



Approaches for Developing Learning Environment Management to Enhance Innovator Characteristics of Kaenchawittaya School Students

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Abstract

The purposes of this research were: 1) to study the priority needs of developing learning environment management to enhance innovator characteristics of Kaenchawittaya school students; 2) to purpose approaches for developing learning environment management to enhance innovator characteristics of the students. The research informants consisted of 1 school director, 3 co-directors, 38 teachers and 3 educational personnel. The total of this research were 45 informants. The research instrument used in this study was 5 rating scaled questionnaire. The data were analyzed by frequency distribution, percentage, mean, standard deviation, and Modified Priority Needs Index (PNI_{modified}).

The research results turned out as follows. The priority needs of developing learning environment management, sorted from the highest to the lowest PNI_{modified} revealed that: 1) for Physical Environment (PNI_{modified} = 0.391); the highest element of

priority need was Risk-Taking ($\text{PNI}_{\text{modified}} = 0.425$); 2) for Management Environment ($\text{PNI}_{\text{modified}} = 0.390$), the highest element of priority need was Risk-Taking ($\text{PNI}_{\text{modified}} = 0.422$); 3) for Academic Environment ($\text{PNI}_{\text{modified}} = 0.379$), the highest element of priority need was Experimenting ($\text{PNI}_{\text{modified}} = 0.400$). There were 3 main approaches; 1) transform classroom and learning area conditions into those that encourage risk-taking and experimenting in both teachers and students through evaluation of school's physical environment. 2) improve management system based on the principle that teachers need to be led innovators through evaluation of current management system. and 3) create academic environments through education design that aims to build the innovator characteristics in learners.

Keywords: Learning Environment Management, Innovator Characteristics

Introduction

Thailand 4.0 is Thailand vision of economic development policy or the Thai government's economic development model. This vision is based on “Stability, Prosperity, Sustainability”, embarking on an important mission to propel revolutions in various sectors. Its purpose is to make adjustments, rearrange, and set a new path and direction for the country's development towards prosperity, ensuring its capabilities to handle new, ever-changing opportunities and threats in the 21st century. One of the monumental opportunities of the country's development in the 21st century is the transitioning from Thailand 3.0 economy into Thailand 4.0 economy where “Do Less, Gain More” is an important key in this new economic model. This new economic direction is demonstrated in the 20-year National Strategy policy (2018-2037) under the 2nd national strategy of competitiveness enhancement, detailing the utilization of innovative technologies to elevate economic potential in agriculture, modern industry,

tourism, service, infrastructure, including economic development based on new-generation enterprises. This utilization requires high innovative proficiency to maintain its continuation, which in turn corresponds to the 3rd national strategy on human resource development, where its essential objective is to respond to the revolution of the learning process affected by the changes in the 21st century. All these strategies reflect the Thai government's intention to drive forward the policies that foster the country's human resource with creativity and innovation inventiveness as one of the country's top prioritized policies.

School is an especially important variable as a driving force of the 3rd national strategy policy of human resource development. Thus, many school policies have already been aiming for the development of creativity and innovation in students. Many schools prioritize technology to encourage innovative skills in students. While it is true that technology plays an important part in the building of innovator skills, to produce students with true innovator ideas, many factors aside from technology are required: the fostering of concepts, beliefs, characteristics, and most importantly, creativity. These skills can be encouraged through the designing of learning environments where students are engineered towards desirable characteristics. Many pieces of research support the idea that many skills, including creativity, correspond to learning environment design. For example, Nui and Sternberg (2003) study on the influence of the school's learning environment in relation to creativity found that Chinese students have less creativity than their American counterparts, attributing this result to the school environment. In the study of Abeer Abdulaziz Alawad (2013) also show that through improving some aspects of learning environment in the classroom such as adding some media board and color wheels and students work exhibit; can encourage students positive characteristics such as creativity, critical thinking, and risk taking, which all of them are the quality of good innovator.

Kaenchanwittaya school's vision aims to develop learning environments following the 2nd national strategy under the 6th objective tasking schools to design environments that promote productive learning. (Kaenchanwittaya School Annual Report of 2019). As the school is limited with an area of only about 2.5 acres, it is then mandatory to allocate school's learning environments as efficiently as possible to promote productive learning and encourage desirable characteristics, considering cost-effectiveness, performance and effectiveness. In conclusion, for the government emergency policies to develop innovation qualities (e.g. creativity) in students, and the school's vision of developing learning environments, the students should be fostered with desirable innovator characteristics through the designing of the school environment. Therefore, this study focuses on the current state, desirable state, priority need and the concept of developing learning environments to foster desirable innovator characteristics in the students of Kaenchanwittaya school.

