The Effect of Future Thinking Curriculum on Future Thinking and Creativity of Junior High School Students

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Abstract: The main purpose of the study was to investigate the future thinking curriculum effects on the future thinking and creativity for junior high school students. A static-group comparison design was employed. Thirty-six ninth grade students from a local junior high school participated in the experimentation with three-unit learning activities, each unit took 45 minutes. Students' responses in Future Thinking Checklist, Torrance Tests of Creative Thinking, and feedback questionnaire were collected and compared with t-test statistical analyses. The major results were as follows:

(1) The future thinking curriculum had significant effects on enhancing creativity ability of junior high school students, including the elaboration and title ability. Eighty percent of the students expressed creative ideas beyond reality in the learning sheet. More than fifty percent of the students thought that the curriculum could inspire their creative imagination ability. They also pointed that they had confidence to use their creative imagination in the future.

(2) Eighty percent of the students felt positive for the future and thought that the curriculum could improve their plot construction, past review and future prediction. Ninety percent of the students could predict the changes in the future. Sixty percent of the students thought that the curriculum could be helpful to predict the changes in the future and improve prospective thinking.

(3) Eighty percent of the students could express their future life which they want to achieve. More than fifty percent of the students understood how to have a wonderful life and made it come true through the curriculum.

Key words: future thinking, creativity

1. Introduction

Humans spend a great deal of time anticipating, planning for, and contemplating the future. Our future thinking is directed toward such ordinary events as what to wear the next day or where to go for lunch, but also toward more significant choices that will potentially impact our long-term happiness and success, such as accepting a job or getting married (Atance, 2012). Chuang (2005) noted that learning futurology could foster the ability of imagination, creativity and invention, which is called the future force; future force also could enhance

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personal judgment, and obtain all possible competitive elements in the future. Future thinking is the architecture of temporal extension which is reflecting on the past, thinking about the future life. It shows that the concept of futurology focused on the past, present and future of space-time background, and tried to find a better future.

The purpose of futures studies is to "discover or invent, examine, evaluate and propose possible, probable and preferable futures" since "futurists seek to know: what can or could be (the possible), what is likely to be (the probable), and what ought to be (the preferable)" (Bell, 1997, p. 73; as cited in Hicks, 2012). The term futures education is used more specifically to denote the translation of futures concepts into learning experiences appropriate for primary and secondary school students (Fitch & Svengalis, 1979; as cited in Hicks, 2012). Liberman and Trope (1998) reported that thinking about the distant future helps to prompt abstract and high-level representations, and the abstract representations facilitate creative thinking (as cited in Chiu, 2012). In the face of the elusive future, you have to imagine your future, to prepare yourself in advance. Our next-generation will affect the future of Taiwan's natural environment, economic development and the country's future, so it is imperative to develop "future thinking curriculum" to foster students' ability of future thinking and creativity.

Förster, Friedman, and Liberman (2004) examined the impact of future thinking on creative thinking by manipulating the temporal distance of one year at most. When increasing the temporal distance of the future time scale, the influence of future time scale on creative thinking might be increased, and the substantial influence of the temporal distance of future thinking on the performance of creative thinking could be verified (Chiu, 2012). The main purpose of this study was to investigate the learning effects of a future thinking curriculum with three-unit future courses for junior high school students on their future thinking and creativity.

2. Theoretical Framework of the Study

The future can't be predicted, but it can be envisioned and brought better future. Futures education is a holistic education, which aims at providing pupils with better opportunities to manage in the future and to develop a better common future (as cited in Lehtonen, 2012; Wolff, 2004). The goal of the futures education is to promote proactive attitudes by providing people with future skills, creating alternative future images and by promoting active participation and empowerment to cope with whatever kind of circumstances in the future (Haapala, 2002; as cited in Lehtonen, 2012). Future thinking refers to the imagination of possible future events or one's ability to creatively imagine the limitless possibilities of hypothetical future scenarios (as cited in Chiu, 2012; D'Argembeau, Ortoleva, Jumentier, & Vander Linden, 2010; Fortunato & Furey, 2011). By future thinking, people try to gain knowledge, understand and evaluate information about the future. An opportunity to portray the future as multi-faceted entity emerges–the possible future (anything could happen), the probable future (believed more likely to happen) and the preferable future (most desirable) (Strong & Bishop, 2012). The main idea of futures education is that our conscious and unconscious future images, in which we believe, affect or even predict our individual and common future.

