

## ***NEW CONCEPT OF DEVELOPMENT PORTFOLIO OF KNOWLEDGE USING CONCEPT MAPPING BASED ON GAMES THEORY***

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### ***ABSTRACT***

We using mind mapping to create a robust learning. It helps to learn quickly, remember the content more easily and access to the brain used to store image concept is simple. However, the mind mapping still needs to use the skills for paraphrasing the text and picture decoding. Which may be only the owner can understand. This research, we design and develop instruction model and new techniques appropriate for biology learning. It uses mapping thinking base on Game theory. The students can keep represent of knowledge link to story. The e-conceptual Maker tool in provide event template such as scene, characters and friends, plant, pet and item under principle close to the real world as possible. Our experiments test with middle student in biodiversity topic. Result of t-test value was 3.285 by significantly 0.001 which less than 0.05 the difference is statistically significant at the 0.05 which clearly better than the mind mapping.

**Keywords:** Mind mapping, Instruction modeling, Digital Game base learning

### ***INTRODUCTION***

Mind mapping are tools that help student think and remember better, creatively solve problems and take action. The mind map used encourages creativity and flexibility, and mind maps help you think outside the frame of norm. Tony Buzan created the Mind Map concept in the early seventies. Based on his brilliant observation that our brains do not process information in a linear way, Mind Mapping allows student to use words, images, and color in an effort to engage the right side of our brains in what is normally considered a left-brain task which is working about organizing information. Mind Maps allow us to quickly get ideas from our heads and down on paper. Another benefit is they lend especially well to free-association. By recording then reviewing rapidly and freely generated ideas we can find connections and new relationships between concepts that we otherwise might have missed. Of course drawing learner ideas is also ideal for staying in a creative mode where more logical and rigid methods might take us off track. Put compound central theme or goal in the middle then add ideas or thoughts around mapping, further adding or relating concepts as student know.

However, Mind maps have some limitations that can not support learning fully. Do not apply to students, who do not think a system, Mind maps is not suitable for student which lack of skills in thinking and writing or focus on the beauty of artistry too. Adding, it requires student for skills in the encoding from words and images. It can not support the course content details

enormous such as biology, chemistry, history, sports and build some skills. These subjects had to remember the details. We need pictures of enormous help in memory than the text. Mind map has no incentives to learn their own. Mind map use only the color and relationships in the system for recognition. It is difficult to shorten it to small or expand the scope of the paper is too large which perhaps be split into several parts. Results may not be desirable for the owner. It encourages a knowledge and understanding of personal learning. It does not extend knowledge to other students. We can not used to support the accumulation of knowledge and cooperative learning. Mind maps were used in the process of Learning Accelerator System.

Learning Accelerator System is important tool in driving the process of creating knowledge quickly. Learning Accelerator reduces learning content development time by as much as 80 percent. The impotent characteristics of the accelerated learning which is different from traditional learning as follows flexible, joyful, access to external knowledge by multi-pathed, collaborative learning for collaborative review, motivated by humanistic, recognized by multi-sensory, nurturing of the brain and nervous system, appropriate activities, relaxation of mental which is the relationship of emotional with the physical and results-based continuous learning.

### *LITERATURE REVIEW*

The perceived change in learning needs of the 'Games Generation' (Prensky, 2001) or 'Net Generation' (Oblinger, 2004) coupled with the ongoing growth in use and acceptability of a range of communications technology has precipitated a growing interest in the potential of games and computer games for learning. In a recent survey, 36% of primary school teachers and 27% of secondary school teachers said that they had used games to teach (Sandford et al, 2006). There are many examples of different and innovative ways in which computer gaming has been used to support learning and teaching in recent years, both with children and in Higher Education. For example, recent research with school children includes the use of bespoke science games (Magnussen, 2005), off-the-shelf historical games (Squire & Barab, 2004), and multi-user gaming environments (Barab et al, 2005). Examples of recent research in Higher Education include the use of games to support the learning and practice of civil engineering concepts (Ebner & Holzinger, 2006), a competitive game to teach programming (Lawrence, 2004), and virtual reality games used with geography students (Virvou & Katsionis, 2006). Advocates of computer game-based learning argue that computer games have the potential to transform the way in which students learn, and motivate and engage a new generation of learners in a way that traditional education does not. Throughout the literature, in the case of both adults and children, an assumption is commonly made that the rationale for using games for learning is that games are intrinsically motivating (e.g. Grice & Strianese, 2000; Alessi & Trollip, 2001; Becker, 2001; McFarlane et al, 2002). There is often no consideration of the fact that students' preferences are not homogenous and that computer games may not be intrinsically motivational for many people, particularly older students in higher education. The method of the study and results are presented and discussed in the next section.

