Early career researcher originality: Engaging Richard Florida's international competition for creative workers

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Abstract

A pressing issue for early career researchers (ECR) is how to produce and gain recognition for making an *original* contribution to knowledge. This raises the questions of what it means for an ECR to contribute to original research, and how s/he might be trained to make such an original contribution, assuming such training is possible. In this paper, these questions are explored via the debate over creativity. Research into the creativity of students from China claims they lack such capability. Florida (2005) argues that international competition for workers from Asia is central to the future of creative societies. Our analysis of evidence generated by biographical research indicates the potential of a Chinese doctoral student for creativity. Her strategies of blending formal and informal knowledge suggest possibilities for developing ECR *originality* through having international research students reveal their critical intelligence to themselves and others, demanding that they know their own creative capabilities through engaging in reflection, and by relating something already they have learnt to their new learning.

Key words: biographical research, creativity, ECR-originality, research education, K+i knowledge,

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Introduction

While originality is demanded in research, it is not enough to say to ECR be creative. What is needed is an investigation into how originality can be unleashed through engagement in research. This paper explores the concept of creativity as a way to better understand what it means to produce original research. In this instance, a biographical approach has been taken to this research problem. The concept of "ECR-originality" which combines formal and informal knowledge offers researchers a way of reflecting on what it means to make an original contribution to knowledge.

Demands for originality in research

Originality is emphasised as a basic requirement for doing research and being a researcher. Originality is a criterion used for "grading a wide range of materials, from student essays and examinations through research grant applications, potential journal articles and book manuscripts to the materials presented by candidates for appointments or promotions" (Johnston 2008, 120). Kiley and Mullins (2005, 249, 250) explored supervisors' conceptions of "good" research and researchers, and found that they regard original research as "both the creation of new knowledge and an innovative approach to the discovery of that knowledge". Lee (2008, 270) found that supervisors encourage original research by having students "become a member of the disciplinary community who [engage in] critical thinking, where the student is encouraged to question and analyse their work". Oancea and Furlong (2007, 128) defined originality in terms of "[novel] conceptualizations, systematizations, theoretical insights, methods and techniques, theoretical perspectives, or unique viewpoints".

University criteria for research degrees require students to undertake a "program of original research [to] uncover new knowledge either by the discovery of new facts, the formulation of theories or the innovative re-interpretation of known data and established ideas" (University of Western Sydney 2009; see also Murray 2002, 52-53; Phillips and Pugh 2005, 61-63). The Australian Research Council Act 2001 (ARC 2009, 59) requires grant applicants to undertake research that leads "to highly creative and innovative ideas and concepts."

The Research Assessment Exercise (RAE) in the United Kingdom evaluated research outputs using the criteria of "originality, rigour and significance" (Johnston 2008, 120). Here originality refers to "innovation, addressing new questions, producing new evidence and insights, and developing new syntheses of existing work" (Johnston 2008, 132). The originality of "world-class research" is that which stimulates "a paradigm shift and such a shift is only likely to be successful if it is rigorously sustained" (Johnston 2008, 126).

In China, as part of its Eleventh Five-Year Plan for Education Development, the Ministry of Education (2009) set the criteria for the assessment of education research projects as "基础研究要力求具有原创性和开拓性，深刻揭示教育的本质和规律，关注学理问题的研究，促进学科建设，形成精品力作". This means that education research is required to be original by disclosing "laws" that focus on theoretical research. "Originality"—newness, novelty, innovation, creativity—is a requirement of research whether it be in Australia, Britain or China.

Why is originality in research so important now? Florida (2005a, 16) argues that "the key factor of the global economy is no longer goods, services, or flows of capital, but the competition for people". This global competition revolves around "a

nation's ability to mobilize, attract, and retain human creative talent" (Florida 2005a, 3). The economic development of many Western nations has been helped by attracting "a steady steam of scientific, intellectual, cultural, and entrepreneurial talent" (Florida 2005a, 5). In this global competition for creative migrant workers, the originality or creativity of research students from China is especially significant (Bradley 2008).

Of course, ECRs are not expected to make a Nobel Prize winning breakthroughs (Mullins and Kiley 2002, 369). However, the demands for researchers to contribute to original knowledge, begs the question of what constitutes originality. The next section considers the concept of creativity for insights into developing skills required for making original contributions to knowledge.

Producing original research through understanding creativity

Boden (2004, 1) defines creativity as "the ability to come up with ideas or artefacts that are *new, surprising and valuable.*" The concept of "creativity" includes original ideas and approaches to solve research problems or finding new ways to deal with analytical challenges. Furthermore, "originality" in formulating questions, analysing evidence, synthesising the literature or generating methods is important for research. Boden (2004) makes a distinction between two types of creativity. H-Creativity is when a new concept arises for the first time in human history. Presumably, this leads to the "scientific revolutions" or "paradigm shifts" that Kuhn (1970) proposed and is expected of world class research (Johnston 2008). P-Creativity involves coming up with a novel concept that is new to the *person* who thinks about it, even though it may have already been discovered by others. The trouble with H-creativity is that it suggests measuring an ECR's creativity in relation to human

history or Nobel Prize winners (Mullins and Kiley 2002). For research purposes P-creativity is too individualistic. Here we use the concept "ECR-originality" as an intermediate position that focuses on a researcher's contribution of novel concepts, evidence, methods or interpretations to a field of inquiry. Whether a given research report is "novel and valuable" has to be assessed, usually by peer review, with judgements being made about it varying across cultures and within research cultures (Boden 2004, 10). Originality is an elusive and often changeable concept. Whether a research proposal, thesis or report is original depends on other theories and intellectual concerns current at the time.

