Creativity Analysis for Smart Specialist of the Ubiquitous Era

Kyoung-hoon Lew[1] and Jungwon Cho[2, *]

[1]*Graduate School of Education, SoongSil University, S.Korea*
[2]*Department of Computer Education, Jeju National University, S.Korea*
[1]*lewkh@ssu.ac.kr,* [2]*jwcho@jejunu.ac.kr*

Abstract

The purpose of this study is to investigate the relationships among creativity, intrinsic/extrinsic motivation and creative home environment. For this study there were 127 young children subjects under age five from 10 kindergarten classes. Data gathered were analyzed for the verification of the hypothesis of this subject for using SPSS 18.0 program. The results of this study were as follows: First, there were significant positive relationships between the intrinsic motivation and the creative personality of the young children but there were no statistically significant relations between the intrinsic/extrinsic motivation and the creative thinking ability. Second, the intrinsic-high/extrinsic-high motivation group was higher than any other types of motivation groups in creative personality. Third, there were significant relationships between the creative thinking ability and creative personality with the creative home environment.

Keywords: *young children, creativity, Intrinsic/extrinsic motivation, Creative Home Environment*

1. Introduction

1.1. Creative Development of Young Children

The ability to generate novel and useful ideas and solutions to everyday problems is an important competence of creativity. Creativity can be evaluated by emotional variables such as personality, motivation and self-efficacy. Promoting the development of creativity is a purpose that is less often or at least less explicitly, stated. Young children, after their infancy, continue to grow physically in a steady manner while they continue to grow cognitively in a rapid manner. Young children begin to explore and adapt themselves to the surrounding environment using their sensory abilities. This is particularly noteworthy, in light of evidence that the early years are very important to the development of creative potential, and that creative imagination peaks during the preschool years and drops at school when children often begin more "formalized" schooling[1]. Dudek and Hall [2] insist creative ability is much generated and very natural activity to young children.

As shown by the study of Adams [3] if we want to develop children's motivation and knowledge, educators must create environments that allow children to think freely beyond the scripted curriculum. Adding creativity to daily instructional practices will ensure that children are given opportunities to develop all of their potential, not just a small part as required by standard education. Liu, Ni, Yang, Li and Cheng [4] insisted that the aim of cultivating creative thinking lies in enlightening students to improve their abilities of proper questioning and constructing effective solutions.

* Corresponding Author.

In actual practice, little progress has been made toward the realization of such goals. For example, research studies suggest that fewer than 10% of the questions asked by teachers require children to think creatively [5]. In many countries, they emphasize the creative thinking ability as the critical power in the future life. And many studies relation with creative thinking ability have been published in various areas such as art, design, machine, business and education [6, 7].

In order to foster creative character and develop educational programs for children we need to know what creativity is, and what it relationships with motivation. Sternberg and Lubart insisted that, an integrated approach, as a desirable approach, is necessary for study on creativity. As the creativity consists of complicated factors, such an argument is persuasive to avoid making the mistake of considering a part as a whole by a fragmentary approach [8, 9]. In this context, creative thinking ability and creative personality should be considered at the same time for the creativity, creative thinking ability being limited to divergent thinking measured by the creative test for young children and creative personality being defined as sub-factor of creative character presented by the creative test.

1.2. Creativity and Intrinsic/Extrinsic Motivation

In Korea, such an argument was studied by Ha [10] and it tended toward two separate dimension not toward one bipolar. The creativity score of students with high intrinsic motivation and high extrinsic motivation was relatively high in average. In fluency and originality, there was a difference between the group of students with high intrinsic motivation and high extrinsic motivation and the group of students with low intrinsic motivation and low extrinsic motivation. However, it was university student-targeted study and it is hard to find young child-targeted studies. In the previous studies on the creativity and the motivation, researchers were not able to deliver consistent results. Thus, we need systematic data to verify the relationship between the creativity and the motivation which are the most interesting variables for children's creativity. It is necessary and important research task to verify empirically theories which provide concrete and substantial information to enhance creativity. Some school student-targeted studies on the creativity and motivation are recently found but it is still hard to find young children-targeted studies.

Amabile *et al.*, [11] in their study on the intrinsic/extrinsic motivation which influences the creativity and Lew [12, 13] in her study on the relationship between the self-determination and the creativity said that there were very significantly related between the motivation and the creativity. We are to study verification of whether the motivation help or hinder creativity. However, such studies on the motivation are mostly about elementary, middle and high school students. Therefore, it is urgent to carry out study of young children and the creativity, to know what relationships there are between the intrinsic motivation and extrinsic motivation in their early childhood which is considered as a period of much heightened creativity.