## MATERIAL AND METHODS

We develop Keen-Learning Accelerator System, the important components of process in accelerated learning is provides students guides and duties support for several learning style, show and describe how to complete specific tasks using self-style, analysis and selection of appropriate methods, provides feedback on the performance, designed to help learners at each process, quiz and assesses the learning module through a series of questions and create a new activation process and return to the first process.

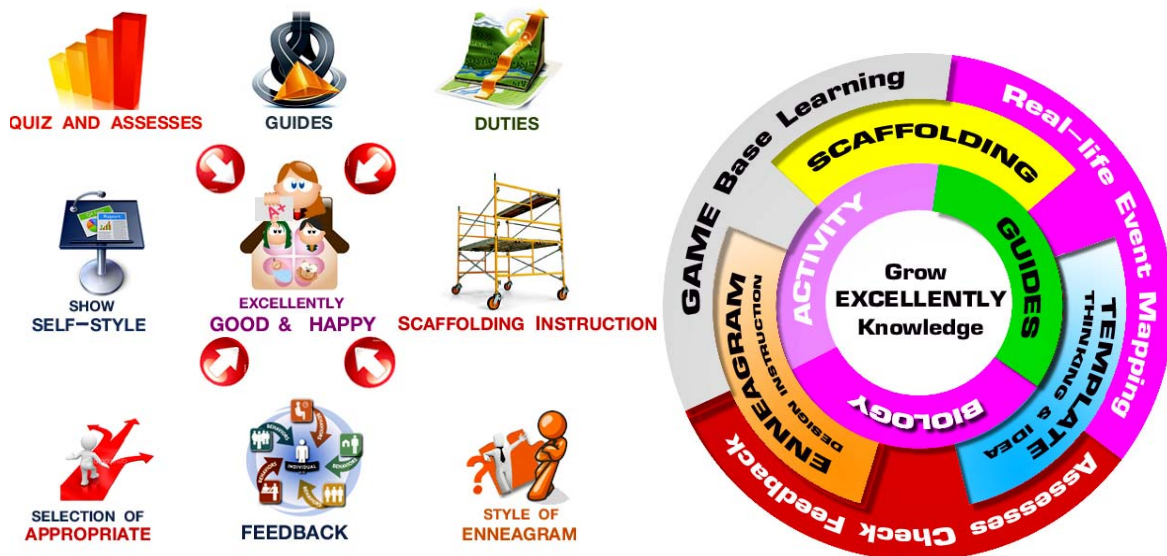


Figure 1. Keen-Learning Accelerator System:

The details of biology have a lot which want to learn and remember in a short time. Good time management skills will help you to become more organized and waste less time preparing to study. It is very important that student start preparing for biology exams well in advance. Be sure that student review own lecture notes before the next class. The students should start reviewing own notes on a daily basis. This will ensure that you gradually learn the information over time and don't have to cram. The biology textbook is wonderful sources for finding illustrations and diagrams that will help student visualize the learning concepts. Be sure to reread and review the appropriate chapters and information in the textbook. The students will want to make sure that they understand all key concepts and topics.

We found the robust learning as a result of suitable environment which is equilibrating point between conceptual of knowledge and the real world. The position of equilibrating point can help students develop the knowledge, skills, and dispositions needed for success in the world at large. The teacher provides a self learning environment for students to try new roles, skills, and responsibilities which are very close to the real world. Students will create a belief under the consciousness. They can create an abstract concept closer to fast. Addition, they can convert their knowledge to real-world skills. In the other hand, they can convert experience the real world become to complex knowledge. It is a skill that most people to lack. We found representatives of equilibrating point are a scenario similar to the real world which is compound as follows: student-teacher, relationships, event and network knowledge (HREN). We use the technique of embedding knowledge into the brain in the deep layers. We use the recall of knowledge with imagination.