According to construal level theory (Trope & Liberman, 2003), temporal distance alters one's mental representation of the world, leading to a change in one's reaction to future events. When thinking about a greater distant future event (e.g., imagining your life 5 years from now), the representations of the cognitive thinking would be more abstract, general, and de-contextualized. Conversely, when thinking about a shorter distant future (e.g., Imagining your life one day from now), an individual would think of the event in a more concrete and contextualized way (as cited in Chiu, 2012). When people thought about their future goal or future life, they

would inspire their imagination, try to portray their future vision, and improve their abstract and creative thinking.

Masini (2011) considered that at the basis of Futures Studies teaching there is a need for learning and teaching how to look to the future in the awareness that we live amid increasing uncertainty and hence the possibility of error. Such awareness brought with it the need to think in terms of alternative futures, and reduce the level of uncertainty about the future, as we all learned long ago. Chen, Li and Lin (2012) pointed out that meaningful memory and learning help to stimulate further thinking and future imagination. It implicated that knowledge and learning is the important fuel of future thinking and imagination. Through the future imagined, students could effectively obtain this capability. Hence, teachers have to teach these basic concepts of future thinking. When students have the concepts of the future, they can reduce the uncertainty about the future and make their career plan.

Jerome Glenn characterized the objective as an attempt to get learners to develop a way of thinking which will help them look beyond today and anticipate what they may be faced tomorrow (as cited in Strong & Bishop, 2012). Futures Inquiry, as a methodology, encouraged consideration of the element of change, its dynamics and its implications in conjunction with futures concepts, trends and issues (Strong & Bishop, 2012). Strong and Bishop (2012) mentioned that futurizing assignments add a dimension of richness and authenticity as learners build anticipatory thinking skills and mental preparation for their future. They proposed several strategies related to the future thinking. First, timelines is easy to implement and beneficial for appending the usual past/present perspective to include a future-sense. It exercises underscore both the source(s) of change and malleability of the future to build the capacity to observe changes. Students are challenged to identify specific "changes", such as plans for a new highway or reports about the air quality or weather patterns. Students then explore "how we got here", before projecting forward how the change might develop locally and globally.

Second, the Futures Wheel is an exercise in stretching the implications of a choice, action or condition beyond the obvious. The process begins by identifying a trend (a condition exhibiting sustainability, momentum and directionality pushing through from the past), event or issue then labeling the centermost circle of the wheel. Its ability is to expose the widening effects of a choice, action or a change in a condition beyond the most foreseeable to the more distant. Last, scenario writing transforms our findings about changes, their dynamics and possible implications into fresh perspectives. An array of possible futures, pre-written as scenarios, based on observed trends and emerging issues in society, the economy, technological innovation, the environment, and political activity are distributed. Using imaginative thinking students answer a series of questions about life (work, recreation, crime, media) in their assigned scenario and report their future life story. Encouraging the active use of imagination in a risk-free environment is a valuable counterbalance to the emphasis on critical and convergent thinking in most classrooms.

3. Method

The study employed a static-group comparison design with the intention to investigate whether the future thinking instruction would produce any effect on the improvement of the students' future thinking and creativity. The research framework was shown in Figure 1.
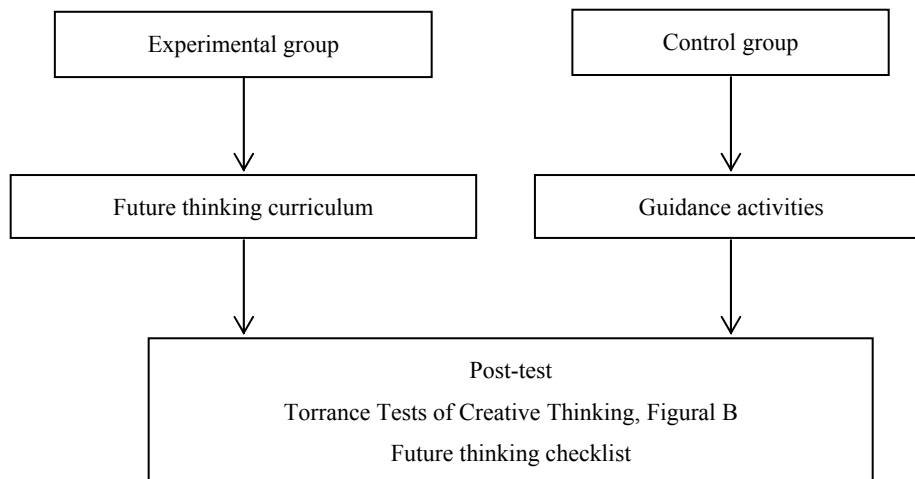
Figure 1   The Research Framework

