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Development of futuristic thinking ability and futurist thinker characteristics for grade 12 students

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Abstract

This study developed the process of futuristic thinking ability and futurist thinker characteristics for Grade 12 students using the Jurisprudential Inquiry Model (JIM) with forecasting techniques. In addition, the researchers measured the students' achievement regarding futuristic thinking ability and futuristic thinker characteristics according to the defined criteria.The target group in this study comprised 45 grade 12 students from Mueang Phayalae Wittaya School, Chaiyaphun province under the Secondary Educational Service Area Office 30 in semester 1 of the 2014 academic year. This target group had attended eight lessons planned using the JIM with forecasting techniques for a total of 16 hours. The instruments utilized in this study were observation form, student opinion record, instruction record, student interview record of learning activities, and post-test futuristic ability.

Descriptive statistics were used to examine the students' achievement in futuristic thinking ability and futurist thinker characteristics. The findings indicated that the grade 12 students had an average score of futuristic thinking ability of 21.40 accounting for 71.33 percent. In addition, the 37 students who met the criteria accounted for 82.22 percent which was higher than the defined criteria. All 45 students (100%) who had attended lessons utilizing the JIM with forecasting techniques presented high futuristic thinker characteristics. The findings contribute significantly to knowledge proposing futuristic thinking ability which can guide teachers in improving their teaching competencies to manage their students' futuristic thinking abilities effectively.

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Introduction

Today's education challenges include teachers keeping students engaged and teaching them what they need to know for tomorrow's careers. Globalization is a current social state that has changed due to technological growth, particularly in Thai society. Thailand's 11th National Economic and Social Development Plan (2012–2016) indicates the need for a main adjustment focusing on quality development of Thai people that places emphasis on the learning process in order to support public understanding.

As a result, education is an important device that could assist the young generation of Thai society to gain knowledge and understand how to make a livelihood. On top of that, education is an effective channel to educate students to understand the social state which has changed according to globalization requirements and to enable them to spend their lives in this environment. Hence there is a need to develop one's skills to acquire knowledge continuously throughout one's whole life (Office of the National Economics and Social Development Board, 2012)which is the proposed model that was found to be parallel to the policy of the Thailand Ministry of Education whose main aim is to develop Thai youth for the 21st century by looking forward to support youth to have good morals, love the uniqueness of Thai society, have critical thinking competency and creativity, technology skills, work

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with other people, and coexist in the world social order (Thailand Ministry of Education, 2008a).

Background of the Study

Futuristic thinking ability can be defined as the ability of forecasting those situations that would occur reasonably and systematically. Learners are expected to consider the forecasted information, thus utilizing it valuably and appropriately in order to look for proper choices and thus to decide and act appropriately to avoid any unsuitable actions. In addition, futuristic thinker characteristics can be defined as the behavior or specific characteristics of the learners in forecasting a tendency that may occur obviously and systematically. Therefore learners who possess futuristic thinker characteristics are expected to be reasonable individuals who are able to deal with forecasted information and utilize it in future living which may be changeable. The Jurisprudential Inquiry Model (JIM) will help learners to have more clarity about values and their thoughts, and to have better self-understanding. As a result, teachers would learn and understand their learners' thoughts and assist them to be much more positive thinkers.

A forecasting technique is a teaching technique that helps the learners to have continuous, systematic thinking. In this situation, learners will be able to take into consideration previous and current data and relate them to forecasting. On the other hand, learners will be able to assume the situation that would occur which is a method that enables the learners to look for choices and thus make a decision either to carry out or to avoid options. In addition, this technique will train the learners to be more confident to give opinions, show off their work, and exchange opinions with their classmates. This forecasting model learning process was found to be able to increase forecasting skills more than by just delivering knowledge (Moonkham & Moonkham, 2009).

