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PSPSKAPE INSTRUCTIONAL STRATEGY FOR ENHANCING KNOWLEDGE CONSTRUCTION OF LEARNERS IN THE 21ST CENTURY

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Abstract

Former educational system does not focus on developing the process of individual learning, thinking, doing, and knowledge construction in real life from varieties of learning resources. To enhance the students in knowledge construction, the teachers have to have knowledge in the theory of constructivism and instructional strategy, learning activities to enhance knowledge construction. This article present the innovation of instructional strategy that synthesized from knowledge construction methodology named PSPSKAPE which consists of 6 parts:

- 1) Present the Problems
- 2) Study the Problems
- 3) Finding for Problem Solutions
- 4) Knowledge Creation
- 5) Applications, and
- 6) Evaluation.

The author described the learning activities in any composition respectively for the teachers to apply the instructional strategy in practical. In addition, the results of PSPSKAPE instructional strategy found that the learners can effectively construct the knowledge and produce the knowledge creation process toward the theory of cognitive constructivism from the basic to advance level of study.

Keywords: PSPSKAPE, Instructional Strategy, Knowledge Construction.

1 INTRODUCTION

Self-knowledge construction concept of constructivism believes that the learning is more important than the knowledge perception. The aim for learning management will enhance the knowledge construction more than the effort to transfer knowledge. This is focus on knowledge construction of individual and the learning environment that is meaningful in term of the real definition. Knowledge construction is the method used in learning management with the principle of the learners should be done by them in knowledge construction. Learning process of constructivism, the learners will construct the knowledge by collaborative problem solving. The learning process starts with the problem which stimulates the cognitive conflict. The prior knowledge or experience is still not used for solving the problem as the experience. The learners should find more information that is called the cognitive reconstructing. The learning activity for the learners to discuss, argue and even use reason to eliminate the cognitive conflict of the learner or among the learners. (Sumalee Chaijaroen, 2004) In addition, Sayamon Insaard (2010) also identifies the concept of knowledge creation process of constructivism as the table 1

Table 1: The process of knowledge construction of cognitive constructivism

Knowledge construction process	Activity
1. Stimulate the knowledge construction	Survey the prior knowledge and experiences of the learners by pretest of self-evaluation
2. Learners relate the prior knowledge or experiences for cognitive conflict	After knowing the prior knowledge or experiences of the learners, the learning process should stimulate the cognitive conflict by using the questions or problem situation for the learners to get information for assimilation
3. Disequilibrium makes the learners find the answers of that cognitive conflict which is not similar to their prior knowledge	The disequilibrium makes the learners try to solve the problem situation of that disequilibrium by finding the answer of cognitive conflict which is not similar to the prior knowledge or experience and the learners will relate the prior knowledge with the new knowledge
4. Accommodation	Finding the answer of cognitive conflict makes the process of accommodation that the learners can describe and solve that problems by themselves
The learners learn	The equilibrium process is the process that learners learn

The knowledge construction of learners takes many steps of learning process. The varieties of learning activities in instructional methods are 1) Inquiry learning 2) Investigation learning 3) Solving problem 4) Problem-based learning 5) Case study 6) CIPPA Model 7) Knowledge construction 8) Simulation. The researcher synthesized the learning activities from those of 8 instructional methods to gain the effective instructional model. The instructional model was recommended and approved by 19 experts using online DELPHI technique. The experts had the harmonize opinion at the level of "Most" (Mdn. = 5, I.R=1) and agreed with the model at the level of "Most" ($\bar{x} = 4.82$, S.D.= 0.33)

The synthesis of instructional method gained the new instructional model called PSPSKAPE Model use for enhancing the knowledge construction effectively as shown in table 2 and table 3.

Table 2: The synthesis of knowledge construction instructional method

Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Conclusion
1. Interesting creation					1. review the prior knowledge	1. Introduction		Introduction step Make learners interesting and present the problem examples
2. Survey and surfing information	1. Observation	1. Understanding the problem	1. Identify the problem	1. Presenting the examples by instructor or learners	2. Searching for new knowledge	2. Review the prior knowledge	1. Survey and analyze the limitation of learning objectives	

Table 2 The synthesis of knowledge construction instructional method (continue)

Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Conclusion
3. Describe, analyze, summarize and discussion	2. Explanation	2. planning for solving the problems	2. Understanding the problems	2. Case studying of learners			2. Specify the objectives	Study step Survey and search for the answers
	3. Prediction	3. Solving the problem and evaluation	3. Study and search for information	3. Discussion of problem for the answers	3. Understanding the information / new knowledge and relate with prior knowledge	3. Adaptation of the idea	3. Selection of real situations and challenge the learners to analyze make decision practice	Analysis step Describe, discuss, share knowledge and analyze the problems
		4. Check the problem solving	4. Synthesis of the knowledge	4. Instructor and learners discuss on the answers	4. Sharing knowledge, discussion among groups		4. Specify the simulation's structure	Analysis step Describe, solve, discuss, share knowledge and analyze the problems
			5. Summarize and evaluate the answers	5. Instructor and learners discuss on problem solving and summarize	5. Summarization and knowledge arrangement			Synopsis step Summarize the new knowledge constructed
4. Extension of knowledge	4. Control and creativity					4. Use of the idea	5. Try out the situations with other students, check for mistakes, edit and improve	Implementation step Use the new knowledge in other situation
5. Evaluation			6. Present and evaluate the outcome		6. Present the product	5. Revision		Evaluation step Instructor and learners evaluate, review and improve the new knowledge altogether

The consideration of instructional model's component are shown in table 3-8

Table 3: The analysis of instructional activity (Step 1)

Instructional activity <u>Step 1 Introduction</u>	Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Frequency
1. Make interesting	✓						✓		2
2. Connect prior experience with new experience	✓					✓	✓		3
3. Discussion within group	✓						✓		2
4. Questions to stimulate the learners to think	✓			✓			✓		3
5. Curiosity creation	✓			✓					2
6. Observe the problem situation or environment		✓						✓	2
7. Specify the problem		✓	✓	✓					3
8. Create the simulation		✓					✓	✓	3
9. Role play		✓							1
10. Real situation		✓							1
11. Specify the assumption			✓				✓		2
12. Present the examples of problem solving					✓				1
13. Giving advise							✓		1
14. Brain storming							✓		1

Summarization of The first step (Introduction step) 1. Connect the prior experience with new experience 2. Raise the questions to stimulate the learners to think 3. Specify the problems 4. Use the simulation

Table 4: The analysis of instructional activity (Step 2)

Instructional activity <u>Step 2 Study</u>	Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Frequency
1. Analysis	✓								1
2. Translate the results	✓								1
3. Summarization	✓					✓			2
4. Description	✓	✓		✓					3
5. Discussion	✓					✓	✓		3
6. Planning for problem solving		✓	✓						2
7. Understanding with the problems		✓		✓		✓		✓	4
8. Study the case study of problems		✓		✓	✓	✓	✓	✓	6
9. Survey / search information	✓		✓		✓				3
10. Connect to the prior knowledge					✓	✓			2
11. Collecting the information	✓		✓						2
12. Enhance cooperative working of the learners	✓								1
13. Brain storming				✓			✓		2
14. Mapping concept				✓					1
15. Questioning	✓								1
16. Specify the objectives								✓	1

Summarization of the second step (Study step) 1. Study case study of the problem situation

2. Understanding the problem 3. Survey the situation 4. Describe and discuss

Table 5: The analysis of instructional activity (Step 3)

Instructional activity Step 3 Analysis	Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Frequency
1. Search from learning resources			✓	✓			✓		3
2. Interview experts							✓		1
3. Searching information			✓				✓		2
4. Group work				✓		✓	✓		3
5. Discussion			✓		✓		✓	✓	4
6. Description	✓						✓		2
7. Mind mapping/project/Program/ Reports							✓		1
8. Present new idea		✓	✓				✓		3
9. Test the project products				✓			✓		2
10. Check the group's idea						✓	✓		2
11. Knowledge check						✓	✓		2
12. Clarification							✓		1
13. Knowledge sharing				✓	✓	✓	✓		4
14. Knowledge extension						✓			1
15. Knowledge synthesis				✓					1
16. Fortune the results		✓							1
17. Choose the role								✓	1

Summarization of The third step (Analysis step) 1. Grouping 2. Searching information from learning resources 3. Discussion 4. Present new idea 5. Knowledge sharing

Table 6: The analysis of instructional activity (Step 4)

Instructional activity Step 4 Synopsis	Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Frequency
1. Discussion the problem solving ways					✓				1
2. Knowledge arranging						✓			1
3. Observed recording	✓								1
4. Summarization	✓		✓	✓	✓	✓	✓	✓	7
5. New knowledge construction	✓		✓						2
6. Evaluation		✓	✓						2