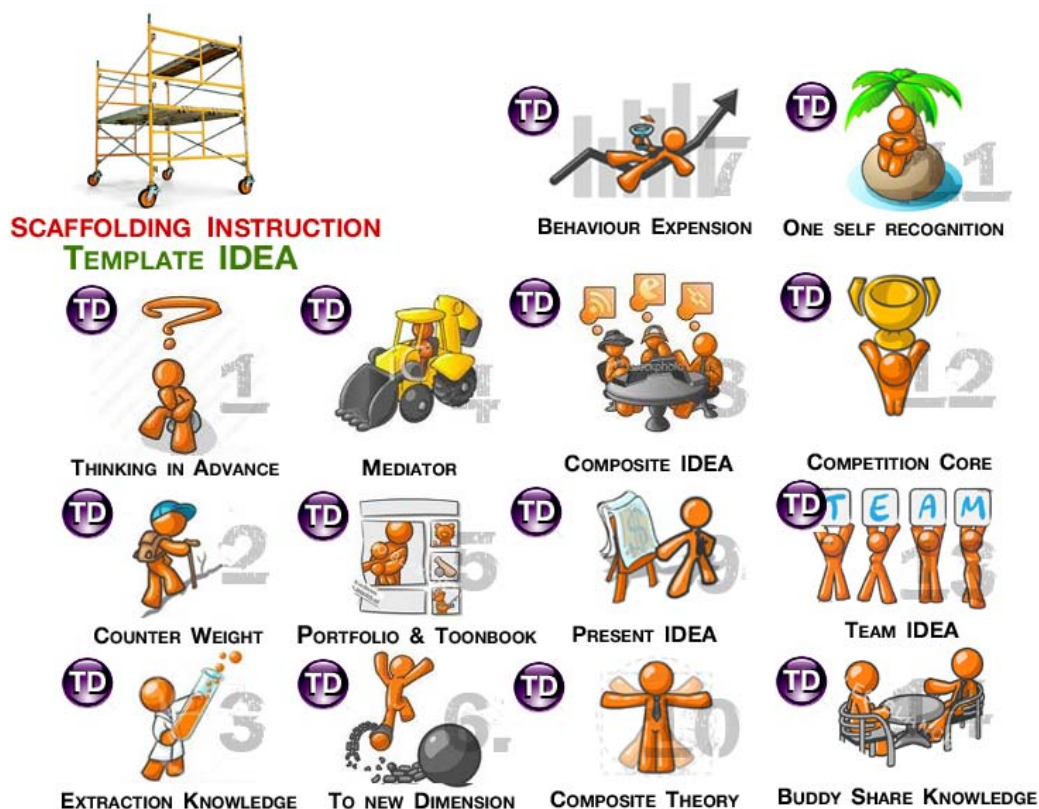


Figure 2. template idea of Keen-Learning Accelerator System

We use the template idea to accelerate the learning process. It helps students that lack previous experience. Template idea (TD) represents previous experience to connect with new experiences in the process of creating knowledge. The students will reduce loading intellectual. It is part of the scaffolding instruction of constructivism theory. We develop fourteen template ideas from the creative theory of Guilford such as thinking advance- Students to think in advance what they have learned (predict plant is growing), Mediator- the students will learn how to use a Le learning materials to suit yourself (VDO/on course /internet/ game base learning), Counter Weight- Students learn to reduce some activities to other activities resulting in better (read textbook exchange with watch documentary), extraction knowledge- the students learn choose the significant for reduce loading intellectual. He can grouping knowledge with frequency of use, To New Dimension- The students learn find new method that is inconsistent with the normally, Portfolio & Toon book- The students learn to collect works and combine several idea in each time, Behavior Expansion- The students learn to use statistics to measure process of behavioral expression (Skills of observation and data collection), Composite IDEA- the students learn from different ideas within the group (dialog technique in HR), Present IDEA- The students learn the process of showing own knowledge and can be apply idea of another, Composite theory- the students create own knowledge from several theories. Oneself recognition- blink idea, Competition Core- the Students learn from participating in the competition continued. Team IDEA- Brain Storming, Buddy Share Knowledge- The students learn to think a partner and connect pair knowledge to network knowledge. These pattern scan be used in single or a combination within template Idea group. It is very flexible and support learner-centered principle. Template IDEA can generate variety of knowledge base on several subjects.