Statement of Problem

The Basic Education Core Curriculum 2008 was planned to develop learners to their potential and placed strong emphasis on their performance. By this line of reasoning, every learner is believed to have his or her capacity in communication skills, knowledge, good attitudes, and feeling to exchange information. In addition, learners are expected to have critical, synthetic, thoughtful, and systematic thinking abilities as well as capacity in problem solving in accordance with rationality, morality, and information. As a result, learners who have experienced the Thai core curriculum will possess effective decision making skills, capacity of life, and technological skills with which they can prepare themselves for survival in Thai society. To what extent Thai curriculum management is able to promote a future society with these expected capacities such as communication skills, creative working attitude, and appropriately, a morality in solving problems, is still questionable (Thailand Ministry of Education, 2008b).

The study by Khammanee, Teeranuruk, Chaokiratipong, Wittayasirinan, Dachakub, and Karnchawasi (2011a) indicated that learners did not utilize thinking skills, were inactive in their learning process, failed to practice their knowledge in their real lives, and had non-holistic learning process. Moreover the lack of practicing skills was determined to be crucial in the learners' learning process.

The result of school external quality assessment (2006–2010) carried out by the Office for National Education Standards and Quality Assessment (ONESQA) revealed that most of the learners needed further development in order to achieve Standard 4 which requires learners to have ability in critical thinking, synthetic thinking, thoughtfulness, creativity, and vision (Office for National Education Standards and Quality Assessment, 2010).

Significance of the Study

Prawarnpruek (2011) found that teachers' teaching activities focused on presenting the learners with knowledge directly rather by than prompting them to possess the skills for seeking knowledge and thus develop their thinking skills. This finding was found to be parallel with the results from teaching and learning activities in the learning area of Social Studies, Religion, and Culture Learning which was conducted in Mueng Phayalae Wittaya School. The results showed that teachers were still focusing on lecturing in teaching activities as they lacked teaching techniques, teaching materials, and they were managing the classes by utilizing textbooks or handbooks. Teachers had complained they were assigned other workload rather than being able to concentrate on the teaching and learning process in the classroom.

Based on the problems with the current school situation in Thailand as mentioned above, there is an urgent need for innovation that enable teachers to develop effective teaching and learning activities particularly in Social Studies courses. This will assist the learners to think while they are facing problems, thus enabling them to solve the problems using the JIM.

Literature Review

Business challenges in the workplace have been escalating, forcing organizations and their leaders to anticipate 'discontinuous change' (Van, Doris, & Brannigan, 1999). As opposed to simply learning about the past and gaining insight from historical decisions, leaders and employers will need to anticipate the future (Dalton, 2001; Werbach, 2001). To be successful, today's learners must be able to seize opportunities, stay abreast of changes, remain flexible, and visualize futures (Bostrom & Lassen, 2006; Eisenhardt & Sull, 2001). Students preparing for future careers must be able to critically analyze the position of a firm and envision where future value can be created for customers (Ackerman, Gross, & Perner, 2003).

Wandee (2011) used factor analysis to investigate the futuristic thinking characteristics of Lower Secondary Level students under the Office of the Educational Services Area, Chiang Rai Region 4, in order to examine the consistency of the structural equation modeling of futuristic thinking characteristics and the empirical data. A total of 1,000 lower secondary school students participated in this study using

multistage random sampling and the findings indicated that there were seven factors of futuristic thinking characteristics consisting of information perception, motivation, self-control, self-confidence, self-efficacy, future expectation, self-development, and data collection before making the decision. The results revealed that the model of the futuristic thinking characteristics had a good fit to the empirical data with goodness fit statistics of GFI = 1.00, AGFI = 0.99, RMR = 0.0097, and chi-square = 1.00 without being statistically significant at a *p* value of 0.74. Therefore the model of futuristic thinking characteristics was consistent with the empirical data.

Chaiwongsa (2005) investigated the futuristic thinker characteristics of grade 11 students in Lamphun province according to Wehmeyer's concept and found that students had futuristic thinker characteristics at a high level. Multiple correlation testing of the student, family and environment with futuristic thinker characteristics had an impact value of 0.75 which was statistically significant at the .01 level and accounted for 56.90 percent.

Kham-arsa (2009) studied the relationship between some factors affecting futuristic thinker characteristics of grade 3 students in the Benjasiri Cluster campus and found multiple correlations between each factor and futuristic thinker characteristics with an impact value of 0.63 in general, which explained 39 percent of variance change. The three significant predictors—motivation, achieving information, and classroom atmosphere—contributed 29 percent, 18 percent, and 17 percent, respectively.

