ACTION RESEARCH OF INTER-DISCIPLINARY FUTURE VISION CURRICULUM PLANNING AND PRACTICE

Chia-Mei Lu[1], Jing-Song Huang[2], Yun-Chai Chen[3], Pai-Lu Wu[4]

[1] Department of Digital Multimedia Design, Cheng-Shiu University, [2, 3]Kaohsiung Municipal Wunshan Senior High School, [4]Center for Teacher Education, Cheng-Shiu University, TAIWAN.

[1]chiameilu1313@gmail.com, [2]deanhuang1212@mail.wsm.ks.edu.tw,
[3]jenny386@gmail.com, [4]pailu@gcloud.csu.edu.tw

ABSTRACT

This study aims to develop inter-disciplinary future vision curriculum planning through action research in response to informatization. Curriculum planning is based on the issues of future society and future technology, and the course is designed from the perspectives of education experience and learning by doing. Thus, in the learning process, students can perceive the relationships among humanity, technology, and environment. Hence, this study enhances the inter-disciplinary cultural creativity competence of problem-discovery, problem-solving, and DIY of students. Through observations, interviews, reflections, dialogues, and text analysis, this study collects data, analyzes a course development model, and presents a practical outcome.

The research subjects are students of Kaohsiung Municipal Wun-Shan Junior High School(Wun-Shan), including freshmen and sophomores of a senior high school and grade 8 students. The courses employed include English, biology, art, household management, music, and information for one semester of learning an elderly issue integrated course. The study produces nine teaching plans of an elderly issue integrated course, and after the course the researcher proposes curriculum planning revision and instructional practice reflection regarding an inter-disciplinary future vision course and instructional activity. From the research findings and results, this study proposes suggestions as reference.

Keywords: future vision, inter-disciplinary, curriculum planning, action research

INTRODUCTION

This study bases inter-disciplinary future vision curriculum planning on future society and technology, designing courses from the perspectives of education experience and learning by doing. Thus, in the learning process, students can recognize the relationships among humanity, technology, and environment. Studying inter-disciplinary issues about caring strengthens students' thinking resources, enhances their thinking about the competence of core value issues, and results in multiple perspectives of technology and human literacy in a society. Specifically speaking, the research and development of educational resources and experimental research help develop a "course of inter-disciplinary cultural and creative future vision" of problem-discovery, problem-solving, and DIY.

In this study, the collaborative research group includes 9 teachers in Wun-Shan. The aim is to develop courses of inter-disciplinary cultural creativity competence for Wun-Shan, through the process of action research, in order to cultivate and enhance students' competence in problem-discovery, problem-solving, and DIY. The curricular model of Wun-Shan Junior High School shall serve as a reference for different circles' development and the practice of

courses so as to cultivate and reinforce students' inter-disciplinary cultural creativity competence of problem-discovery, problem-solving, and DIY.

LITERATURE REVIEW

Maker and future vision related research

Future vision refers to competence of imagination, creativity, and thinking about the future (including problem-solving, speculation, communication and expression, creative leadership, lifelong learning, social development and human concern, sustainable development, and environmental concern) (Ministry of Education, 2009). Dewey (1910) argued that by imagination, people can visualize a future beyond the reality. It supplements people's imagination, enhances their observation, and liberates their logic limitation. Imagination is the competence to reorganize or combine elements and things. It is not only the base of creativity, but also the important factor of culture, art, science, and technology creation (Vygotsky, 2004). "Force of future" refers to the ability and drive of future thinking - that is to say, original imagination, process of vision thinking, and creativity result in various scenes of a future vision for people to select the most favorable one. In vision thinking, imagination is the ability and creativity is the drive (Chan and Chen, 2011).

An imagination tool of futurology includes systems thinking, which allows individuals to observe things from the individual to the overall perspective and from a linear thinking model to a non-linear one. It connects short-term and long-term thinking (Chan and Chen, 2011). In this era of cultural and creative industries, education must show different comprehension and direction from the past upon agriculture or industry. Culture and creativity are not only the important content of education in this new era, but also the reason and objective to launch educational reform (Yu, Wu, and Fan, 2012).

New technology and creativity related research

The difference between technology creativity and general creativity is that the content of technology creativity is not simply the proposal of several concepts. It requires operation of tools and processing of materials as well as the output of results (Li and Chang, 2000).