Results from many previous studies show that it is questionable whether the extrinsic motivation has a negative influence on the creativity [14]. Such results allow analogizing the motivation structure of two separate dimension by which both of intrinsic motivation and extrinsic motivations are high or low, not that of one bipolar by which the intrinsic motivation is high when the extrinsic motivation is low, and vice versa.

1.3. Creative Home Environment

The evidence suggests that the family is a critically important influence on, and quite possibly the major force behind, the ethnology of creative behavior [15]. Wright and Wright [16] have developed a three-pronged model of the creative family environment. The three

main components of the creative family environment are said to be respect for the child, stimulation of independence, and an enriched learning environment. For example, the creative family environment shows respect for the child by consulting with the child and explaining family decisions to the child. Creative children often come from families where there is a great deal of parental explanation of family decisions and rules, and where children are given voice in establishing rules. The creative family environment stimulates independence by providing both the freedom and the psychological safety to explore, experiment, and make decisions [17] by allowing children the freedom to express both negative and positive feelings and by encouraging children to take risk with new and unfamiliar ideas [18]. Finally the creative family environment provides an enriched learning environment by valuing play, and by providing creative and flexible role models. The core factor in creative home environment is interaction between parent and child. Encouragement, support, tutoring and attention, advice, and caring are also important [19]. Creative home environment made from respect for the child, giving fluency learning context, stimulate independence. Sung and Kim [20] has found that “encouraging children’s questions, suggest using imagination, having lots of materials of thinking house children’s academic achievement is high.” Cho [21] insisted that the creativity were the acquired ability that it could be developed through environmental stimulation like as parents, family and education.

2. Method

2.1. Participants

The present study focused on 5and6year-old preschoolers to investigate the creative thinking ability, creative personality and the motivation types. In total, 150 subjects were sampled from 5 kindergartens in the capital region. The present children's socio-economic background was the class of middle-class people. Excepting missing data 127(boy: 54, girl: 73) children were statistically analyzed.

2.2. Instruments

2.2.1. Integrated Creativity Test: This test for Preschooler developed by Lee and Lee (2002) was used to measure creative thinking ability and creative personality. This test was developed on the basis of the Volcano Model for Creativity Measurement influenced by theoretical background of Guilford [22] and Torrance [23]. This test for 4 to 5 year-old preschoolers is sub-divided into language, drawing, and personality domains.

The language domains consist of imagination, fluency, and originality factors. The drawing domain didn't involve in the present study. The creative personality domain consists of curiosity, independence, run a risk, and task commitment factors. Language tests were scored 0 or 1 point per test item. Creative personality test items were scored of 1 to 5 points, as in the Likert scale.

2.2.2. Intrinsic/Eextrinsic Motivation Test: This is carried out using the questionnaire presented by Jin[24] after determining the confidence and the examining the construct validity. Testing tool consists of two sub factors: intrinsic motivation such as interest, pleasure, satisfaction and challenge; extrinsic motivation such as social reward including compliment and award, and material reward. There are 8 questions for each factor, totalizing 16 questions. Each factor is assessed by 5-point rating scale: from 'definitely yes'(5) to 'definitely no'(5). Testing reliability is .89 intrinsic motivation and .82 extrinsic motivation.

2.2.3. Creative Home Environment Scale is carried out using the questionnaire presented by Oh and Choi [25]. This test was developed on the basis of the 'creative environment checklist' influenced by theoretical background of Amabile [26] and the 'hot housing family' influenced by Hills [27]. Testing tool consists of four sub factors: respect for the child (8 items/ *e.g.*, "I often discussed with my child."), enriched learning environment (9 items / *e.g.*, "I always display my child's products."), stimulation of independence (7 items/ *e.g.*, "I encourage my child enjoy adventure."), family pressure (8 items/ *e.g.*, "We have much rules."). There are 8 questions for each factor, totalizing 32 questions. Each factor is assessed by 5-point rating scale: from 'definitely yes'(5) to 'definitely no'(5). Testing reliability is .75-87.