Purposes of the Study

1. To study the priority needs of developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students.
2. To propose approaches for developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students.

Conceptual Framework

In order to create approaches for developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students, three main concepts were used as follows.

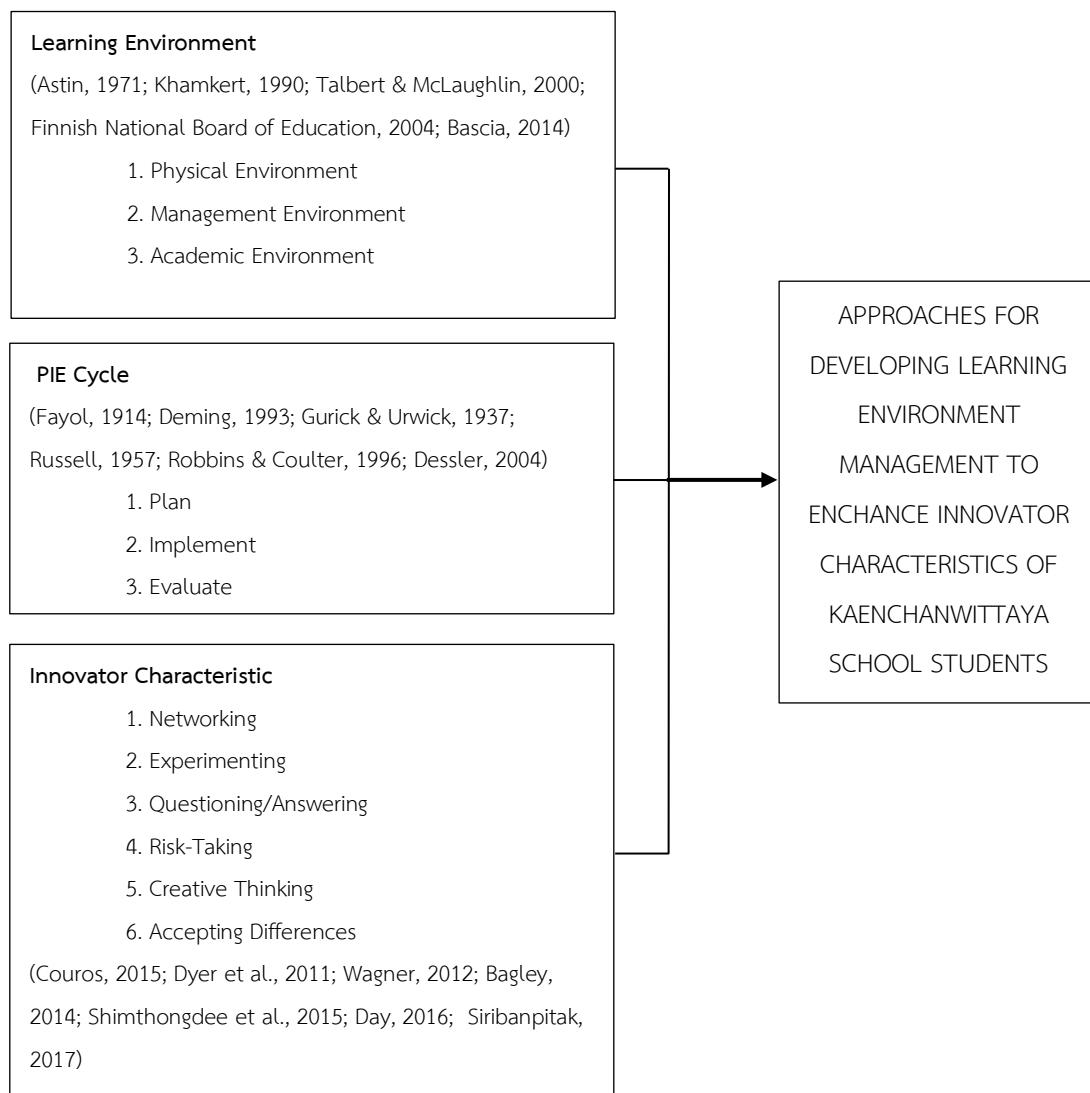
- 1. Learning Environment** - according to the literature review from multiple academic works, learning environment consisted of three important elements; 2.1

Physical environment – the basic environment of everything described as “physical” that supported and promoted student learning various from classroom, instructional media, learning center, playground, etc. 2.2 Management environment - the environment of school’s administration process that affected teachers and all school personnel such as school policy, positive working climate and teacher training, 2.3 Academic environment – the environment of classroom climate such as the way of teaching, school curriculum, and positive interaction between students and teacher in the class.