3.1 Participants and Procedure

Thirty-four ninth grade students from a local junior high school participated in the experimentation with three-unit learning activities, each unit took 45 minutes. The other thirty-six students served as the control group. The experimental group consisted of 15 males and 19 females. The classroom teacher included 3-units future thinking curriculum (see Table 1) into her original instruction plans, guiding students to answer some questions about the future films and imagining their future life in 2030. The classroom teacher in third grade, as well as the school counselor, was participated in the study. By watching the future city, or the future life of the film, the teacher guided students to understand the current state of the environment, technological advances which may impact on the future, and deeply thought about their future life. During the activity, students needed to use divergent thinking to imagine their role in the future, then used critical thinking to delineate their feasible and appropriate future life, with the purpose to enhance their future thinking ability and creativity. The data were collected in the course of one semester.

Table 1   The Framework of Future Thinking Curriculum

Topics	Strategy	Content
Future city	Brainstorm	The teacher introduced the future city presentation which was designed by Australians and guided students to imagine their ideal future city.
Future life	Brainstorm	Through watching some future films, students imagined their future life in 2030 and answered some questions related to the future films.
Career vision	Future wheel	The teacher introduced how to use the future wheel to portray their future vision. Students have to write the report about "My future life in 2030."

3.2 Instruments and Data Analysis

Two instruments were used in the present study. The first instrument is that Li (2006) revised from E. Paul Torrance and Orlow E. Ball with H. Tammy Safter prepared in 1992 in Torrance Tests of Creative Thinking, Figural B (TTCT). It was used to measure junior high school students' creation which included five factors, fluency, originality, title, precision, and openness. The scale has good internal consistency ($\alpha = .911 \sim .991$) and construct validity with its preliminary fit criteria, overall model fit and fit of internal structure model.

The second instrument is the future thinking checklist which developed by the author, based on the concepts of future imagination disposition to Wu's (Wu, 2011) scale and on those of future time perspective to Chiu's (Chiu,

2006) scale. The items related to beyond reality, past review and future prediction, emotion and value, plot construction, predict changes, critical thinking and decision making. The author used the checklist to assess students' learning sheets to give the degree of future thinking and critical thinking.

The SPSS18.0 statistical software version was used to analysis all quantitative data. Students' learning sheet and their feedback on the curriculum were also collected for mutual authentication between quantitative data and qualitative data. Students' responses in Torrance Tests of Creative Thinking, Future Thinking Checklist, and feedback questionnaire were collected and compared with descriptive statistics, and t-test.

4. Results and Discussion

The major results were as follows. The future thinking curriculum had significant effects on enhancing creativity ability of junior high school students, including the precision and headline ability (Table 2). The experimental group students got higher scores than control group students on precision and headline ability significantly, but they got lower scores than control group students on fluency significantly. The reason of the lower scores of the fluency is that students focused on the details of future life scene. From the feedback questionnaire, more than fifty percent of the students thought that the curriculum could inspire their creative imagination ability. They also pointed that they had confidence to use their creative imagination in the future. The findings were proved that when students imagined their future in 2030, their creative thinking would be improved. It was the same with Förster, Friedman, and Liberman (2004). The empirical evidence from Förster et al. (2004) showed that those participants under the condition of distant future thinking, or who primed by a distant-future imagination task had better performance in insight problems and creative generation task than those under the condition of near future thinking suggesting that thinking about the distant future can improve creative thinking (as cited in Chiu, 2012; Friedman & Förster, 2002; Schooler, Ohlsson, & Brooks, 1993).