The cultivation of cultural and creative talents must rely on specialty and inter-disciplinary knowledge and should also focus on local culture and internationalization. Aside from curriculum design of formal education, teaching methods and materials must be adjusted and should develop a new evaluation system. Only in a "cultural and creative" society can "cultural and creative industries" be sustainable in Taiwan (Yu, Wu, and Fan, 2012).

The curriculum planning of this study explores future society and future technology based cultural and creative issues and develops an innovative service and design regarding future trends and allows students to propose their own interesting and useful cultural and creative innovative service and design. In order to accomplish the curricular objective of learning, one must rely not only on a knowledge comprehension of theory, but also on innovative practice creation. The practice of courses and students' learning outcome strengthen the depth and intensity of their concerns on society, humanity, and technology based cultural and creative issues, problem-solving, and goals.

RESEARCH DESIGN AND PRACTICE

This study utilizes action research to explore the proper courses to cultivate and enhance secondary school students' inter-disciplinary cultural creativity competence of problem-discovery, problem-solving, and DIY.

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp

Research Method

The orientation of action research includes the following: practice orientation, collaboration, and reflection. "Practice orientation" means the teachers participate and practice the action. In the action, they study the intelligence, construct the courses, and develop knowledge.

Research Field

Humanistic characteristics of the research field

The research field of this study, Wun-Shan, in Kaohsiung of Taiwan.

Experience of curricular development in the research field

Wun-Shan applied for "Educational Program of Creative Thinking" of the Ministry of Education in 2012, "Future Vision and Creative Talents Cultivation Program" of the Ministry of Education in 2013, "Digital Assisted Subject Reading Program" of the Ministry of Education in 2014-2016, and "High-Scope Program" of the Ministry of Science and Technology in 2016-2018.

Research Process

This study explores and analyzes the issues, searches for partners, reviews related literature, probes into the problems, constructs curricular development, executes a model and strategy, reviews the curricular development model and strategy, and presents research outcomes. Through observation, text analysis, and reflection, it collects data related to a promotion model and a strategy for curricular development and conducts two rounds of an action cycle. The first round was conducted in the academic year of 2016, and the second round is expected to be practiced in the academic year of 2017.

Researcher's Background and Role

Chen (2002) argued that it is extremely critical to explore researchers' personal factors, because they are important for the flexibility and precision of research tools and the quality of research. In this study, 9 teachers of Wun-Shan explored the curricular development model by collaborative action research, and 4 collaborative researchers are the main tools to collect and analyze data.

Research Practice and Data Analysis

Since November 2016, this study has collected data, searched for research subjects, and planned the curriculum. In December 2016, the researcher discussed the activities and instructional design with the research team. In March 2017, teachers of different subjects launched their instruction. According to the curricular planning of each subject, they conducted 9 thematic instruction (three times of art, one time of information, one time of biology, one time of household management, two times of music, and one time of international vision). In the process, the related documents were relatively preserved. Finally, data were analyzed.

Reliability, Validity and Research Ethics

In order to enhance reliability and validity, this study conducted long-term research and inter-disciplinary cooperation that lasted for ten months. Before the study, the researcher was fully prepared to control research points. Courses were designed according to the literature. The researcher analyzed the instruction to ensure consistency between design and practice. The study was based on authenticity, and the researcher precisely indicated the data sources. For the concern of research ethics, before the study the researcher obtained the agreement of

collaborative researchers, the school, and students, who were all fully informed of the research method and use of data.

RESEARCH RESULTS AND DISCUSSION

This study utilizes action research to explore the proper courses to cultivate and enhance secondary school students' inter-disciplinary cultural creativity competence of problem-discovery, problem-solving, and DIY.

Framework of action research

Figure 1 shows the framework of action research of the curriculum.