Aims of the Study

Based on the problem statements above, the current researchers wanted to use the Jurisprudential Inquiry Model together with forecasting techniques in teaching and learning activities of the learning area as Social Studies, Religion, and Culture Learning for learners from Primary grade 12. More specifically, the researchers sought to investigate:

1) The developmental process of futuristic thinking ability of grade 12 students using the JIM with forecasting techniques

2) students' achievements with regard to the futuristic thinking ability of grade 12 students according to defined criteria

3) students' achievements with regard to the futuristic thinker characteristics of grade 12 students according to defined criteria.

Methodology

Research Design

Action research classroom based proposed by Power (2005) was applied as the research design. Researchers used Plan, Act, Observation, and Reflect (PAOR) as the nature of the action research activities in eight lesson plans involving 16 hours of classroom activity as follows:

Plan

1. A survey plan was carried out to analyze the problems of teaching thus study the appropriate solutions to solve the problem.

2. In the planning, the researchers also analyzed the core curriculum under the Basic Education Act 2551 to ensure the content of teaching and learning was in accordance with the learning outcomes in the area of Social Studies, Religion, and Learning Culture.

3. The learning activities suggested in the syllabus were used for teaching events. In the planning process, researchers considered educational concept, theories, and principles as guidelines to creating a measurement of the futuristic thinking ability and features of futuristic thinkers.

4. In addition, researchers also re-examined the JIM with forecasting techniques. Researchers adopted a plan of activities for teaching and guidelines in solving problems in the planning process.

5. The researchers established a measurement tool to evaluate the achievement of futuristic thinking ability and futurist thinker characteristics by grade 12 students.

6. The instruments of the study were adapted in the planning process and consisted of a reflection on teaching critical thinking ability test, observation form, student opinion record, instruction record, student interview record of learning activities, and post-test futuristic ability.

7. All the research instruments were checked by experts regarding the accuracy of the content. Feedback from the experts was used to improve the research instruments.

2) Act or operating instruction to perform

8. The study plans which had been developed in the Plan stage were used to carry out the planned teaching activities with the target group.

9. The action research activities as defined in the Plan were executed and operated before observing the process.

Observation

1. Observation was carried out for each of the lesson plan continuously.

2. The students' behavior and their participation were recorded.

3. Teachers' teaching behavior was observed and recorded accordingly.

4. Students' opinion and their level of interest while studying were recorded.

Reflect or reflection on practice

1. Data on the stakeholders' reflections as a common criticism were collected.

2. A summary of information to guide lesson plans for the following lesson plan was made during the reflection session.

Research Samples

The target group in this study comprised 45 grade 12 students of Mueang Phayalae Wittaya School, Chaiyaphun province under the Secondary Educational Service Area Office 30 in semester 1 of the 2014 academic year. This target group was selected by utilizing purposive sampling based on two criteria: 1) this group of students were found to be lacking critical thinking skills to solve problems and provide comments on the report and 2) they were found to be low achievers, particularly in science subjects.

Research Instruments

The instruments utilized in this study were observation form, student opinion record, instruction record, student interview record of learning activities, and post-test futuristic ability. In addition, a 30-item multiple choice test was used to evaluate futuristic thinking ability and a 30-item test using a 4-Likert scale was used to evaluate futuristic thinker characteristics.

Data Collection and Data Analysis

The target group attended eight lesson plans using the JIM with forecasting techniques for 16 hours. Descriptive statistic including mean score and standard deviation were utilized in this study.

Research Findings

The results of this study are presented in accordance with the research aims indicated above. The initial finding was the results of the developmental process of futuristic thinking ability of grade 12 students using the Jurisprudential Inquiry Model (JIM) with forecasting techniques. This was followed by the students' achievement test on futuristic thinking ability of grade 12 students according to defined criteria. Finally, students were checked for their achievement of futuristic thinker characteristics according to defined criteria.