2. PIE Cycle consisted of three important elements of management process 1. Plan – an action of defining policies and strategies in order to achieve the goal of an organization, 2. Implement – an action of executing the planned policies and strategies in order to reach a specific goal, 3. Evaluate – an action of defining the outcome of the executive planned policies and strategies in order to find the problems of the process and lead to new plans and solutions. PIE cycle is used as a process for managing each elements of learning environment in order to enchant innovator characteristic in students.

3. Innovator Characteristic according to the literature review from multiple academic works, innovator characteristic consists of six important elements; 1) Networking – emphasized teamwork, cooperation, and communication with the team, 2) Experimenting – emphasized doing new things with new methods, and having research skill, 3) Questioning/Answering – emphasized questioning skill and having critical and associational thinking, 4) Risk-taking – emphasized thinking outside the box and having risk management skill, 5) Creative thinking – emphasized having creative ideas and having design thinking skill, 6) Accepting differences – emphasized valuing other opinions and not being self-centered

From studying related concepts, theories and literature review, the research consisted of 3 conceptual frameworks for creating approaches for developing learning environment management to enhance innovator characteristics of Kaenchanchittaya school students presented in the diagram below.



Research Methodology

The study was conducted using a descriptive research method. According to the research objectives, there are two major procedures.

1. Study the priority needs of developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students. The number of respondents was 45 people, selected through purposive sampling including 1 school director, 3 co-directors, 38 teachers, and 3 educational personnel. The research instrument used in this study was a 5-level rating - scaled questionnaire that consisted of two parts: respondents' information and the questions about current state and desirable state of developing learning environment management to enhance innovator characteristics of the school students. The data were analyzed using frequency distribution, percentage, mean, standard deviation, PNImodified and content analysis in order to find out the priority needs

2. Propose approaches for developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students by analyzing the priority needs of developing learning environment management to enhance innovator characteristics of the school students, analyzing the comments from the open-ended questions, studying additional journals, theories and literature review to develop the draft of approaches by the researcher. The drafts were evaluated by three experts in order to find the suitability and feasibility of the approaches. The data was analyzed using frequency distribution. After the data had been evaluated, the researcher then corrected the approaches and propose the complete version of approaches for developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students.

Findings of the study

1. The first Priority Need Index of developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students was Physical Environment ($PNI_{modified} = 0.391$), the highest priority need of management process was Evaluate ($PNI_{modified} = 0.415$) and the highest element were risk-taking ($PNI_{modified} = 0.425$) and experimenting ($PNI_{modified} = 0.395$), respectively

2. The second Priority Need Index of developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students was Managing Environment ($PNI_{modified} = 0.390$), the highest priority need of management process was Evaluate ($PNI_{modified} = 0.419$) and the highest element was risk-taking ($PNI_{modified} = 0.422$) and Experimenting ($PNI_{modified} = 0.401$), respectively.

3. The third Priority Need Index of developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students was Academic Environment ($PNI_{modified} = 0.380$), the highest priority need of management process was evaluate ($PNI_{modified} = 0.416$) and the highest element was experimenting ($PNI_{modified} = 0.400$) and Risk-Taking ($PNI_{modified} = 0.414$) respectively.

Table 1 the Priority Need Index of developing learning environment management to enhance innovator characteristics of Kaenchanchittaya school students

