishra dan Kohler, (2008), and Tessmer (1998) will be applied as the evaluation. Then, this model is developed into certain situation, tested, revised and retested until it becomes perfect and productive result. Finally, it is found a characterized TPACK instructional model. The sample of this research is the third class of elementary school in Palembang

**TPACK Phase**

1. Energing stage: the early stage, the teacher has an awareness to the ICT that will be used socially or individually for his/her professionalism development. Action 1: teacher introduces animation programs, simulation and virtual laborotarium and access to the learning resources by utilizing the internet related to their field of study and contact with technology. Action 2: teacher observes, tries, gets to know the program obtained from the liquefaction internet access
2. Applying stage: teacher starts using TPACK to design the lesson plan, s/he also explores the curriculum, syllabus and material description in accordance with his/her subject. Action 3: the teacher is supplied by the TPACK description and seek the compliance of program animation, simulation and virtual laborotarium with the subject and well organized. Action 4: teacher connects and designs the correspondence among technology, learning objectives, learning materials and pedagogy.
3. Infucing stage: teacher starts modifying, initiating the TPACK development based on materials or modul. Action 5: teacher designs the lesson plan individually or in group. Action 6: teacher is equipped by instructional model based on instructional scenarios to haveHigher Order Thinking Skills (HOTS). Action 7: teacher designs alternative.
4. Transforming stage: teacher applies TPACK model socially and personally and develops his/her professionalism. Action 8: teacher creatively and innovatively designs lesson plan, instructional activity and implements the instruction, evaluation and instructional reflection.

Characterized TPACK flow

**ENERGING STAGE**

**Preparation**

Action

1

Media Setting

The researcher introduces to the teacher the animation program, simulation, laboratorium, instructional system throuch internet access

Teacher observes, tries, get to know the access program from the internet adjusted to the teaching material

Action 2

**APPLYING STAGE**

**Application**

The researcher equips the teacher the characterized TPACK and finds the suitability for the program animation, simulation, and well structured by the teacher

The teacher design the lesson plan explored by the curriculum, instructional based theme syllabus

Stage

3

Stage

4

The teacher connects and designs the correspondence among technology, learning objectives, and pedagogical material

**INFUSING STAGE**

Continued

Continuation

**INFUSING STAGE**

Action

5

Teacher modifies the iniation in the TPACK development based on the subject

The researcher give an example of characterized lesson plan and teacher designs the lesson plan in group or individual

The teacher is equipped by instructional model with instructional scenario HOTS by the researcher

Action

6

Action

**7**

The teacher prepares an integrated instructional activities namely characterized and materialized TPACK

**EVALUATING STAGE**

Self evaluation

Revise

One to one

Expert Reviews

Revise

Small Group

Revise

Field Test

Figure 2: Characterized TPACK Model Development and Tessmer (2011)

**The Development Results and Discussion**

This instructional model is a student-centered instructional model and provides opportunities to use strategies and ICT-based instructional method. The instructional model which is developed in this research is characterized TPACK instructional model that is intended to foster critical thinking skill and ICT mastery for third grade elementary school. Instructional model created in this study include, the design, implementation, characterized TPACK instructional evaluation, in terms of practicality and potential effect.

Validity test of TPACK model

1) Design

Material validation and media accuracy were done three times. The final validation get very good score (90%) were seen on the accuracy model with characterized TPACK model and the scope of character values to the used media was appropriate (87%). The validity test of instructional material is compliant to the theme taken from the third class with 85% score. Lesson plan validity is 88% or very good because it contains materials and characters and the media related to ICT in elementary school

2) Practicality

The result of small group or one to one: instructional activity: respondent A category low scored 40, respondent B good category scored 75 and respondent C very good category scored 88. While the achievement gained by each student in small group is respondent A get 80, B get 90, and C get 60. It means they get high achievement

3. Final evaluation (potential effect)

To see the potential effect of the use of characterized Tecnology Pedagoy, Content and Knowledge model, it is done a small group and carried on with test. The potential effect of instructional media in the application of PATCK viewed by learner’s activity: 1) the students can follow the instruction of the used media, 2) they can listen teacher’s explanation, 3) learners take note to the important aspect, 4) learners can solve the task given, 5) they can answer teacher’s question and express their arguments, the potential effect of the instructional media to the learners’ outcome. It can be gained through three ways, they are: a test which is conducted after teaching and learning process, exercises, and homework. The final score was analyzed by combining the test result, exercises, and homework, then, it is gained from 38 students, 10 (26.32 %) categorized very good, 25 (65.79%) are in good category and 3 (7.90%) in fair category

**Conclusion**

The development of characterized TPCK model in the instructional development for elementary teacher is vey useful. It has good validity level, practicality and potential effects from characterized TPACK model. The experts say that this model is valid. In practicality test , characterized TPACK is effective in the third class of elementary school, while the potential effect of this model shows very high level, where 65.79% of the students applies ICT-based instructional

**Suggestion**

It hoped that the teacher can use characterized technology, pedagogy, content knowledge model started from the design until the application in the class. Because it can improve the teaching and learning activity and the learners’ outcome, besides that, it is hoped that school can facilitate the facilities and infrastructures, so the teacher can develop his/her instructional skill and ICT-based instructional.

References

Darling Hammmond (2006), *Powerful Teacher Education: Lessons from Exemplary Program*. San Francisco: John Wiley & Sons

Kohler dan Mishra, (2008), *Handbook of Technological Pedagogical Content Knowledge (TPACK) for Education*, Routledge for the American Association of Colleges for Teacher Education, New York.

Sutrisno 2012, Kreatif Mengembangkan Aktivitas Pembelajaran Berbasis TIK, Jakarta:Referensi.

Sutrisno, 2011, Pengantar Pembelajaran Inovatif Berbasis Teknologi Informasi dan Komunikasi

Tessmer, M. 1993. Planning and Conducing Formative Evaluations. London: Kogan Page Limited

Undang-undang Republik Indonesia Tentang Sistem Pendidikan Nasional Tahun 2003, Jakarta: CV. Tamita Utama.