Development Process of Futuristic Thinking Ability of Grade 12 Students Using Jurisprudential Inquiry Model with Forecasting Techniques

The development process of futuristic thinking ability of grade 12 students is elucidated in Figure 1. This study was conducted utilizing the activity-based learning teaching model recommended by Joyce and Weil (1996) and consisted of five steps.

Step 1: Present the case

At this stage, issues were presented that had alternative solutions. Examples of the type of sentences practiced are:

1. It should be legal to freely decide whether to have an abortion or not.
2. There should or shouldn't be a register of prostitutes.
3. Legislation should prohibit people from smoking.
4. Learners should or should not be allowed to contest.
5. Avoid issues related to religious beliefs.

Teachers presented a case to ensure learners were able to learn the facts that related to the issue of who, what, where, when, how, and why. The results of this presented case showed that the learners were interested and eager to find out the facts of the given case including the relevant analytical values.

Step 2: Learners develop their own position

Learners should have their own stand on the issue. Learners choose their own stance regarding the issue and explain their reasons for their choice.

Teacher utilized the JIM including six forecasting techniques, namely: Relevance Tree Technique, Future Wheels, Matrix Forecasting, Trend Extrapolation, Scenario Technique, and Future Analysis Value Forecasting to promote learners' futuristic thinking. Teachers randomly selected learners and asked them what their particular position was with relevant reasons or comments in order to correspond to the presented case in Step 1. The results revealed that learners were able to offer their own opinions for their selected issues. They also identified and discussed their own opinions of values as well as their arguments. A majority of learners preferred the Relevance Tree Technique compared to the other techniques.

Step 3: Teachers re-examined the standpoint of learners

Step 3 was used to double-check or re-examine learners' standpoints by allowing them to review their stance. Teachers also re-examined the standpoints of learners. Teachers used sample situations as below:

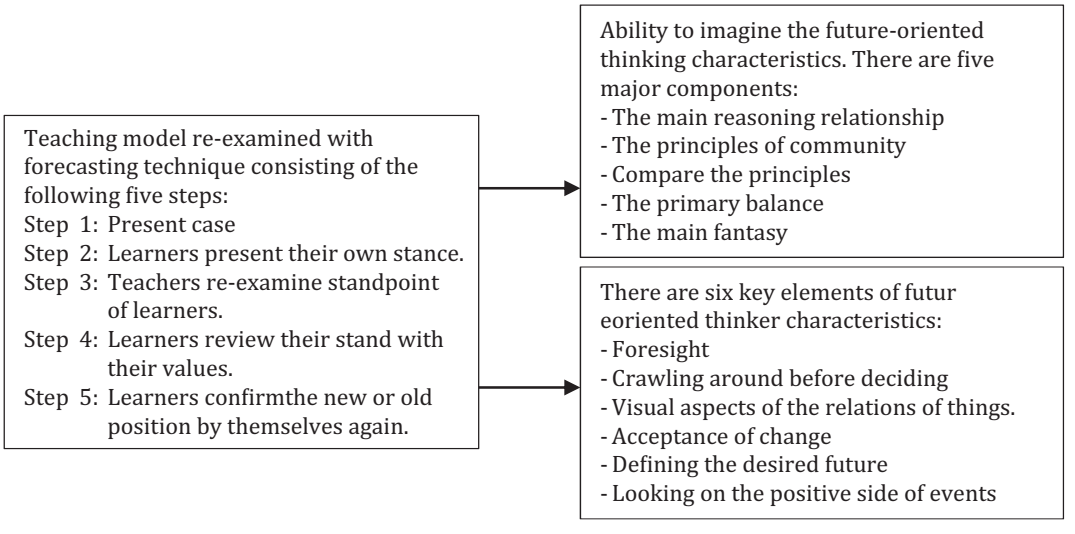

Figure 1 Developmental process of futuristic thinking ability of grade 12 students

1. If there were other positions to choose, another learner was confirmed to promote the original position and to give the rationale for the selection.