Developing learning environment		Innovator characteristics					
Learning environment	Management process (PIE)	1. networking	2. experimenting	3. Questioning/ Answering	4. Risk taking	5. Creative thinking	6. Accepting differences
1. physical ($PNI_{modified} = 0.391$)	1. evaluate ($PNI_{modified} = 0.415$)	0.438 (2)	0.387 (6)	0.393 (5)	0.426 (3)	0.394 (4)	0.453 (1)
	2. implement ($PNI_{modified} = 0.398$)	0.399 (3)	0.421 (2)	0.399 (3)	0.449 (1)	0.365 (4)	0.358 (5)
	3. plan ($PNI_{modified} = 0.361$)	0.336 (6)	0.377 (2)	0.346 (5)	0.400 (1)	0.354 (4)	0.358 (3)
	total	0.389	0.395 (2)	0.379	0.425 (1)	0.371	0.388
2. management ($PNI_{modified} = 0.390$)	1. evaluate ($PNI_{modified} = 0.419$)	0.410 (4)	0.471 (1)	0.397 (5)	0.442 (2)	0.382 (6)	0.417 (3)
	2. plan ($PNI_{modified} = 0.380$)	0.393 (3)	0.340 (6)	0.421 (1)	0.417 (2)	0.372 (4)	0.345 (5)
	3. implement ($PNI_{modified} = 0.371$)	0.355 (5)	0.400 (2)	0.382 (3)	0.406 (1)	0.329 (6)	0.358 (4)
	total	0.385	0.401 (2)	0.400	0.422 (1)	0.360	0.372
3. academic ($PNI_{modified} = 0.380$)	1. evaluate ($PNI_{modified} = 0.416$)	0.311 (6)	0.431 (2)	0.408 (4)	0.433 (1)	0.417 (3)	0.407 (5)
	2. plan ($PNI_{modified} = 0.363$)	0.364 (5)	0.375 (3)	0.411 (1)	0.385 (2)	0.367 (4)	0.284 (6)
	3. implement ($PNI_{modified} = 0.361$)	0.399 (1)	0.394 (2)	0.358 (5)	0.366 (4)	0.353 (6)	0.385 (3)
	total	0.357	0.400 (1)	0.392	0.394 (2)	0.378	0.356
Grand total		0.377 (4)	0.399 (2)	0.390 (3)	0.414 (1)	0.370 (6)	0.372 (5)

According to the results of priority need index in table 1, the researcher ranked the priority need index of developing learning environment management to enhance innovator characteristics of Kaenchanchittaya school students. Afterwards, the qualitative data from comments in the questionnaire and literature reviews were used to develop the drafted of approaches through content analysis. The draft was to

evaluate the suitability and feasibility of the approaches by three experts. Then, the draft was revised according to the experts' comments to propose the complete version of approaches for developing learning environment management to enhance innovator characteristics of the school students. The approaches are as follows.

- 1) transform classroom and learning area conditions into those that encourage risk-taking and experimenting in both teachers and students through evaluation of school's physical environment.
- 2) improve management system based on the principle that teachers need to be lead innovators through evaluation of current management system.
- 3) Create academic environments through education design that aims to build the innovator characteristic in learners.

Discussion

Enhancing innovators characteristics in the students of Kaenchanwittaya school

From the study, the overall current state of enhancing innovator characteristics of Kaenchanwittaya School students was at a moderate level. The highest average characteristic was networking. The lowest average characteristic was risk-taking. The overall highest priority need to develop the innovator characteristics in the students of Kaenchanwittaya School was Risk-taking ($PNI_{modified} = 0.414$).

It was evident that Kaenchanwittaya School highly prioritizes on environments designed for its learners and educators to cooperate through the exchange of knowledge and opinions, as illustrated in the Self-Assessment Report (SAR) (2017) in the 2nd criteria “The Process of Administration and Management of the Director” under the 3rd article on “Participation of Teachers in All Departments”, and in the 3rd criteria “Designing Learner-Centered Education Process” under the 1st article on “Education

Process that Encourages Participation of all Students". This agrees with the concept presented by Orachorn Prajan and Sukanya Chamchoy (2018), who cited the synthesis of various academic concepts relevant to the innovator characteristics; one of the essential skills was networking or the ability to initiate cooperation to exchange knowledge, and to further create and develop new knowledge. On the other hand, Kaenchanwittaya School insufficiently prioritized the development of risk-taking characteristics. Risk-taking characteristics encouraged learners to think outside the box, doing something with an unprecedented method while considering and managing potential risks and forecasting possibilities. A part of this negligence was due to risk-taking being a new concept, and the absence of concrete learning policy to support the development of risk-taking characteristics in Kaenchanwittaya School. Furthermore, the school policies mainly prioritized achievement rather than desirable characteristics required for the development of innovator skills. Pruet Siribanpitak's (2018) concept elaborated the ability to assess and manage risk as an essential part of the innovator characteristics. Couros (2015)'s concept also stated that in the current education system, most schools prioritize education to be in a safe, albeit controlled environment where students were expected to follow conventional traditions and plans with no opportunity to venture outside the box. If students were to be innovators, it was then very crucial to build risk-taking characteristics in students.