Portfolio of Knowledge is like an essential notebook that students have accumulated knowledge in different forms. It consist the structure, relations level of knowledge by individual students is stored. We design our accumulated knowledge base on the game theory together with robust scaffolding of the knowledge. It is different with portfolios that do not choose the best job. It is not used to up to work or up degree. It used to structure thinking system to the explicit knowledge. It takes a solid knowledge even get on. The learners construct robust knowledge by themselves. We develop Keen-Learning Accelerator System (KLAS) and Keen-Learning Nervous System (KLNS). It is important components of extremely learning accelerated process. It use several techniques include scaffolding Instruction. Scaffolding Instruction describes specialized teaching strategies geared to support learning when students are first introduced to a new subject. Scaffolding gives students a context, motivation, or foundation from which to understand the new information that will be introduced during the coming lesson.

Scaffolding techniques should be considered fundamental to good, solid teaching for all students, not just those with learning disabilities or second language learners. In order for learning to progress, scaffolds should be gradually removed as instruction continues, so that students will eventually be able to demonstrate comprehension independently.[2] Keen-Learning Accelerator System, (KLAS) is a part of Keen-Learning Nervous System (KLNS)

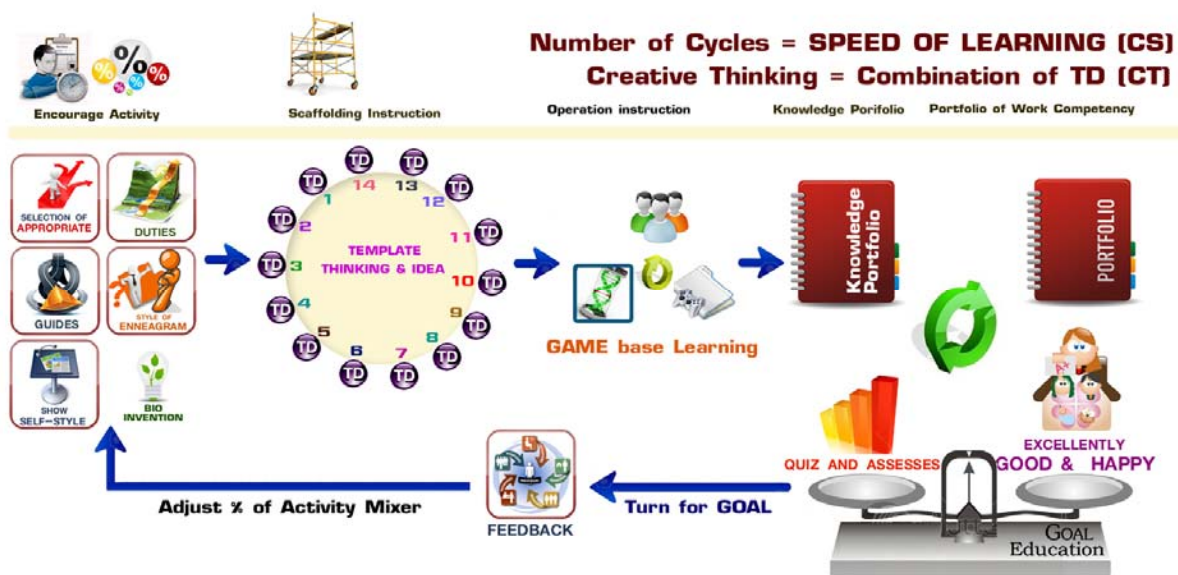


Figure 3. Keen-Learning Nervous System

Nine learning styles of Enneagram theory help to support individual children. The game for a concept of knowledge will help create a clear understanding. It helps to see the values and guidelines to be used in everyday life. It provides the ability to apply knowledge of each student clearly, helping to happiness when to perform duties in the game successfully, develop concepts or main idea, and enhancing creativity continues.

Keen-Learning Nervous System (KLNS) is a systematic learning process. It was generate from neural networks process in computer science. It consist aim of behavioral which set a goal. This pattern consist Input section (encourage activity), scaffolding instruction (Template IDEA), section of game base learning, portfolio of Knowledge, portfolio of working, section of compare between output with the objective behavior. Finally. Loop back to update the input (Adjust the percentage of encourage activity and close to the target is

more.). The number of cycle shows speed of knowledge while several of Template IDEA shows creative thinking or CT. (see figure 3)

Encourage activity section of Keen-Learning Nervous System (KLNS) include 100 percentage of encourage activity as follows; [1] Selection of appropriate in media, pattern, instruction model and Teaching techniques. The teachers provide variety environment of students to choose by not repeated in any way. [2] Guides by teacher, friends, social technology.[3] Show Self-style - the teacher must to providing experience of classroom to support expression them learning styles.[4]Duties- the teachers must provide activities that challenge thinking and skills to students (play and learn together). [5] Style of Enneagram-The teachers must provide activities that support the learning for 9 group's children follow Enneagram theory (Reformer/ Helper/ Motivator/ Romantic/ Thinker / Skeptic/ Enthusiast/ Leader/ Peacemaker) We use this section as input and adjust it until approaching the goal of student development.