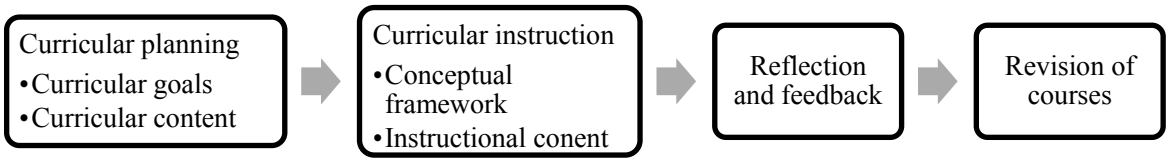

Figure 1. Framework of action research for the curriculum

Course Planning

Concepts of curricular planning

This action research focuses on the issues of future society and future technology and we expect to trigger students' care toward humanity and enhance their warmth toward society. This study probes into caring issues of language, society, nature, life technology, art, and music, strengthens students' thinking resources, and enhances the thinking competence of core value issues in order to result in multiple perspectives of technology and human literacy in society and the ability to thoroughly ponder on the future and future vision.

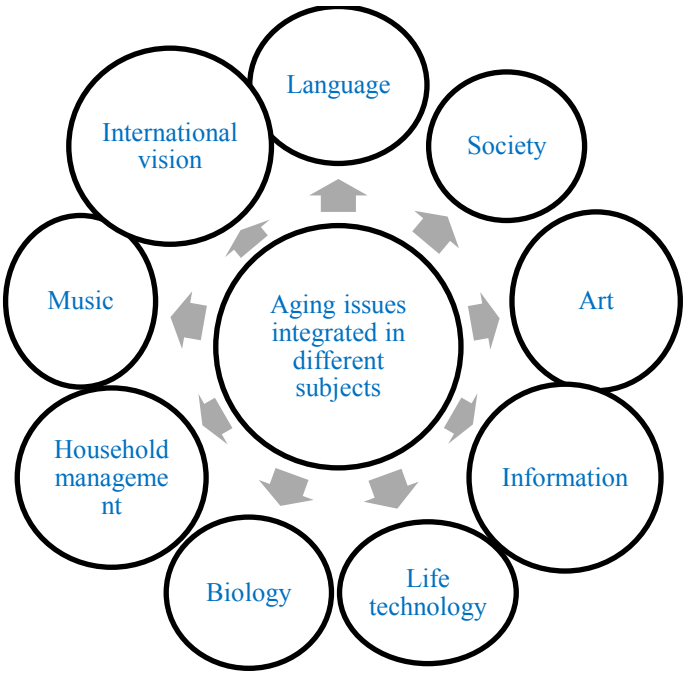

Figure 2. Aging issue integrated with curricular planning of different subjects

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp

Instructional practice and planning of project courses

Project courses and DIY allow students to construct new knowledge and skills by developing ideas through their own rhythm and preference. Students discover more interesting problems, attempt to solve them, and become more enthusiastic about what they have learned. This study combines inter-disciplinary knowledge education, professional education, and experience and cultivates students' courage and creativity to cope with the future.

Thematic content design of the course

In the thematic content design of this curriculum, the aging issue was the aim to construct the company. 2030 Wun-Shan Dreamer set up "aging learning department", "aging design department", "aging building and living environment department", "aging ecological learning department", and "aging healing department", as shown in Figure 3. The principal is the general manager. The teachers of different specialties of the school are the managers of different departments. Teachers of the departments are in charge of teaching plan development and the teaching of courses. Students pondered the characteristics of modern society, economy, and life and explored different issues and values. As to technology, based on the thinking of visionary science, it probed into the potential of technology, simulated technology development risk and impact, developed the drive of future technology, and improved future society. In the course, students discuss the future path of aging and discover potential business opportunities and the crisis of future society or technology in the process of discussion and practice so as to study the most appropriate strategy and method.