Learning environment that enhance innovators characteristics of Kaenchanwittaya school students

From the study, the Priority Needs Index (PNI_{modified}) of learning environments that enhance innovator characteristics in the students of Kaenchanwittaya School were found to consist of many compelling factors. Therefore, this study would present the result in various aspects, ranked in the order of importance. All 3 factors were ranked as follows:

1st Priority Needs: Physical Environment (PNI_{modified} = 391) Physical environment design is essential in the development and promotion of innovator characteristics. However, the limited area of Kaenchanwittaya School restricted the potential development of the physical environment. The physical learning environment was prioritized as the first need because many innovator characteristics required training and development through active learning. Active learning such as experimentation, networking, creativity, etc. required investment and procurements of area and equipments. This confers with the concept of Pruet Siribanpitak (2018) who proposed that, in the new paradigm of education management with the purpose to develop “new generations” into “innovators”, school and classroom must be transformed into “an inventor space, an innovator space or learning space to create inventions or innovations” (labelled as “Maker Space”). Furthermore, Sakorn Mahahing's (2015) research on the environment management methods of the basic educational institution in the Primary Educational Service Area 4, Khon Kaen, found that physical development was of the utmost importance as well.

2nd Priority Needs: Management Environment (PNI_{modified} = 390) contained PNI value that was similar to the first priority need. According to the report, Kaenchanwittaya School consisted of many senior employees with long working experience, proving to be difficult in changing mindset and developing innovator characteristics. Moreover, the regulations and policies of the school, along with the current education system, did not promote teachers into innovators. The development in management was important for the school to successfully encourage the students to develop innovator characteristics, therefore, the teachers and personnel themselves need to possess innovator proficiencies as well. This notion was in accordance with the idea of Wasan Suthawas (2016), who studied theories to develop the potential of educational innovators, which stated that the educational

innovator must be a person with proper qualities and necessary skills to develop innovations while also implementing them to improve work quality and student abilities. Furthermore, the idea of Couros (2015) who emphasized the teacher's development of innovator characteristics as an essential quality to nurture students into innovators. However, the current education system allocated a large sum of time to meetings and paperwork that were not related to teaching instead of providing opportunities for teachers to improve and exchange their innovative knowledge.

3rd Priority Needs: Academic Environment (PNI_{modified} = 380) Kaenchanwittaya School had always emphasized the development of students' academic potential, as indicated in the school's SAR (Self-Assessment Report) (2017) under the criteria 1.1 "Development of Learning Achievement". The development of educational atmosphere, along with academic support, was an important process to develop innovator characteristics in accordance with the National Education Plan of 2017-2036 (2017), elaborating the vision of the National Education Plan, under Article 4.5: Learner's objectives, where all learners were encouraged to develop their education skills in the 21st century. The plan consisted of 3Rs8Cs, which comprised attributes and characteristics leading to the development of an innovator.

Learning environment management to enhance innovator characteristics of Kaenchanwittaya school students

From the study, the highest Priority Needs Index of the management process of learning environment management to enhance innovator characteristics of Kaenchanwittaya school students was Evaluation (PNI_{modified} = 0.417) which was the process of defining outcomes of the executive planned policies and strategies in order to find the problems of the process and lead to the new plans and solutions. Evaluation phase was very important in managing and creating learning environment because it was the key factor in assessing the success of the projects leading to the

future improvement, which was in accordance to the theory of Pearce and Robinson (2009). Kaenchanwittaya School had been very active in planning and implementing many projects to foster creativity in students but still lacked meaningful assessing and evaluating the outcome, rendering the projects quite ineffective. However, the Priority Needs Index of planning ($PNI_{modified} = 0.368$) and implementation ($PNI_{modified} = 0.376$) was still considered to be important. That was because in managing learning environment to enhance innovator characteristics, the school director needed lots of planning on the approach that was the most suitable for building specific environment that fostering specific innovator characteristics and leading to meaningful implementations, which was accordance to the idea of Robbins (1996) explained that planning is an action of defining policies and strategies in order to achieve the goals.

Approaches for developing learning environment management to enhance innovator characteristics of Kaenchanwittaya school students

1) transform classroom and learning area conditions into those that encourage risk-taking and experimenting in both teachers and students through evaluation of school's physical environment.