Scaffolding Instruction of Keen-Learning Nervous System (KLNS) will help accelerate rate of learning in students through Template IDEA. ), Section of game base learning will help accelerate rate of learning and reinforce robust knowledge. Portfolio of Knowledge can help determine the accurate direction of learning .It help in feedback process and reduce loop cycle of learning.

The event challenging enough and not too complicated can to link the event a lot of knowledge. Only Image recognition will represent for vision in the real world. The researcher develops and test about instruction model for building Keen-Learning Accelerator System, Keen-Learning Nervous System (KLNS) and learning with Portfolio of Knowledge. We tested it in Biological Science. Portfolio of Knowledge base on game is different from the portfolio of work that building owners themselves. It is different from the Computer Assisted Instruction (CAI) due to students create their own.It combines games portfolio of work, instructional model and feature of mind mapping. It is the perfect tool for learning. It is better than mind mapping or portfolio of work in previous time as follows; [1] it is appropriate to use the concrete object course which used for rich detail representing of knowledge. Example, subject Biodiversity, Geology, Ethnicity etc. These courses explain the meaning with picture than text. [2] RPG maker XP application can be stored in the form of text dialogue and speech dialogue with other characters. The audio can be stored the human voice in the MP3 file.

It is talking like a conversation similar to the real world as possible. We can use the speaking voice of friends in various situations link to the some important knowledge.[3] We can store picture and audio from the actual events such as the capture of the elephant together with the sound of the elephant, The images of microbiology can be stored together with sound description of the teacher. The children will recognition knowledge from the voice of teachers in quiz. It supports the retention of learning in long term memory. They can go back to learn from their portfolio of knowledge at any time. It consist pictures, sound and details which is complete than the Mind mapping.[4] It supports the corroborative learning. The student can share exchange portfolio of knowledge for corroborative learning. The children can take pictures from a lesson to a simple game computer.[5] The Students can keep impressive memories into portfolio of knowledge such as activities at school, sport, Learning activity, academic competition which can be used as the linking to knowledge in the some time. These visual concepts will links to resources under consciousness. The photo that activities with his friends will help builds icon of knowledge return to in-depth knowledge. We collect the knowledge and access to deeper levels.[6] If student have no previous

experience or creativity, we use template thinking(TD) help link with new events. It would be easy to create new knowledge. [7] It can save storage both picture and sound efficiently. We can convert to multimedia animation and comic books. It stimulates thinking and remembers than the slide. [8] We can use the special effects on image link to events and sequence of context. The systematical sequence of events is building a robust knowledge rather than branches of alphabet. [9] It is using technology appropriately and effectively to achieve value, while the computer is cheap and most schools are supported by the government.[10] Mind mapping use text and icon is on the hook for the subconscious knowledge while our portfolio uses events and scenes do it. It is a beautiful system and more interesting than Mind mapping.[11] The scenes in the game to help clustering the information for recognition. We use the dialogue and event to help remember details each level. [12] In case Mind mapping is large and very complex. It must be sorted several sheets of paper which perhaps to separate pages. The portfolio of knowledge flow the links in the scene, loop seamlessly. It creates enjoy for learning.[13] It is used as part of the portfolio of work. On the other hand, the Game base learning can contain both portfolio of knowledge and portfolio of work in the same program. It can be used to divide the nature of the scene clearly. It can be used to divide the two parts of the scene clearly such as shops keep the work of learning, adventure game to help the accumulation of knowledge. [14] Mind mapping use colors to stimulate memories while portfolio of knowledge base on game use color , animation , character, effect , sound , music , speech audio and story. [15] The teachers can create a section recommended or the part of scaffolding instruction adds to portfolio of knowledge of the students everyone easily.[16] Create a portfolio base on game computer can learn easily without knowledge of programming. We use a RPG maker XP application as a tool to create portfolio of knowledge. It has calculation system and variable support for abstract subjects such as Mathematics, Physics, Chemistry, etc.[17] The portfolio of knowledge base on game are motivated by the emotion itself which Mind mapping can not. It record personal relationship and emotions through the interaction of characters which is similar to the real world as possible. Example as create for learning environment in the coffee shop with softly music, conversations about knowledge or virtual library in the scene of game.[18] We can analyze the data to the psychological and other instructional technology.[19] The portfolio of knowledge base on game motivated with material collection, prizes in the chest, Find a code and fight the monster. It stimulates learning and part of Keen-Learning Accelerator System (KLAS).[20] The portfolio of knowledge base on game support instruction model as learning several forms such as game base learning, Cooperative learning, problem base learning, self learning and distance learning.[21] It can be exchanged in a group of students. It promotes learning by helping each other.[22] The portfolio of knowledge base on game systems security in both the public and each part of the game. They may send some code to friends for access in the secret scene.[23] We can create a scene of the actual environment by import photo of building, school, house, portrait into the scene. We collect all the multimedia experience which mind mapping can not. Our system supports for the main idea that large.[24] The portfolio of knowledge base on game support English, English, Japanese which can be shared foreign. It can be used to teach the language very well especially for conversation. We can use as a medium of instruction within group of students or the public.