2. If the learners faced any other situation, they had to confirm how they would face that situation.

3. Learners had to use reasoning to adhere to a stance on a particular problem faced.

4. Learners had to give reasons for their adherence to a position whenever they faced a problem.

5. Learners had to have sufficient data to support the position that they adhered to.

6. Data were used as the basis to determine the appropriateness of the group's positions.

7. If learners held a certain position, they must be ready to face the consequences.

8. Whatever the consequences, learners had to confirm whether this stance was upheld or not.

The results indicated that learners were able to review their standpoints by providing feedback to confirm the position and explain the reason for insisting on their own standpoint. However, there were some learners who changed their opinions or standpoint at Step 3 but they showed that they were able to explain why they had had a change of mind.

Step 4: Learners review their stand with their values

The learners reviewed their stance. Teachers taught learners the opportunities to modify or confirm the upheld values. Teachers allowed learners to modify, give comments or confirm their opinions or position values that were upheld by utilizing the six forecasting techniques again.

The results revealed that learners were able to discuss independently their opinions or values. Most of them were quite confident in their initial opinions and values. Although some of them had changed their opinions and values, they demonstrated their ability to explain why they had to make the change.

Step 5: Learners confirm the new or old position by themselves again

In Step 5, the teachers offered more information to the learners and allowed them to find out more information and facts to support their opinions and values. Learners had to confirm the new or old position according to their decision. Again learners had to try to find the real values of various perspectives to confirm the true values that they relied on.

The results of this final step showed that learners sought information and facts to support their opinions and values independently. In addition, learners also showed their capability to consider the consequences of choosing the opinions and values that they upheld as a kind of confirmation on their futuristic thinking.

In addition, the researchers synthesized the forecasting into six learning techniques during the instruction process. These six learning techniques were: technical branch relation (relevance tree technique), ECC future wheels (reels), square effects (matrix forecasting), estimating the trend (trend extrapolation), visualization future technique (scenario technique), and analysis of change (future analysis value forecasting). The learning activities were made to develop the ability to think, thus developing future-oriented features to become the students' futuristic thinker characteristics.

Quantitative Findings—Students' Achievement on Futuristic Thinking Ability and Futuristic Thinker Characteristics of Grade 12 Students according to Defined Criteria

The criterion was set as 70 percent of the students to pass the criterion of 70 percent as success rate. On the other hand, the futuristic thinker characteristic test was compared to the defined criteria with not less than 70 percent having the futuristic thinker characteristics being considered as a quite high level. As a result, the researchers requested learners to write an essay to reflect their learning in order to collect data about futuristic thinker characteristics.

The results related to the development of futuristic thinking ability of Grade 12 students of Mueang Phayalae Wittaya School using the JIM with forecasting techniques, revealed that the students had average scores of 21.40, accounting for 71.33 percent of the full score. In total, 37 students passed the criterion level, accounting for 82.22 percent of all students. On the other hand, the results of the study indicated that 45 students (100%) had futuristic thinker characteristics at quite a high level, which was higher than the defined criteria. The details of the quantitative findings are shown in Table 1.

Discussion

The results of this study revealed that Grade 12 students were able to gain an average score on futuristic thinking ability of 21.40, accounting for 71.33 percent of the total score and 37 students passed the defined criteria, accounting for 82.22 percent of the total number of students who all showed higher futuristic thinking ability than the defined criteria. Following this line of reasoning, the Jurisprudential Inquiry Model proved to be essential to assist learners to practice their analyzing and problem solving abilities. This implies t hat the learners had been provided with sufficient opportunities to utilize futuristic thinking skills in current and future society. For example, learners were able to give their opinions on the related problems, to take part in handling conflicts, to present appropriate behavior according to dogma, and to make their stand based on right and proper regulations (Wattanaweerapong, 2007).

Table 1 Qualifying examination results

N	Full score	Mean score	Number of students passing the examination	
			n	%
45	30	21.40	37	82.22

Moreover, the forecasting technique placed great emphasis on creating future matter which may occur from feasible plots by considering uncertainty factors. Uncertainty factors are factors that can occur unexpectedly and affect issues that could be a part of the possible future. Apart from the developing attempt, researchers added group work handouts on futuristic thinking ability into the lesson plans to help promote learners to forecast the future reasonably by using previous or current data. This helped learners to prepare themselves for adaptation before making an appropriate future decision. This finding was further supported by McClelland and Winter (1969) who compared the ability in forecasting with reaction behavior in various situations. Their findings indicated that ability in forecasting the future was crucial particularly to an individual's behavior when acting in various situations.