The first approach suggested the transformation of the classroom and learning area conditions into those that encouraged innovator characteristics in both teachers and students, which supports the idea of Thanes Khamkerd (1990) stating that the physical environment, for example, material surroundings such as buildings and classrooms, depended on each school's conditions as there might had been some differences in necessities which were based on the notion and consideration of all school personnel under the principles of "Thinking Together, Doing Together". Moreover, Astin (1971) explained that the physical environment denotes natural or man-made environment such as school buildings, classrooms, libraries, and learning areas. These environments affected people in their vicinity. Regarding the development

of risk-taking characteristics, Couros (2015) described the relationship between school environment and the development of risk-taking characteristic that the overly controlled environment might have deterred students from handling risks, a factor which led to new experiments in students. Maintaining a balance between nurturing experience and building confidence in students to attempt new things was important in the development of risk-taking characteristic. For the development of experimenter characteristic, Dyer (2011) categorized the method of development into three steps: the first step was creating the opportunity in which the developer could accrue new skills, the second step was bringing the developed knowledge to create the prototype, and the final step was bringing the prototype to presentation.

2) improve management system based on the principle that teachers need to be led innovators through evaluation of current management system.

The second approach suggested the improvement of management based on the principle that teachers needed to be led innovators through evaluation of current management system. This was in accordance with the idea of Astin (1971) that the school environment, in its role as educational provision, must create management policies and internal management guidelines with amiability, where teachers felt comfortable to participate at work. Department of Academic Affairs (2006) signified teachers as one of the learning environments in school that needed to be taken into consideration. Thus, a school must emphasize the improvement of its teachers regarding management skill, enthusiasm, love-giving, warmth and understanding qualities. According to the aforementioned ideas, if the school was to truly develop the risk-taking and experimenter characteristics in students, it must begin by developing teachers through the adjustment of organization cultures, training, and other methods to enhance necessary qualities required for being a true innovator. Most importantly, according to Couros (2015), the school director needed to be a

transformational leader, who developed a shared vision and provided opportunities and guidelines for all teachers to learn and create innovations that led to student development.

3) create academic environments through education design that aims to build the innovator characteristic in learners.

The third approach suggests the creation of academic environments through education design that aimed to build the innovator characteristic in learners. According to Thanes Khamkerd (1990), good academic environment needed educational administration that meted learning objectives, encouraged each student's competencies, placed students as the center of education, and encouraged group study to create collaboration between teachers and students. Moreover, Reeve (2019) provided suggestion on how to administrate the education to create risk-taking characteristic through learning from mistakes, stating that the support provided for students to make them feel safe and encouraged to speak up to answer or express their opinions was an important factor to push them to more challenging questions or tasks.

Recommendations

1) The school director should accelerate the development of indicators to evaluate the result of educational environment development, especially the physical environment. The purpose is to measure the effectiveness of the current educational environments whether they are sufficient and suitable for the development of innovator characteristic in students. This refer to the results which found that assessment was the most needed factor for the development of educational environment management that encourages the innovator characteristic in the students of Kaenchawittaya School. Moreover, the assessment process is an important process

to indicate the underlying deficiencies or problems of the project or existing work system.

2) The school director should develop risk-taking characteristics in teachers and students by promoting confidence to express their opinions and try new things, while at the same time, utilizing their abilities to manage risks and calculate possibilities. This refers to the study of priority needs in innovator characteristics development of Kaenchanwittaya School which showed that the risk-taking characteristic is the most priority needs, as it was one of the essential characteristics in becoming an effective innovator.

3) The school director could apply the approaches for the development of learning environments that enhances the innovator characteristics in the Kaenchanwittaya School into the contexts of their schools in order to develop the innovator characteristics in students, since the desirable conditions of the development of learning environment that enhances the innovator characteristics of Kaenchanwittaya School were at a high level. Moreover, the evaluation of appropriateness and possibility of the approaches were at the highest level.

Future Research

1. There should be more research regarding to the development of risk-taking characteristic in students and school personnel through various environment design since this is one of the innovator characteristics with the highest priority needs which will significantly further nurture students into future innovators.

2. There should be more research concerning to the development of physical learning environment that enhances the innovator characteristics, because the physical environment was the learning environment subject with the highest priority need. The research may be conducted with a wider range of population sample, for example, the approaches to develop management of physical learning environment

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that enhances the innovator characteristics in private schools from Educational Service Area 2 of Phetchaburi province.

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