Scaffolding instruction of Keen-Learning Accelerator System, (KLAS) Keen-Learning Nervous System (KLNS) is partnership created between teachers and learners which support by media technology. Our model consists of six elements as follows; the accumulation of knowledge section about adventure story and sequence content in the game, the hook on the information both is the conscious and subconscious level, help section of teachers, the knowledge review, significant extensions and interpretation and section of create the



portfolios of knowledge and private information. We create a portfolio of knowledge base on game with seven steps. First, we have developed instructional scaffolding by the teacher in biology field. Second, we are learning biodiversity with conventional teaching and survey in the biodiversity. Third, the students develop portfolio of knowledge continuation instructional scaffolding of teacher. Forth, the students will use its navigation for built portfolio of knowledge base on game theory. Fifth, the teacher will screen significant which has hidden in the game such as the relationship to friends, attitude in subject and motivating factors of individual. Sixth, the students express knowledge and provide portfolio of knowledge base on game to publish such as website or exchange in classroom. Finally, enjoy the success together by sharing and learning to play.

**EXPERIMENTAL AND RESULTS**

Our experimental research use Randomized Control Group Pre-test Post-test design. The sample of our research is undergraduate students of major in Science Education were 40 people. They studied in the third grade of B.Ed. curriculum. They are quite knowledgeable in the field of biology and life sciences. They are students of the Faculty of Education in Chandrakasem Rajabhat University, Thailand. The content used in this research as biodiversity. We compare the use of Mind mapping with portfolio of knowledge base on game theory.



Figure 4. the sample propose design framework to use portfolio of knowledge base on game theory.

Table 1. Show comparison of learning achievement pretest of sample group.

Sample	N	Average	S.D	df	t
Experimental group	20	9.4	1.26	39	0.65
Control group.	20	9	1.88		



Table 2. Show comparison of learning achievement for before and after learning of experimental group

Sample	N	Average	S.D	$\Sigma D$	$\Sigma D^2$	df	t
Before	20	9.4	1.26	133	929	19	19.48
After		17.5	2.45				

Remark: statistically significant at the 0.05

Table 3. Show comparison of learning achievement for before and after learning of sample in control group.

Sample	N	Average	S.D	$\Sigma D$	$\Sigma D^2$	df	t
Before	20	9.1	1.7	142	1026	19	24.8
After		15.96	2.6				

Remark: statistically significant at the 0.05

Table 4. Show comparison of learning achievement for before and after learning between control group and experimental group.

Sample	N	Average	S.D	df	t
Experimental group	20	17.31	2.46	39	1.71
Control group.	20	15.96	2.55		

Remark: statistically significant at the 0.05

Table 5. Show comparison of robust recognition between control group and experimental group.

Sample	N	Average	S.D	df	t
Experimental group	20	13.91	1.6	39	3.285
Control group.	20	12.16	1.9		

Remark: statistically significant at the 0.05

Result of t-test value was 3.285 by significantly 0.001 which less than 0.05 the difference is statistically significant at the 0.05 which clearly better than the mind mapping. The portfolio of knowledge base on game theory creates robust recognition in the knowledge long time than mind mapping.



Figure 5. Examples as portfolio of knowledge base on game theory which is effective more than mind mapping.

## DISCUSSION

The researchers should experiment with several subjects in the next time. The researchers can use as a tool for educational research in several problems. The researchers should try to use a variety of activities base on other theory such as problem base learning, project base learning.

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