Summarization of The fourth step (Analysis step) 1. Knowledge conclusion 2. New knowledge creation 3. Evaluation

Table 7 Analysis of learning activity (Step 5)

Instructional activity <u>Step 5 Implementation</u>	Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Frequency
1. Application knowledge for other situation	✓	✓			✓				3
2. Creativity		✓							1

Summarization of The fifth step (Implementation step) Application knowledge for other situation

Table 8: Analysis of learning activity (Step 6)

Instructional activity <u>Step 6 Evaluation</u>	Inquiry learning	Investigation	Problem solving	PBL	Case study	CIPPA	Knowledge construction	Simulation	Frequency
1. Product evaluation	✓	✓	✓	✓	✓	✓	✓	✓	8
2. Suggestion							✓		1
3. Continually development planning							✓	✓	2
4. Project presentation			✓	✓					2

Summarization of The sixth step (Evaluation step) 1. Product presentation 2. Outcomes evaluation 3. Planning for continually development

PSPSKAPE Model

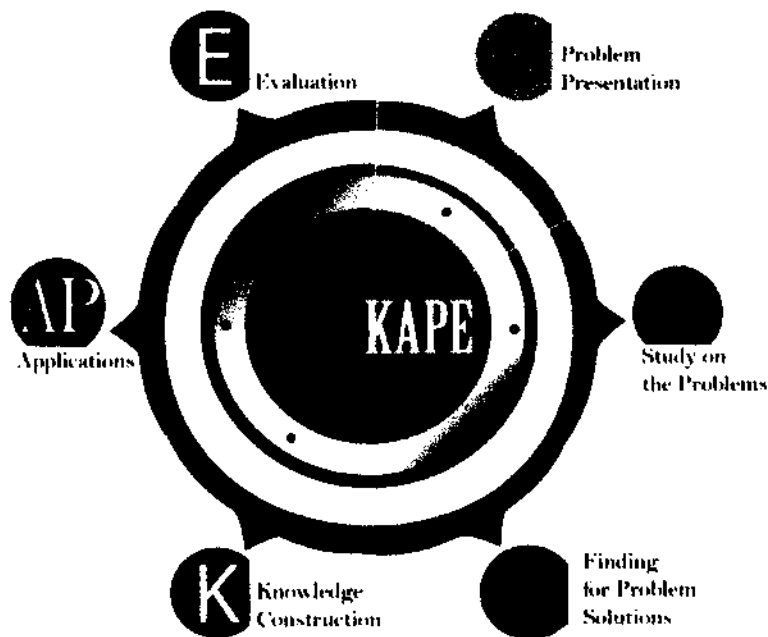


Fig. 1 Instructional model of knowledge construction: PSPSKAPE

The synthesis of the instructional model for knowledge construction, it can be concluded the instructional model called "PSPSKAPE: which has 6 components:

1. **Present the Problems:** this step is to connect the prior knowledge or experiences by questioning, specifying the problem, create the real situation or simulation to stimulate the process of thinking
2. **Study the Problems:** this step is to let the learners study and understand with the questions, problems and situation specified. The learners identify the assumptions, discuss and test the assumption of their own and others
3. **Finding for Problem Solutions:** This step is to work in group from any learning resources to find the answers and solve the problems or manage with the situation specified. The selective ways of solving problem would be possible and appropriate to the situation specified. The information that learned or checked should be accurate and not bias.
4. **Knowledge Creation:** this step is to create the description and present, discuss, sharing knowledge, altogether conclude and evaluate the new knowledge.
5. **Applications:** This step is to apply the new knowledge to any other situation.
6. **Evaluation:** This step is to evaluate the process and products of the learners. The evaluation includes self-evaluation, peer evaluation, and by instructor. It also planned for continually development of the learning process