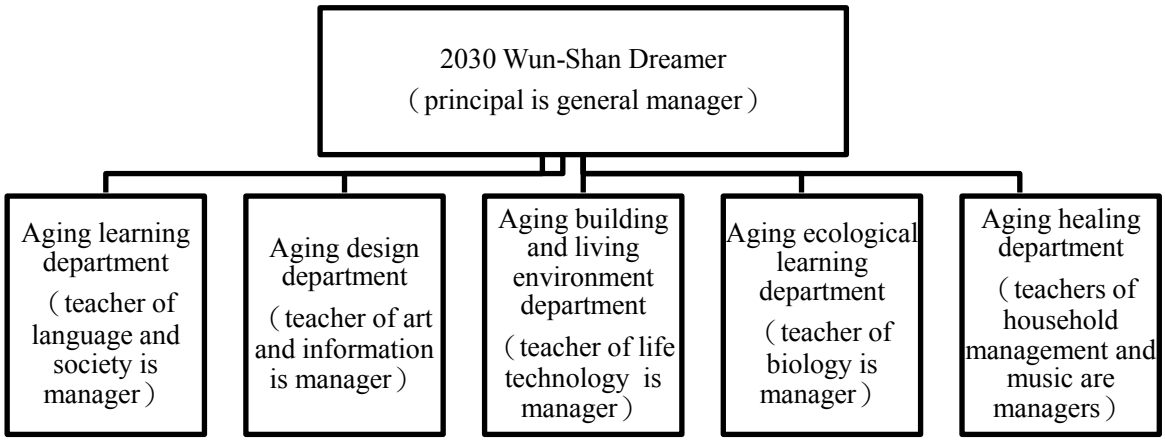

Figure 3. Structure of 2030 Wun-Shan Dreamer Company

Planning, practice, and reflection of course teaching plan

This inter-disciplinary future vision elderly issue integrated curriculum develops nine teaching plans: information course: mobile device for future aging society; household management course: silver future: elderly diet design; music course: music imagination of future elderly group; art course: product design of future aging group; biology course: the elderly with physical, mental, and spiritual balance; art course: are you aging; music course: the elderly love of music; art course: aging world; and international vision course: Sustainability of Taiwan Cultural Heritage.

EFFECT OF COURSE PRACTICE

The study utilizes action research to explore the proper courses to cultivate and enhance secondary school students' inter-disciplinary cultural creativity competence of problem-discovery, problem-solving, and DIY.

1. Course planning

Curriculum planning, introduction of content, reflection, and quantitative statistics are shown in Table 1.

Table 1. Curriculum planning, introduction of content, reflection, and quantitative statistics

No.	*Curriculum planning*	*Introduction of content and reflection*
1	Information course: mobile device of future aging society	1. Reflection: Students needed more stimuli for imagination and should obtain information technology competence associated with imagination. The teachers' control over course time should be more effective in order to enhance instructional outcome. 2. Number of teachers and students are 270 persons; teaching aid developed: 1; and teaching plan developed: 1
2	Household management course: silver future: elderly diet design	1. Reflection: The teacher invited the students to interview their elderly relatives such as parents and grandparents or find "taste of family" by memory. Subsequently, students shared their family story by oral presentation. Finally, they shared and practiced the secret in the dish of family. Students not only recognized the taste of family from the memory, but also recorded and shared the dishes from different families by DIY. 2. Number of teachers and students is 400 persons
3	Biology course: the elderly with physical, mental, and spiritual balance	1. Reflection: Guidance of students' thinking: based on the concept of green ecology, they develop positive thoughts and activities for the elderly's lives that are healthy. Through DIY and outdoor instruction, students reflect on the positive effect of ecology on the elderly. 2. Number of teachers and students is 160 persons; teaching aids developed: 1; and teaching plan developed: 1
4	Art course: product design of future aging group	1. Reflection: Students needed more stimuli of imagination and should obtain the ability of information technology that is associated with imagination. Teachers' control over course time should be more effective to enhance instructional outcome. 2. Number of teachers and students is 280 persons; teaching aids developed: 1; and teaching plan developed: 1
5	Art course: are you aging	1. Reflection: In course content, students recognize the creation and design of issues in a future aging society and explore the concept, symbols, and significance. Semantic expression and transformation of modeling help enhance students' cognition of forms and lead to modeling semantic communication and creativity. A future vision thinking tool and creative thinking tool of intel seeing reason, it reinforces students' learning motivation and collaborative learning process. As to thinking skills, students apply high-level competence of analytical thinking, comprehensive thinking, evaluation thinking, problem-solving, and flexible thinking. Generally speaking, students have a positive evaluation on future vision course content. The practice of a future vision curriculum enhances students' logic thinking ability, allows them to solve life problems, and upgrades their thinking level. At the beginning of the practice of a future vision, the researcher realized that regarding a future aging society, students mostly imagined scenes of science fiction and application of technology. They