2.3. Procedure and Data Analysis

As stated previously, the creative test was administered individually by trained researchers to 150 preschoolers during the four weeks, two-month period. The creative personality test and motivation test for parents were sent home and answered directly by parents. The relations among children's creative thinking ability, creative personality, and motivation types were analyzed according to total scores and sub factor scores. The scores were analyzed using SPSS WIN 18.0 statistical package. For the research question Descriptive Statistics, Pearson's correlation coefficient, ANOVA, post-hoc analysis (Schéffe) were performed.

3. Result

3.1. Descriptive Statistics between Creativity and Motivation

Table 1 reports the mean, standard deviation and correlations among the sub-factors of creative thinking ability, creative personality and motivation.

Table 1. Correlations between Observed Variables(N=127)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1.imagination	*1*										
2.fluency	*.16*	*1*									
3.originality	*.32****	*.66****	*1*								
4.total	*.46****	*.89****	*.90****	*1*							
5.curiosity	*.12*	*.16*	*.09*	*.16*	*1*						
6.Independence	*-.04*	*.01*	*-.16*	*-.08*	*.21**	*1*					
7.run a risk	*.13*	*-.04*	*-.16*	*-.07*	*.27***	*.36****	*1*				
8.task_ commit.	*.01*	*-.03*	*-.06*	*-.04*	*.10*	*.31****	*.40****	*1*			
9.total	*.13*	*.5*	*-.12*	*.00*	*.58****	*.72****	*.71****	*.65****	*1*		
10.I.M	*-.03*	*-.07*	*-.14*	*-.11*	*.23***	*.27***	*.24***	*.20**	*.26***	*1*	
11.E.M	*.12*	*.07*	*.05*	*.09*	*.14*	*-.01*	*.12*	*.15*	*.19**	*13*	*1*
Mean	*1.69*	*8.86*	*4.55*	*15.1*	*3.18*	*2.98*	*2.99*	*3.08*	*3.07*	*3.97*	*3.33*
SD	*1.54*	*3.8*	*3.12*	*6.86*	*.43*	*.39*	*.35*	*.30*	*.24*	*.49*	*.41*

** p<.05, ** p<.01, *** p<.001*

Note: IM presents intrinsic-motivation; EM presents extrinsic-motivation;

3.2. Group Classification by Intrinsic And Extrinsic Motivation Type

Young children's motivation types consisted of higher group and lower group based on average score of each motivation: group below average in both of intrinsic motivation and extrinsic motivation (Group1); group above average in extrinsic motivation and below average in intrinsic motivation (Group2); group above average in intrinsic motivation and below average in extrinsic motivation (Group3); and group above average in both of intrinsic motivation and extrinsic motivation (Group4).

Table 2. Group Types by Level of Intrinsic/Extrinsic Motivation

Type of motivation	*Group1 (n=35) M(SD)*	*Group2 (n=25) M(SD)*	*Group3 (n=20) M(SD)*	*Group4 (n=47) M(SD)*	*Total (n=127) M(SD)*
imagination	*1.71(1.36)*	*1.88(1.76)*	*1.75(1.41)*	*2.19(1.45)*	*1.93(1.49)*
fluency	*8.69(3.67)*	*9.04(3.83)*	*7.85(2.94)*	*9.32(4.21)*	*8.86(3.80)*
originality	*5.14(3.54)*	*4.12(3.05)*	*3.60(1.76)*	*5.04(2.94)*	*4.66(3.02)*
total	*15.54(7.25)*	*15.04(6.62)*	*12.20(4.73)*	*16.04(7.29)*	*15.10(6.86)*
curiosity	*3.14(.35)*	*3.11(.30)*	*3.19(.45)*	*3.25(.52)*	*3.18(.43)*
Independence	*2.94(.41)*	*2.86(.35)*	*3.06(.28)*	*3.06(.43)*	*2.98(.39)*
run a risk	*2.85(.31)*	*2.99(.28)*	*3.07(.39)*	*3.06(.38)*	*2.99(.35)*
task commitment	*2.97(.31)*	*3.05(.29)*	*3.20(.40)*	*3.13(.23)*	*3.08(.30)*
total	*11.91(.93)*	*12.01(.81)*	*12.52(.93)*	*12.50(1.08)*	*12.24(1.00)*

Note: Below average in intrinsic/extrinsic motivation(Group1: G1), Above average in extrinsic motivation and below average in intrinsic motivation (Group2; G2), Above average in intrinsic motivation and below average in extrinsic motivation(Group3: G3), Above average in intrinsic/extrinsic motivation(Group4: G4)

35 young children were at low scores in both of motivations, 25 at high score only in extrinsic motivation, 20 at high score only in intrinsic score, and 47 at high score in both of motivations. Young children at high score in both of extrinsic and intrinsic motivations represented the largest distribution while those at low score in both of extrinsic and intrinsic motivations represented the smallest distribution. This result indicates that there may existed motivation type of high or low score in both of intrinsic motivation and extrinsic motivation besides that of high score only in intrinsic motivation or extrinsic motivation.