Description of instruction model for knowledge construction: PSPSKAPE

1. **Presenting the problem:** the objectives are for stimulating the learners to learn and gain more motivation, social interaction. The descriptions are 1) Group the learners to work via the activity PSPSKAPE 2) Study the content or situation: the learners connect the prior knowledge concerned with contents in learning unit and use the questions to stimulate the thinking process and altogether identify the problem from real situation or simulation.
2. **The study of problem:** the learners study and try to understand with the questions or situations. Learners will survey knowledge from any learning resources for problem solving. Alternative of knowledge should be provided for the learners to open their vision. Learners are able to select and filter the important knowledge for answering the questions. The learning activities are 1) Learners try to understand the problem identified 2) Learners search knowledge from online (electronic) learning resources, static resources such as principles, theories, rules and dynamic resources to continually reach the new information. 3) Learners learn from experts by asking question via the e-mail 4) Learners check the accuracy of information and filter that knowledge for answering the questions.
3. **Searching for the ways of problem solving:** working in group is used for learners to find the answers of problem solving. The information from any learning resources will help the learners to discuss and give the appropriate answers. The learning atmosphere of sharing knowledge will be able to choose and filter the answers of problem solving. The activities are 1) learners use MSN Messenger for sharing their idea from the learning process to discuss with others 2) learners discuss the problem for giving the appropriate answers among groups and summarize the ways of solving problem together. 3) in case of unable to solve the problem, the learners can study in learning resources.
4. **Knowledge construction is done by presenting the description, knowledge sharing, summarize new knowledge together, and evaluate the new knowledge.** The objectives are to reflect new knowledge of the learners in form of description and sharing knowledge among their own group and others. The learners evaluate new knowledge of their own and others. The learning activities are 1) after learners gain conclusion of new knowledge by the learning process, the group process for answering the questions using discussion board to record and diffuse those knowledge from their group 2) learners can share knowledge from other group that also share knowledge 3) instructors join and consider the knowledge of learners and stimulate the learners in the lesson and do activities, record new knowledge from other group and give advices after the learners' record

5. Application: the application of knowledge in any situation aims to use the experience in any other situation and to let the learners summarize the own concept of new knowledge they learned. The activities are 1) Learners apply the new knowledge in many other situations such as a summarization of new knowledge, writing the mind map of new knowledge, and present their own new knowledge 2) instructors ask learners the applied questions in daily life and let the learners to discuss, analyze, and create the ways of preventing the problems.
6. Evaluation: the evaluation include the process evaluation, self-evaluation, peer-evaluation, and by instructors. Evaluation should be planned to use continually. The aims of activities are 1) Learners do pretest of self-evaluation 2) Learners join the activities of PPSKAPE 3) Learners summarize the knowledge in group by reflect knowledge in discussion board 4) Instructors evaluate the knowledge construction of learners using tools for knowledge construction 5) Learners do self-evaluation by reading knowledge from other group and from instructor's advice 6) Learners do posttest of self-evaluation. If the posttest is not good enough, the learners would study more to add up knowledge for effectiveness.

The finding is harmonized to Sayamon Insa-ard (2010) that studied the model of knowledge construction which enhanced the knowledge construction of the students. The study of 135 undergraduate students from learning activities via learning object and reflect the knowledge constructed on discussion board. The knowledge construction is evaluated by evaluation form of Van der Meijden's coding scheme. The results was founded that the students had high-level elaboration at 28.57 percent and the low-level elaboration was at 49.86 percent. The research is harmonized to the research of Adriana, Henrika and Meijden and Theodora van der (1955); Shukor, Harun and Tasir (2011) which is founded that the reflection of knowledge on discussion board in form of asynchronous, the samples had knowledge construction from the low level to high level. For the social context, the samples were able to gain the thinking skills and knowledge construction. Discussion board was the main tool used to evaluate the thinking process and related the idea and reasons. The analysis of knowledge reflection is caused by the knowledge and correct understanding. The instructor took roles of facilitator. The study also suggested that the discussion of each group, questioning for stimulation of learning could make the students to gain more knowledge construction. (Zhu et al, 2009)

2 CONCLUSION

The strategy of knowledge construction PPSKAPE for enhancing the students' knowledge construction is the instructional model has 6 components 1. Introduction to the problem 2. Study the problem 3. Finding the ways of solving problem 4. Knowledge construction 5. Implementation 6. Evaluation. In any component, there will be the activity, tools for knowledge construction of the students by their own. The group process is used in learning management. Technologies used of the knowledge construction communication are e-mail, chat and discussion board to reflect the learners' knowledge. The learners can reach the active learning and interact with others students and instructor. Discussion and reflection of knowledge or experience can lead to knowledge sharing and systematically enhance the learners' cooperative learning, knowledge construction, and concept. The PPSKAPE model can also be used in e-Learning or in the normal classroom to gain the knowledge construction from low to high level. So the use of strategy of knowledge construction instructional model of PPSKAPE is the effective model and be the alternative for instructors to use in instruction for enhancing the knowledge construction of students. The model also effectively responses the learning objectives of student centered approach in the 21st century.

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