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp

No.	Curriculum planning	Introduction of content and reflection
		intended to accomplish the assignments in the shortest time and with the most effective method instead of in-depth thinking on the argument. As to this point, the teachers should spend more time and methods to guide students to develop in-depth and feasibility thinking. In the process of result presentation, half of the groups did not succeed since they did not have sufficient time to reorganize the result of their discussion. We suggest that in the future students can be allowed to have more time to generalize their imagination of the future aging issue in order to more successfully achieve their presentation. 2. Number of teachers and students is 190 persons; teaching aides developed: 1; and teaching plan developed: 1
6	Music course: 1.music imagination of future elderly group 2.the elderly love of music	1. Reflection: The course successfully integrated this issue. The curriculum can be extended to elderly community service. 2. Number of teachers and students is 280 persons; teaching aides developed: 1; and teaching plan developed: 1
7	Art course: aging world	1.Reflection: Students needed more stimuli of imagination and should obtain the ability of information technology that is associated with imagination. Teachers' control over course time should be more effective to enhance instructional outcome. 2.Number of teachers and students is 190 persons; teaching aids developed: 1; and teaching plan developed: 1
8	International vision course: Sustain-ability of Taiwan Cultural Heritage	1.Reflection: By thinking of a future vision, students produced a future journal regarding possible changes to Taiwan's future culture. Students thus enhanced their knowledge of cultural heritage. In this course, English was a linguistic tool instead of simply a subject. In the English oral presentation, students were constantly corrected and strengthened by the teacher regarding English content grammar, pose, fluency of English presentation, and clearness and precision of English pronunciation. Most students suggested that in the summit, Korean students' English proficiency and stage performance were outstanding. Therefore, they intended to reinforce English competence in order to be more competitive in the world. When cooperating with other students from South Korea, Morocco, and Rumania, the Taiwanese students realized that different countries showed different cognition of cultural heritage. For instance, being located in Europe, the introduction of a cultural heritage in Rumania was from a broader sense and included the cultural heritages of North America, Africa, Asia, and Europe. As to Morocco, since its culture was unique, those students mainly introduced their own local culture. This was the same situation for the Korean students. In learning sheets, students mentioned that the teachers were unlike the traditional ones who only read from the textbooks. In class, the teachers guided them. After class, they spent plenty of time with the members collecting data and accomplishing the briefing. The briefing was constantly improved by the teachers' guidance in terms of format,

No.	Curriculum planning	Introduction of content and reflection
		content, presentation, coherence, and organization. The making of the briefing was based on skills of information technology, such as ICT. In this course, students significantly obtained the skills of ICT application. Hence, according to the students, although there were only two hours of the course in one week, they spent the relative time and efforts, which was worth it since they made significant progress. hen they cooperated with Korean students in the summit, they stated that the Korean students produced logic and professional briefings. Therefore, they intended to make progress in writing briefings and using ICT techniques. Hence, this course strengthened students' competence of global competitiveness and cooperation. 2. Number of teachers and students is 80 persons; teaching aids developed: 1; and teaching plan developed: 1

Effect

It develops a creative curriculum, constructs a creative talent cultivation model, and strengthens students' competence to develop imagination and create a future vision.

Effect on students

Students can show in-depth thinking and explore the future aging issue, thus reinforcing their information literacy of high-level thinking tools. Thinking tools enhance students' association ability and cultivate their systems thinking, critical thinking, communication and leadership, social development and human concern, leadership, communication and negotiation, problem-solving, and team work ability. Thus, students have the experience and competence of design and acquire the learning experience of creative design methods. The summit reinforced their briefing competence, stage performance, and spontaneous response and strengthened their English oral expression.

Effect on teachers

The teachers obtained the competence to develop thematic projects and got experience to instruct students' PBL. The teachers also expanded their professional knowledge and ability at new technology issues, such as 3D modeling. They also acquires competence at creative thinking instruction and creative multiple evaluation.

Effect on school

The school constructed a school based curriculum that combines future vision, creative thinking, and ubiquitous learning. It thus provides the instructional resource of a "future vision application project" in the curriculum of the senior high school and offers experiences of PLC and PBL integrated in an information science course.

Connection

International inter-disciplinary learning

The sustainability of Taiwan Cultural Heritage was based on a "project study". Through the option of an international vision course, juniors and sophomores of the senior high school were clustered by heterogeneity. One group included 4 members who accomplished their tasks by collaborative learning. Students conducted collaborative learning in groups and participated in a summit with Korean students. Students of Michuhol Foreign Language High School attended the summit for international cooperation. The summit trained the students' briefing competence, stage performance, and spontaneous response and also reinforced their

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp

English oral expression. Students practiced non-simultaneous cultural heritage course interaction and learning with partners from South Korea, Morocco, and Rumania. The summit enhanced students' ubiquitous learning and their ability in global competitiveness and cooperation.