With regard to creative thinking, Group4 (*M=16.04, SD=7.29*) was at the highest score, being followed by Group1 (*M=15.54, SD=7.25*), Group2 (*M=15.04, SD=6.62*) and Group3 (*M=12.20, SD=4.73*). With regard to creative personality, Group3 with high intrinsic motivation only was at the highest score (*M=12.52, SD=.93*), being followed by Group4 (*M=12.50, SD=1.08*), Group2 (*M=12.01, SD=.81*) and Group1 *(M=11.91, SD=.93*).

To determine whether there was a significant difference among four groups in creative thinking and sub-factors, the analysis of variance (ANOVA) was carried out. The result is as follows (see Table 3):

Result of analysis of variance for creative thinking score among groups showed that there was no significant difference among groups in creative thinking ability with fluency(*F=.737, p>.05*), originality(*F=1.661, p>.05*) and total of creative thinking ability(*F=1.558, p>.05*).

However, there was a significant difference among groups in creative personality such as run a risk and task commitment as well as total of creative personality. There was no significant difference in curiosity (*F=.794, p>.05*) and independence (*F=.787, p>.05*) while there was a

significant difference in run a risk (*F=2.893, p<.05*), task commitment *(F=3.078, p<.05*), and total of creative personality (F=3.559, p<.05).

Table 3. Creative Thinking Ability and Creative Personality by Intrinsic/Extrinsic Motivation Type of Four Groups

		sum of squares	*df*	*mean square*	*F*	*p*	*Schéffe*
imagination	between groups	*5.553*	*3*	*1.851*	*.835*	*.477*	
	Within a group	*272.809*	*123*	*2.218*			
	total	*278.362*	*126*				
fluency	between groups	*32.183*	*3*	*10.728*	*.737*	*.532*	
	Within a group	*1791.266*	*123*	*14.563*			
	total	*1823.449*	*126*				
originality	between groups	*44.800*	*3*	*14.933*	*1.661*	*.179*	
	Within a group	*1105.641*	*123*	*8.989*			
	total	*1150.441*	*126*				
total	between groups	*216.909*	*3*	*72.303*	*1.558*	*.203*	
	Within a group	*5706.761*	*123*	*46.396*			
	total	*5923.669*	*126*				
curiosity	between groups	*.440*	*3*	*.147*	*.794*	*.499*	
	Within a group	*22.730*	*123*	*.185*			
	total	*23.170*	*126*				
Independence	between groups	*.817*	*3*	*.272*	*1.787*	*.153*	
	Within a group	*18.751*	*123*	*.152*			
	total	*19.569*	*126*				
run a risk	between groups	*1.041*	*3*	*.347*	*2.893*	*.038*	*1<3, 4*
	Within a group	*14.747*	*123*	*.120*			
	total	*15.788*	*126*				
task commitment	between groups	*.814*	*3*	*.271*	*3.078*	*.030*	*1<3*
	Within a group	*10.848*	*123*	*.088*			
	total	*11.662*	*126*				
total	between groups	*10.014*	*3*	*3.338*	*3.559*	*.016*	*1<3, 4*
	Within a group	*115.357*	*123*	*.938*			
	total	*125.371*	*126*				

To determine whether such a difference resulted from a difference among certain groups, Schéffe post-hoc test was carried out for run a risk, task commitment and total of creative personality. The result showed that in curiosity, the mean differences of Group1 from Group3 and Group4 were .21 and .22 respectively, and there was a significant difference with .04 significance probability and at .05 in significance level. In task commitment, the mean difference between Group1 and Group3 was .016, and there was a significant difference with

.03. In total of creative personality, the mean differences of Group1 from Group3 and Group4 were .63 and 0.61 respectively, and there was a significant difference with .02.

Thus, there were consistently significant differences between Group3 with high intrinsic motivation and low extrinsic motivation and Group1 with low intrinsic and extrinsic motivations, in curiosity, task commitment and total of creative personality. The result showing the significant differences between Group4 and Group1 in curiosity and total of creative personality can be interpreted as evidence that young children with high intrinsic and extrinsic motivations are at high score in creative personality, too high intrinsic motivation Group was at higher score in task commitment than low group, which indicates that the tendency to persevere in doing what they began is high in young children with high intrinsic motivation, who are interested in the task by themselves.

3.3. Descriptive Statistics between Creativity and Home Environment

In order to investigate the score trend of creativity and creative home environment descriptive statistics were administered and the results are shown in Table4. Rankings are as follows; respect for the child, 3.43(SD=.43), stimulation of independence, 3.41(SD=.43), family pressure including high level control and direction strict is 3.29(SD=.51), enriched learning environment, 2.92(SD= .39).

In order to investigate the relationship between creativity and creative home environment of young children, Pearson correlation coefficients were computed and presented in Table 4.

Table 4. Correlations between Observed Variables (N=127)

	respect for the child	*enriched learning environment*	*Stimulation of independence*	*family pressure*
imagination	*.07*	*.23***	*.12*	*-.20**
fluency	*.34***	*.32***	*-.05*	*-.03*
originality	*-.10*	*.14*	*-.11*	*.01*
total	*-.05*	*.38***	*-.05*	*-.06*
curiosity	*.23***	*.07*	*.19**	*-.05*
Independence	*.13*	*.14*	*.05*	*.04*
run a risk	*.19**	*.14*	*.09*	*.02*
task commitment	*.11*	*.10*	*-.11*	*.02*
total	*.27***	*.17**	*.12*	*.01*
Mean	*3.43*	*2.92*	*3.41*	*3.29*
SD	*(.43)*	*(.39)*	*(.43)*	*(.51)*

* p<.05, ** p<.01, *** p<.001

Asking child's thought and discussed home make the children think more divergent. Also the atmosphere encourages children challenge something new. Respect for the child correlated significantly positively to fluency(r=.34, p < .01), curiosity(r=.23, p < .01), run a risk(r=.19, p < .05) and total score of creative personality(r=.27, p < .01) but not related to imagination, originality, task commitment factors.

Rich learning home including try something new, an exhibition of children works and lead to a variety of experiences correlated significantly positively to imagination(r=.23, p < .01), fluency(r=.32, p < .01), total score of creative thinking ability(r=.38, p < .01) and total score

of creative personality(r=.17, p < .05) but not related to the others factors.

Problem solving by oneself correlated non significant to creative thinking ability. There were significant correlation between curiosity and stimulation of independence. This result expected that convergent thinking to solve problems by collecting existing experience to stimulate more useful to solve their own problems.

Family pressure including having lots of rule and direction correlated significantly negatively to imagination factor(r= -.20, p< .05).

4. Conclusion and Discussion

The present study was to examine the relationship among motivation type, creative home environment and creativity of young children.

Firstly experiment, it is aimed at verifying the theory that motivation types can be better understood by two separate dimension including high or low score in both of intrinsic motivation and extrinsic motivation rather than one bipolar classifying into only two: high intrinsic motivation-low extrinsic motivation and low intrinsic motivation-high extrinsic motivation[28], when applying to young children. It is aimed also at determining empirically whether there are differences among such motivation types by two separate dimensions in creative thinking ability and creative personality. Groups were classified into four after dividing into higher group and lower group based on the average score. Also, frequencies of such groups were investigated and differences between certain groups, if any, in creative thinking ability and creative personality were verified.

Secondly experiment investigates relationship between creative home environment and creativity of young children.

To this study were subject 127 young children from 5 kindergarten classes. The Pearson's correlation among creative thinking ability, creative personality, and intrinsic/extrinsic motivation and ANOVA (analysis of variance) performed were analyzed according to total scores. Conclusion drawn from according to the analysis is as follows:

Firstly, an examination of relationship of young children's creative thinking ability and creative personality with intrinsic/extrinsic motivation showed that there was a significant relationship between their creative personality and intrinsic motivation. However, creative thinking ability was deemed to have no significant relationship with intrinsic motivation. An examination of relationship of young children's creative thinking ability, creative personality, and extrinsic motivation showed that there was no significant relationship with them. That result supports several theories and research results, indicating that an important factor for young children's creative thinking ability is intrinsic motivation [6, 7]. Results showing no relationship of their extrinsic motivation with creative thinking ability and creative personality conform to the result of researchers who raised a question whether extrinsic motivation has a negative influence on creativity [14, 29]. The best way to maximize young children's creativity is to provide them with physical environment to motivate them to immerse themselves in what they want to do by planning and implementing it. In addition, results did not show that extrinsic rewards or decolonization given appropriately to young children so as to make them immerse themselves in work have a negative influence.

Secondly, in this study, the creativity was examined not only in cognitive aspect but also considered with character as an affective factor and motivation factor to examine the relationship of their intrinsic/extrinsic motivation with creative thinking ability and creative personality. As a result, creative personality has a significant relationship with intrinsic motivation but no relationship with extrinsic motivation. This conforms to the argument of researchers who maintain that intrinsic motivation is, in general, more important than

extrinsic motivation for creativity [11, 30]. It means that motivation has a significantly higher relationship with affective creative tendency than cognitive creative thinking ability. Such a creative characteristic tendency should be further studied in detail about how it can influence creative character.

Thirdly, there was a significant difference between group with high intrinsic motivation and high extrinsic motivation and group with low intrinsic motivation and low extrinsic motivation in creative personality. Such attempt resulted in finding groups of new intrinsic-extrinsic motivation types, that is, high-high type and low-low type besides two existing motivation types, that is, high-low type or low-high type. Groups of high-high type was at higher score that groups of high-low type or low-high type and was at statistically significantly higher score than group of low-low. Through this result that high intrinsic/extrinsic motivation group was higher score in creative personality than high intrinsic motivation group denied the hypothesis that extrinsic motivation has a negative influence on creativity. In another words, this result supports the hypothesis that extrinsic motivation with intrinsic motivation helps children in using higher creativity [11, 31]. Therefore, it denied the opinion that extrinsic motivation such as rewards and encouragement harms enhancing children's creative ability.

Forth, an examination of relationship of young children's creative thinking ability and creative personality with creative home environment showed that there was a significant relationship. Respect for the child and enriched learning environment factors have significantly positive relationship with imagination, fluency sub factors of creative thinking ability, but negative relationship between family pressure and imagination. Respect for the child sub factor has significantly positive relationship with curiosity, run a risk and total of creative personality score. Enriched learning environment factor has significantly positive relationship with total of creative personality score and imagination, fluency sub factors of creative thinking ability, but negatively relationship between family pressure and imagination.

The results of this study were creative thinking ability has significant relation with rich home learning environment as like Wright and Wright [16] claims. This results mean family keep thinking about children’ play is very precious, provide the opportunity to have a lot of experience and parents doing role model with flexibility were make , that young children rich and diverse thought and imagination were excellent. In creative personality aspect respect for the child and fluently learning environment have positive correlation with curiosity and run a risk. These points are consistent with the results of MacKinnon [17]. The atmosphere that giving children a voice in determining the rules, to explain the family's decision and to hear the opinion of the child within the family make children have the ability to offer several comments about one problem, which correlated closely with. On the other hand, the pressure of family factors did not show a positive correlation. This result is consistent with Hills [27], such as from family members expect a high level of control over the interaction criticism, directing, anxious to perform for achievement and low self-concept, negative attitude of the children. Children of control type of parent have low creative ability to perform a low consistent in Hirish-Pasek [32]'s study. Home environment, not to perform strictly controlled and limited to the atmosphere but to provide the opportunity for children to experience a variety of interests. The limitations of this study, in order to generalize to all infants nationwide sampling of more research continues to be, because of the few places in the metropolitan area kindergarten. In addition, teachers of kindergarten or efficacy variables associated with social relationships around the home environment need to be made in the follow-up study.

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Authors

Kyoung Hoon Lew, assistant Professor of Graduate School of Soongsil Univ. in Korea. She serves as a senior member under and a committee member of Korean Society for Creativity Education (KSCE) and The Korean Society for the Gifted & Talented (KSGT). Her research interest includes Motivation, Creative environment, Program of creativity and Development of creativity etc. Until now, she wrote 30 papers, compiled a teaching book and perform project related with her field.

Jungwon Cho received his Ph.D. degrees in Electronic Communication Engineering from Hanyang University, Seoul, S.Korea at 2004. In 2004, he joined Jeju National University, Jeju, S.Korea, where he currently is a Professor at the Department of Computer Education. He visited the Purdue University as a Visiting Scholar in 2007-2008. He is an author of over 30 papers in refereed international journals and conference proceedings. His research interests include computer education, information ethics, smart learning, and multimedia information retrieval. He is a member of the KAIS, the IEEE and the IEICE.