In addition, the results of the current study were in accordance with Khontiang (2008) who conducted participatory action research with the process of thinking building and living under sufficiency using the JIM in Patai Udomsuksa School. That research found that the JIM was able to develop learners' thinking skill to be reasonable, creative, and cautious. In other words, learners were able to give their opinions and show their perspective based on reasonable data. Additionally, learners were able to understand the principle of the way of life based on sufficiency. Thus, the JIM developed learners' thinking skill to be reasonable, creative, and cautious, producing learning between teachers and students.

Furthermore the results of the current study corresponded with the findings of Inthawong (2009). That study reported on the process to develop the futuristic thinking of gifted students in science and technology subjects and found that the futuristic thinker characteristics of the science and technology students generally were at a high level. After the students had attended activities, an assessment regarding futuristic thinker characteristics was carried out. The results derived from that assessment showed that the students possessed futuristic thinker characteristics in general. Furthermore, the students were found to have particular futuristic thinker characteristics such as foresight, gathering data before making decision, visualizing relationship of creations, accepting change, drawing the future by themselves, and having positive thinking. All these futuristic thinker characteristics were found to be significantly higher ($p< .01$) when compared to assessment results from before attending the activities.

The results of the current study indicated that 45 (100%) grade 12 students at Mueang Phayalae School passed the defined criteria of having a high level of futuristic thinker characteristics. This implies the Jurispridential Inquiry Model is be able to assist learners to have clarity in their thoughts about values, understand themselves and furthermore, the teachers could also learn and understand the learners' thoughts as well. This, in turn, will help the learners to have broader perspectives. Additionally, it can help to develop the learners' ability to make decisions (Khammanee, Teeranuruk, Chaokiratipong, Wittayasirinan, Dachakub, & Karnchawasi, 2011b).

The findings of this study were in line with Phoonphatcheewin (2005) who stated that the forecasting technique focuses on learners' thinking systematically, continuously, and reasonably by using previous and current data, and forecasting situations to help learners notice future effects; this is a method of making decisions involving choosing whether or not to carry out a specific course of action. Finally, the results paralleled past research reported by Kham-arsa (2009), Wandee (2011), and Chaiwongsa (2005).

Conclusion

The researchers recommend that learners should change their group every time they participate in the activities in order to promote and develop their cooperation. They are encouraged to take turns in each group in different positions, for example, sometimes as a presenter, other times as a leader or a follower. This provides opportunities for all learners to develop learning skills associated with being a learner or follower and also to promote their confidence in giving opinions in public. In addition, teachers should give learners opportunities for socialization and to have more interaction during the teaching and learning process.

Based on the study, the researchers would like to share some experiences faced to help with further improvement. The problems raised from conducting this study included: content-based instruction has to be detailed, some learners worried about clustering and the exchange of knowledge among themselves, time to do evaluation was insufficient, some learners may lack interest in literature and textbooks, time constraints, learners felt stressed, teachers spoke too fast, and the questions posed did not fit appropriately. Based on the mentioned problems, some improvements have to be considered. For example, teachers have to adjust the content to suit the time and intervention issues, and identify events of interest on a daily basis. Teachers have to explain and allow the learners to learn together in their group. Teachers should control each step of the learning activities appropriately. Teachers should provide a variety of teaching materials. Teachers should reschedule properly to match the time allocated to the learning activities. Teachers should control the speed of explaining and give clear descriptions while posing their questions.

Finally, the researchers recommend future investigation of various parameters such as problem solving ability, logical implementing ability, and critical thinking skills. Future research could undertake a comparative study of futuristic thinking between the urban and rural students. The findings of this study contribute significantly to knowledge proposing futuristic thinking ability which can guide teachers in improving their teaching competencies to manage their students' futuristic thinking abilities effectively.

Conflict of interest

Conflict of interest did not exist either between the authors or the Faculty of Education, Khon Kaen University and the respondents that may have influenced the authors' actions.

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