Inter-disciplinary cooperation

For the development of a teaching plan, future vision community teachers conducted inter-disciplinary dialogue with specialty lecturers of the school. The courses studied included strategy of future vision, case sharing of future vision, sharing and practice of instructional project, Y line, future triangle, practice of the Futures Wheel, technique of future vision practice (Sketch up), creative thinking tool (Visual Ranking), Seeing Reason, Showing Evidence, practice of datura thinking, evaluation strategy of future vision, thinking skill of future vision, and future vision teaching plan sharing. These courses serve as references for community teachers to develop their own project teaching plan.

CONCLUSION AND SUGGESTIONS

Through inter-disciplinary future vision curriculum planning, this study focused on future society and future technology and designed a course from the perspectives of education experience and learning by doing. In the learning process, students recognized the relationships among humanity, technology, and environment. The subjects were students of Wun-Shan. The participants of the integrated courses were juniors at sophomores of the senior high school and grade 2 students of the junior high school. The courses integrated refer to English, biology, art, household management, music, and information. The goal was taking an elderly issue integrated course that lasts for one semester. It resulted in nine teaching plans of elderly issue integrated courses. After the courses, the researcher proposed a curriculum planning revision and instructional practice reflection on the inter-disciplinary future vision curriculum and instructional activity. Generally speaking, the practice of inter-disciplinary future vision curriculum helps cultivate students' independent and active learning competence so that they can become excellent talents with inter-disciplinary ability. The study's suggestions are the following:

1. The future vision integrated curriculum should be continued so as to extend and expand future vision education.
2. Teachers can start participating in teaching plan design and R&D and actively stimulate students' imagination, thus reinforcing the vision. The teachers of the school made progress from initially being unfamiliar with the future vision to guiding students to apply their imagination on different subjects. They also produced teaching plans and significantly enhanced their R&D capacity.
3. Students' change is the most effective, as they showed significant imagination. Ever since the school promoted imagination education, the students not only have been selected among the top ten national stories concerning the global children action challenge, but have also actively participated in imagination related competitions.

REFERENCES

[1] Chan, J. C., & Chen, Y. H. (2011). Developing imagination for Taiwan's future: The role that education can play. *Educational Resources and Research, 100*, 23-52.

[2] Chang, T. A. (2008). *A study of the instruction design of webquest e-learning history curriculum with virtual reality technology*. Taipei, Taiwan: Graduate Institute of Department of Industrial Education, National Taiwan Normal University.

[3] Cheng, P. W., Chiu, H. Y., & Kuo, W. C. (2011). The research of use culture creative industry to develop Kaohsiung's culture tourism. *City Development, 8*, 81-111.

[4] Dewey, J. (1910). *How we think*. Boston: D. C. Heath & Co.

[5] Galtung, J. (1982). *Schooling, education and the future*. Malmo, Sweden: Department of Education and Psychology Research, Lund University.

[6] Hu, Y. T. (2009). *A practice-based study of Taiwan's cybercultural product design*. Yunlin, Taiwan: Graduate Institute of Department of Digital Media Design, National Yunlin University of Science and Technology.

[7] Huang, K. P. (2011). *A study on the influence of virtual reality on junior high school students' product cognition and innovative design performance*. Taipei, Taiwan: Graduate Institute of Department of Technology Application and Human Resource Development, National Taiwan Normal University.

[8] Li, T. W., & Chang, Y. S. (2010). The meaning and teaching of scientific and technological creativity. *Living Technology Education, 33*(9), 9-16.

[9] Ministry of Education, Taiwan. (2009). *Future imagination and creative talent cultivation plan book*. Taipei: Ministry of Education Advisory office.

[10] Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian and East European Psychology, 42*, 7-97.

[11] Yang, C. H. (2011). The orange technology and intelligent life. *Science development, 466*, 30-35.

[12] Yu, K. H., Wu, J. J., & Fan, H. L. (2012). Educational innovation for the cultural and creative industries. *Educational Resources and Research, 105*, 1-38.

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp