A Comparative Study on Chinese Teachers' Implicit Theories of Creativity in the Context of Cross-cultural Communication

Shan Huang and Baoling Yang
YewChung International Education Foundation, Hong Kong, China
ahill@126.com, baoling_yang@cedim.cn

Abstract—**Teachers' Implicit theories of creativity affect cultivation of students' creativity. This study aimed to investigate Chinese teachers' implicit theories of creativity in international schools in Chinese mainland by comparing the effect size with the previous research data. Results showed that there are mixed patterns of implicit theories in cross-cultural groups. Mixed patterns can be further divided into Native, Westernized, Continuous, Mutational, and Common patterns. Combined with individual interviews, this study further analyzes the deep reasons for the formation of the mixed patterns of implicit theories in cross-cultural groups from the perspectives of creative thinking and creative personality, and finds that school evaluation methods and the definition of students' achievements affect teachers' implicit theories of creativity.**

Index Terms—**Implicit theories of creativity, Context of cross-cultural communication, Mixed patterns, Effect size, Adjective Rating Scale (ARS)**

I. INTRODUCTION

The importance of cultivating creativity has been widely recognized by all sectors of society. There is no universally accepted definition of creativity in academic circles [1]. Everyone has their own understanding of creativity, which can be totally different in some cases. For example, Brazilians tend to associate creativity with tourism, while the Dutch tend more to associate it with "being alone" [2]. The perception of creativity exists in different individuals. Sternberg [3] has creatively proposed the implicit theories of creativity, referring to the concepts, structures, and views that are formed in the context of the public's daily life and work and exist in the minds of individuals in some form. Runco [4] believes that implicit creativity has important practical significance. In specific educational practice, teachers carry out teaching activities according to their own understanding of creativity. When evaluating students' works and choosing teaching methods and tasks, they intentionally or unintentionally use their own understanding of creativity as the criteria of judgment, which may have an impact on the cultivation of students' creativity [5], [6]. Therefore, it is particularly important to pay attention to the influencing factors of teachers' implicit theories of creativity.

A. Related Work

Csikszentmihalyi believes that creativity is not merely an intellectual process, but a result of the interaction between "individual-society-culture" systems [1]. A systematic review of related previous works [7] [8] indicates that personal circumstances and cultural beliefs affect teachers' implicit theories of creativity. Runco and Johnson [9] use the questionnaires of ARS to ask American and Indian teachers to rate adjectives they considered to be creative traits. The structure of multivariate analysis of variance (MANOVA) shows the differences between the two cultural groups. Karwowski [10] collects data from Australia, Italy, Poland, and the UK and applies the network structure and factor analysis method, finding that implicit theories of creativity can be divided into three parts: cognitive traits, non-conformism, and adaptability. The first two parts are relatively stable in different cultures, while adaptability varies in different countries.

Based on the Oriental culture represented by China, studies mainly conducted by Chinese scholars make cross-cultural comparisons on implicit theories of creativity. In terms of creative thinking, researchers believe that Chinese teachers tend to highly associate the attributes of creativity with intelligence [11] and meanwhile tend to associate creativity more with critical thinking, independence, and motivation, but less with literature. German teachers tend to associate creativity more with encouragement and feedback, independence, and initiative, but less with mathematics [12]. In terms of creative personality, different from German teachers, Chinese teachers tend to regard the "cooperation" complying with moral standards as a feature of creative students, while regarding the word "disobeying rules" not complying with moral standards as a feature of non-creative students [13].

The preceding research paradigm is based on the investigation and comparative study of different independent cultural groups, which tends to label teachers' implicit theories of creativity with nationality and is stereotyped as a specific pattern.

B. Study Goals

Unfortunately, very few studies based on cross-cultural groups have been conducted. Especially in the context of

international communication and East-West fusion, it is difficult to simply define Chinese teachers or western teachers with the increase of Chinese teachers' international communication and interaction.

Therefore, specifically, the goals of this study are as follows:

(1) To examine whether cross-cultural communication impact teachers' implicit theories of creativity. Under the background of eastern and western cultures, are teachers' implicit theories of creativity the opposite? Or, is it possible that a continuum exists between those implicit theories?

(2) To identify whether teacher's implicit theories of creativity could be cultivated or not. Are teacher's implicit theories of creativity fixed concepts influenced by their native cultures? Or, as a Chinese idiom goes, oranges change with their environment; do school-running models and atmosphere influence the development of teachers' implicit theories of creativity?

II. METHODOLOGY

A. Participants and Procedure

This study takes participants of two schools for children of expatriates in Shanghai and Beijing as the research objects. Both schools are mainly based on the British National Curriculum International General Certificate of Secondary Education (IGSCE) and the International Baccalaureate (IB), and the students are all non-Chinese students. The schools' teachers from Chinese mainland are mainly responsible for the Chinese language and culture courses and need to cooperate with foreign teachers in teaching. This sample group can be regarded as a typical representative of Chinese teachers in the background of cross-cultural communication.

In this study, 45 questionnaires are sent to Chinese teachers (including teachers from Hong Kong, Macao and Taiwan) and 44 are collected and valid. In the later period, five teachers are randomly selected for semi-structured interviews.

B. Instruments

Questionnaires. Questionnaires of ARS are used for teachers to select features associated with creativity. To compare the data of existing domestic and foreign studies, the average value and standard of each item are required for the existing documents. Therefore, this study has referred to the ARSs used in domestic and foreign researches [13]-[15] compared and organized them, and finally formed a questionnaire containing 43 adjectives (20 adjectives have been actually used for analysis).

The questionnaire applies the 5-point Likert scale.

The interview outline is made according to the previous researches and the preliminary interview outline, and the interview is semi-structured.

C. Statistical Analysis Methods

The questionnaire is in the name of the research project conducted by the headquarters of the educational institution, and the Chinese principal of each school is commissioned to inform teachers. Questionnaires are collected using the online survey function of SharePoint.

To avoid being affected by different study sample sizes, this study mainly investigates the effect size, uses Cohen's D to compare the differences between two groups of independent samples, and uses self-compiled formulas in Excel for calculation. The data of the three existing researches is manually entered, and is checked by another researcher. The research of Runco & Johnson is used as the representative of western teachers ("western teachers" for short), the researches of Mou Haiyan and Yang Weigang et al. are used as the representative of teachers in national public schools ("public schools" for short), and this study is used as the representative of Chinese teachers in international schools ("international schools" for short).

III. RESULTS

Data of the 20 adjective items shared by "international schools", "public schools" and "western teachers" is compared in pairs to calculate the effect sizes. According to Cohen's [16] criteria for medium effect sizes, adjectives for creativity can be divided into five patterns:

Native pattern: "International schools" are homogeneous with "public schools" and heterogeneous with "western teachers". Cross-cultural groups are more influenced by their native cultures.

Westernized pattern: "International schools" are homogeneous with "western teachers" and heterogeneous with "public schools". Cross-cultural groups are more influenced by foreign (western) cultures.

Continuous pattern: "International schools" are heterogeneous with "public schools" and "western teachers" and their values are in the middle of the other two's. Cross-cultural groups present a continuous transitional form between eastern and western cultures.

Mutational pattern: "International schools" are heterogeneous with "public schools" and "western teachers" and their values are either higher or lower than the other two's. New implicit theories emerge in cross-cultural groups.

Common pattern: 'International schools" are homogeneous with "public schools" and "western teachers". Cross-cultural groups have the same understanding of creativity. (see Table I).

TABLE I. COMPARISON BETWEEN" INTERNATIONAL TEACHERS" AND "WESTERN TEACHERS"," PUBLIC TEACHERS " WITH COHEN'S D VALUE OF EFFECT SIZE

Category	Item	International Teachers		VS Western teachers	VS Public teachers
		Mean	SE	Cohen's D	Cohen's D
Native pattern	Imaginative	4.39	0.68	-0.78	-0.09

	Humorous	4.18	0.72	0.50	0.24*
	Clever	4.14	0.73	0.05	-0.90
	Easygoing	4.39	0.68	0.17	0.78*
	Interests Wide	3.73	1.03	0.18	-0.78*
Westernized pattern	Intelligent	4.02	0.75	0.28	-0.54
	Confident	3.95	0.88	0.39	-0.55
	Spontaneous	3.98	0.72	0.22	-0.68
	Emotional	3.68	0.85	0.21	-0.57*
	Curious	4.09	0.73	-0.34	-0.67*
	Clear Thinking	3.98	0.78	0.80	-0.95
Continuous pattern	Individualistic	3.98	0.72	-0.82	1.22*
	Artistic	3.95	0.88	-0.56	0.34*
Mutational pattern	Friendly	3.98	0.84	0.80	0.61
	Enterprising	4.00	0.74	0.04	-0.16
	Alert	4.07	0.78	0.39	-0.19
	Adventurous	4.18	0.78	0.10	-0.33
Common pattern	Determined	3.82	0.86	0.35	-0.43
	Original	4.18	0.72	0.06	-0.27
	Flexible	3.98	0.78	0.01	-0.18

Note: the data with ""*"" from Yang Weigang et al; others from Mou. SE stands for Standard Error.

Among the 20 items in the study, 6 are common items, accounting for 30%. It can be seen that different cultural groups have some consistency in implicit theories of creativity. There are only two items of the native pattern (accounting for 10%). It can be seen that compared with the Chinese teachers in public schools, teachers in international schools show new features of the implicit theories of creativity. There is another mutant item that does not seem to correspond exactly to the scholars' [17] idea that "the features of creativity manifest itself as a continuum between Chinese mainland, Macao, Hong Kong, and the West."

IV. DISCUSSION

A. Comparative Analysis of Creative Thinking

Like "public schools", "international schools" tend not to divide imagination into the scope of creativity. In the interview, teachers mention that "imagination" is excessively abstract and easy to become fantasy, while creativity needs to be presented specifically. This is consistent with the idea suggested in the study, that is, Chinese teachers emphasize practicality in creativity.

The practicality of the school environment is directly reflected in the student evaluation system and method. In the public school environment, the evaluation system is relatively simple, regarding "Clear Thinking", "Clever", and "Intelligent" as the embodiment of intelligence. Therefore, it shows the conclusion that Chinese teachers believe that the attributes of creativity are highly correlated with intelligence [11] in the study. For teachers in an "international school", "Clear Thinking", "Clever", and "Intelligent" are different from each other. The definition of "Clear Thinking" is close to logical thinking and can correspond to mathematics and science. Mathematical capability is China's traditional advantage. Many teachers frankly say that "I am not good at math but I didn't expect that foreign teachers are even worse at

it"; "I don't want my kids to have to struggle with math, but nor do I want them to lose their math foundation. Therefore, "Clear Thinking" belongs to the continuous pattern. "Clever" has a broad meaning and cannot be directly related to the specific discipline evaluation. As a result, different from public school teachers, teachers in international schools score "Clever" significantly lower (Cohen's D = -0.95), showing a westernized pattern. "Intelligent" corresponds to the concept of "Multiple Intelligence" advocated by schools. Teachers mention that annual activities such as the annual concert, sports meeting, and science festival play a significant role in schools, and students can also show their creativity in those activities. International school teachers attach more importance to "Intelligent" (Cohen's D = -0.54). Similarly, "Interests Wide" presents as westernized.

It seems that the conclusion that "Chinese teachers believe that the attributes of creativity are highly correlated with intelligence" still stands. It shall be accurate to say that "teachers believe that the attributes of creativity are highly correlated with the types of intelligence that are reflected in school evaluations." That is, the differences in the implicit theories of creativity in different cultures are due to different evaluation systems [18]. We should not blindly depreciate the "tradition and stubbornness" of Chinese teachers in public schools. Chinese teachers have also mentioned that the negative factors of creativity cultivation are mainly the evaluation systems and limited resources [12]. However, it seems that they cannot make a great breakthrough in the existing environment.

B. Comparative Analysis of Creative Personality

Previous research [19] have found that Chinese people tend to use the characteristics of personality to describe creators (such as diligence). This study shows that public school teachers seem to think highly of "Confident", "Emotional", and "Spontaneous" but think poorly of

"Easygoing" (the opposite of disciplined). The above three adjectives can also be defined as the characteristics of successful people in society. Chinese people tend to match creative figures with political figures that have made great social contributions.

For the above descriptors of creative personality, teachers in international schools show obvious inconsistency with those in public schools, and all those items are westernized. It is generally believed that students in international schools are more confident, emotional, and spontaneous. Teachers in international schools acknowledge this, but they also say that "many children are introverted and parents worry that they will not adapt to public schools and therefore choose international schools for them instead." "Some children look quiet at ordinary times, but unexpectedly, some has published a novel and some works as an anchor of live game streaming in his/her spare time." If it is necessary to focus on each student's growth and students have diversified space of development, the correlation between implicit theories of creativity and the characteristics of successful people in society will decrease.

International school teachers' opinion on "Individualistic" is of the continuous pattern, that is, they yearn for individualism but meanwhile cannot fully accept it. During the interview, some teachers mention that "when I left the system and entered an international school, I thought I could have more freedom, but I find that they are also new restrictions." "Some foreign teachers are really good at doing things by themselves, but sometimes they also give up their job and I have to cover for them." The mixture of "public self-consciousness" and "private self-consciousness" also exists in Chinese teachers in international schools.

It is worth noting that an evolutionary item appears in creative personality: Friendly. Similar to the conclusion in the comparative study [13] between Chinese and German teachers that "Chinese teachers tend to regard the cooperation complying with moral standards as a feature of creative students", teachers in international schools tend more to choose "Friendly" than western teachers (Cohen's D = -0.80). Surprisingly, teachers in international schools also pay more attention to this item than those in public schools (Cohen's D = -0.61). Just as overseas Chinese seem to be more united than native Chinese of distinct collectivism, cross-cultural groups may better reflect the characteristics of their native cultures when facing heterogeneous cultures in the context of cross-cultural communication. There will inevitably be contradictions in the cooperation between Chinese and foreign teachers, and it is often the Chinese teachers who make compromises in the end. Some teachers mention that "I used to cooperate with foreign teachers to rehearse a play and we had some discrepancy in the script. They later washed their hands of the matter. But I still hoped the students to finish the stage play, and so I had no choice but to manage the rehearsal." "There are many group activities in the school, requiring a lot of coordination work." International school teachers approve such factors as friendliness, cooperation, and harmony.

After the systematic literature review, it is concluded that moral development and creativity are positively correlated [20]. If we do not restrict creative behavior to individual innovation but extend it to a team's successful innovation, perhaps the "virtue-oriented" behavior such as "altruism" in traditional Chinese culture is conducive to innovative thinking and activities.

V. CONCLUSIONS

This study uses an adjective rating scale (ARS) to investigate Chinese teachers' implicit theories of creativity in international schools, and calculates and compares the effect size with the data of Chinese teachers in public schools and western teachers studied by predecessors, finding that there are mixed patterns of implicit theories in cross-cultural groups. Mixed patterns can be further divided into five types: native, westernized, continuous, mutational, and common patterns. For the understanding of creativity, Chinese teachers in international schools reflect the influence of native culture and western culture, but they cannot be equal to the original independent groups in the East and the West. Cross-cultural communication groups reflect the attributes of the cultural continuum and even new mutational features. For example, compared with "teachers in public schools" and "western teachers", teachers in international schools are more inclined to define the "Friendly" affirmed by traditional Chinese culture as an attribute conducive to innovation.

Combined with individual interviews, this study further analyzes the deep reasons for the formation of mixed patterns of implicit theories in cross-cultural groups from the perspectives of creative thinking and creative personality. In the expression of creative thinking, this study suggests that we cannot simply assume that "Chinese teachers believe that the attributes of creativity are highly correlated with intelligence", but that, according to different evaluation systems in different cultures, "teachers believe that the attributes of creativity are highly correlated with the types of intelligence reflected in school evaluations." In creative thinking, this study proposes that we shall not simply determine whether the "virtue-orientated theory" has a negative impact on creativity; instead, we shall consider both "individual innovation" and "team innovation".

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

HS conceived and designed the study. HS and YBL collected and analyzed the data. HS wrote the paper. YBL contributed to revising the paper. All authors read and approved the final manuscript.

REFERENCES

[1] M. Csikszentmihalyi, "Society, culture, and person: A systems view of creativity," *Nature of Creativity*, pp. 47-61, 1988.

[2]   M. A. D. Santos, S. M. Wechsler, S. M. Nader, C. M. Barboza, and M. C. B. Mundim, "Creativity according to laypeople's opinions: A transcultural comparison," *Revista De Psicologia Pucp*, vol. 38, no. 2, pp. 479-497, 2020.