Table 2   The Results of Torrance Tests of Creative Thinking

Item	Group	Mean	SD	t	η^2	Statistical power
Fluency score	Experiment	18.44	7.59	-2.417*	0.079	.664
	Control	22.78	7.42			
Originality score	Experiment	13.74	6.34	-.063		
	Control	13.83	6.76			
Title score	Experiment	4.82	2.80	2.881**	.109	.811
	Control	3.08	2.23			
Elaboration score	Experiment	3.71	1.17	2.179*	.065	.575
	Control	3.11	1.12			
Flexibility score	Experiment	3.91	1.69	-.068		
	Control	3.94	2.25			
Total score	Experiment	44.62	14.67	-.573		
	Control	46.75	16.38			

*$p<.05$, **$p<.01$

In the study, the future thinking checklist was used to assess the degree of the future thinking in the learning sheets, as shown in Table 3. The curriculum could inspired students' future thinking. Eighty percent of the students expressed creative ideas beyond reality, and referenced the past and present things to think about the

future in the learning sheet. For example, students pointed that the future city were the ring, weightless city, the hill-type construction, green city and so on. We could obtain solar and energy from the nature. The city was built on the ocean just like Dubai hotel. Eighty-five percent of the students could think about the future from different points of view and make their decisions about their future life. Eighty-three percent of the students felt positive for the future. Few students felt negative for the future, such as alien invasion. Ninety percent of the students could express the future changes and expressed critical thinking ideas.

According to students' feedback, sixty percent of the students thought that the curriculum could be helpful to predict the changes in the future and improve prospective thinking. Eighty percent of the students could express their future life which they want to achieve. More than fifty percent of the students understood how to have a wonderful life and made it come true through the curriculum. Ninety percent students could express that how technology affect our present and future life, gave the reasons. They also pointed out that the technology brought advantages and disadvantages of living. From students' feedback of the open-ended questions, some students thought that the curriculum could enhance their imagination and knew the future trend, and changed the world. They felt positive for the future, and knew that they could consider future goals, plan their career, and prepare in advance.

Table 3　The Results of Future Thinking Checklist

Item	Number (Percentage)				
	1	2	3	4	5
beyond reality	3(8.6%)	4(11.4%)	8(22.9%)	19(54.3%)	1(2.9%)
past review and future prediction	1(3.0%)	5(15.2%)	11(33.3%)	15(45.5%)	1(3.0%)
plot construction	1(2.9%)	4(11.4%)	15(42.9%)	13(37.1%)	2(5.7%)
emotion and value	0	5(16.7%)	16(63.3%)	9(20.0%)	0
predict changes	0	3(8.6%)	9(25.7%)	22(62.9%)	1(2.9%)
decision making	1(2.9%)	4(11.4%)	24(68.6%)	6(17.1%)	0
critical thinking	0	3(10.0%)	18(60.0%)	8(26.7%)	1(3.3%)

5. Conclusion

The major results were as follows. The future thinking curriculum had significant effects on enhancing creativity ability of junior high school students, including the precision and headline ability. Eighty percent of the students expressed creative ideas beyond reality in the learning sheet. More than fifty percent of the students thought that the curriculum could inspire their creative imagination ability. They also pointed that they had confidence to use their creative imagination in the future. Eighty percent of the students felt positive for the future and thought that the curriculum could improve their plot construction, past review and future prediction. Ninety percent of the students could predict the changes in the future. Sixty percent of the students thought that the curriculum could be helpful to predict the changes in the future and improve prospective thinking. Eighty percent of the students could express their future life which they want to achieve. More than fifty percent of the students understood how to have a wonderful life and made it come true through the curriculum. The study could encourage teachers to combine the future issues in their academic subject, and inspire students' learning motivation and imagination to think about their future. In the future, the study could add the curriculum units and extend the research time in the future, so students have a plenty of time to imagine their future life.

The study found that future thinking curriculum can really improve students' future thinking and creativity. According to the research findings, the author provided some suggestions for future implementations. Firstly, it was important to employ multiple teaching strategies to enhance students' future thinking, creativity and learning motivation. Secondly, in addition to using paper type instrument, researchers can also consider varieties of measurement, such as implementing dynamic assessment, play, painting, group reports to share views on the future life. Thirdly, future research could extend the program time, then students have more time to think about and discuss the different future issues. Lastly, provide extra resources for potential curriculum. Teachers can provide information about the future imagined novels, comics, movies, DVD, etc. Students can read during school, or at home and share their perspective with their classmates. They can have a deeper understanding to the future life through this way.

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