[3]   R. J. Sternberg, "Implicit theories of intelligence, creativity, and wisdom," *Journal of Personality and Social Psychology*, vol. 49, no. 3, pp. 607-627, 1985.

[4]   M. A. Runco. (2004). Creativity. Annual Review of Psychology. 55. pp. 657-687. [Online]. Available: http://doi.org/10.1146/annurev.psych.55.090902.141502

[5]   P. Kampylis, E. Berki, and P. Saariluoma, "In-service and prospective teachers' conceptions of creativity," *Thinking Skills and Creativity*, vol. 4, no. 1, pp. 15-29, 2009.

[6]   S. H. Paek and S. E. Sumners, "The indirect effect of teachers' creative mindsets on teaching creativity," *Journal of Creative Behavior*, vol. 53, no. 3, pp. 298-311, 2019.

[7]   E. O. Bereczki and A. Karpati, "Teachers' beliefs about creativity and its nurture: A systematic review of the recent research literature," *Educational Research Review*, vol. 23, pp. 25-56, 2018.

[8]   D. R. Mullet, A. Willerson, K. N. Lamb, and T. Kettler, "Examining teacher perceptions of creativity: A systematic review of the literature," *Thinking Skills and Creativity*, vol. 21, pp. 9-30, 2016.

[9]   M. A. Runco and D. J. Johnson, "Parents' and teachers' implicit theories of children's creativity: A cross-cultural perspective," *Creativity Research Journal*, vol. 14, no. 3-4, pp. 427-438, 2002.

[10]   M. Karwowski, J. Gralewski, T. Patston, D. H. Cropley, and J. C. Kaufman, "The creative student in the eyes of a teacher: A cross-cultural study," *Thinking Skills and Creativity*, 2020.

[11]   D. W. Chan and L. K. Chan, "Implicit theories of creativity: Teachers' perception of student characteristics in Hong Kong," *Creativity Research Journal*, vol. 12, no. 3, pp. 185-195, 1999.

[12]   J. Zhou, J. Shen, X. Wang, H. Neber, and I. Johji, "A cross-cultural comparison: Teachers' conceptualizations of creativity," *Creativity Research Journal*, vol. 25, no. 3, pp. 239-247, 2013.

[13]   Y. Weigang, W. Youzhi, S. Baoping, S. Jiliang, "A study on the cultural influence of implicit theories of creative students between chinese and germany teachers," *Studies of Psychology and Behavior*, vol. 12, no. 2, pp. 156-160, 2014.(In Chinese)

[14]   M. A. Runco and D. J. Johnson, "Parents' and teachers' implicit theories of children's creativity: A cross-cultural perspective," *Creativity Research Journal*, vol. 15, no. 2-3, p. 309, 2003.

[15]   M. Haiyan, "Study on high school teachers 'perceptions on creativity," Doctoral dissertation, 2009. (In Chinese)

[16]   J. Cohen, J. W. Cohen, *et al*., "Statistical power analysis for the behavioral science," *Technometrics*, vol. 31, no. 4, pp. 499-500, 1988.

[17]   M. C. K. Mak, K. P. Vong, S. Lu, and S. O. Leung, "Towards a Performing Creative Characteristics Scale (PCCS) for Chinese young children," *Thinking Skills and Creativity*, 2020.

[18]   T. Ivancovsky, S. Shamay-Tsoory, J. Lee, H. Morio, and J. Kurman, "A dual process model of generation and evaluation: A theoretical framework to examine cross-cultural differences in the creative process," *Personality and Individual Differences*, vol. 139, pp. 60-68, 2019.

[19]   X. D. Yue and E. Rudowicz, "Perception of the most creative Chinese by undergraduates in Beijing, guangzhou, Hong Kong, and Taipei," *Journal of Creative Behavior*, vol. 36, no. 2, pp. 88-104, 2002.

[20]   W. Shen, Y. Yuan, B. Yi, C. Liu, and H. Zhan, "A theoretical and critical examination on the relationship between creativity and morality," *Current Psychology*, vol. 38, no. 2, pp. 469-485, 2019.

Shan Huang is a researcher in YewChung International Education Foundation, being responsible for the Chinese language and thinking skills assessment. Research interesting including: Psychometrics, Bayesian Statistics, Assessment in AI Era.