Creativity can not be built up without knowledge. Knowledge may be divided into two kinds—formal and informal. Formal knowledge is based on a discipline (e.g. education) or a job (e.g. an educational researcher) that "you learn in books, lectures, and [by] other direct means of instruction" (Sternberg & Lubart, 1995: 150). Informal knowledge is what "you pick up about [that] discipline or [that] job from [the] time spent in that arena" (Sternberg and Lubart 1995, 150). The latter is rarely explicit, mostly acquired through experience, and judgments about its value depend on the research context.

Selby, Shaw and Houtz (2005, 301) argue that "human creativity is a function of the interaction of personality and the environment". They claim that creativity "involves openness, an internal locus of evaluation, and the self-confidence or courage to pursue ideas that one considers important, despite external discouragements" (Selby, Shaw and Houtz 2005, 303). Creative researchers attend "to their 'inner voices' their personal beliefs about what is right or worthwhile, rather than being influenced by contrary views" (Selby, Shaw and Houtz 2005, 303). They list twenty-nine characteristics to categorise a person's creative attributes including

cognitive abilities, personality traits and past experiences. Thus, improving a researcher's capabilities for producing original knowledge involves extending and deepening the individual's intellectual capabilities—and also expanding the research culture around the individual researcher.

Torrance (1993, 233) argues that creativity requires an interactive relationship between "Person, Press, Process and Product" (4 Ps). Creativity arises directly from interaction between a person's habits and the field of research:

> The process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and formulating hypotheses about these deficiencies; evaluating and testing these guesses and hypotheses; possibly revising and retesting them; and, last, communicating the results (Torrance 1993, 233).

These 4Ps may help an ECR to creatively identify novel concepts for a particular research project and how these might be applied in a given field in a deliberate way.

A researcher uses her/his Personal capabilities and intellectual resources in creative research endeavours. Press refers to the impact of the research culture—research workshops, forums and conferences on an individual's creativity. Research is the Process of combining different literature, concepts and evidence together to produce novel concepts. Creative research Processes engage in practices to produce knowledge that solves a research problem or to negotiate the disjuncture between knowledge and ignorance. Creative Products such as theses or journal articles are the results of the Person, Press and Processes. For instance, an international student maybe bring to bear her bilingual capabilities and intellectual heritage from China to inform her study of the benefits young Australian adults are gaining from reforms of Senior Learning (Years 10-12). Thus, considerations of creativity or originality in research benefit from including the stages in a researcher's development and the qualities of the research culture required to nurture an original contribution to

knowledge. The next section reviews research which has compared the creativity of Western and Chinese students.

Western and Chinese creativity

The influences of external environment and education on students' academic creativity have been studied for many decades. For instance, Chan and Chan (1999, 185) investigated teachers' implicit theories of creativity, that is "the constructions of lay people, derived from their belief systems about creativity". They found that Hong Kong teachers regarded "nonconforming or disobedient behaviour as rebellious; expressive behaviour as arrogant or attention seeking, and assertive behaviour as self-centred or opinionated" (Chan and Chan 1999, 194). Thus, these behaviours were categorised by these teachers as negative rather than creative characteristics. Chan and Chan (1999, 194) conclude that because these "teachers attributed unfavourable characteristics to creative students [which] might imply that some teachers could hold negative attitudes toward creativity".

Niu and Sternberg (2003, 106) studied American (N=76) and Chinese (N=63) undergraduate students to investigate influences on their creativity. They found that Chinese students outperformed American students in mathematics and sciences attributed to differences in their beliefs and attitudes. However, Chinese student's artwork was rated as less creative by both Chinese and American judges. Niu and Sternberg (2003, 106) claim that America fosters "individual freedom and expression of individuality, whereas Chinese culture tends to encourage more conformity at the expense of creative expression".

Rudowicz (2004, 55) reviewed the literature on creativity in China's history, philosophy, culture and current drive towards modernisation. He proposes a "western conception of creativity [that involves] a willingness to reject tradition, orientation on

self-actualization, celebration of individual accomplishment, and concentration on the future" (Rudowicz 2004, 59). This is contrasted with a Chinese conception of creativity which is said to involve respect for the past and maintaining harmony with nature. Rudowicz (2004, 78) argues that "differences in, and opportunities for, creative expression might not be equally distributed across different cultures or even within a given culture due to intra-cultural and socio-historical dynamics".

Zha, Walczyk, Griffith-Ross and Tobacyk (2006, 355) contend that "intellectual creativity is the ability to view what is ordinary in a novel or atypical way [and] the interpersonal and intrapersonal process by which unique, superior, and genuinely valuable products are developed". They compared the creativity of American and Mainland Chinese graduate students, and found that Americans rated high in "openness to experience, self-acceptance, achievement motivation, dominance, hostility and impulsiveness" (Zha et al 2006, 356). They found that the Chinese students depended more on interpersonal relationships and lacked an environment which encourages, nourishes and rewards creativity. Their results suggest the American students displayed greater creativity than their Chinese peers in terms of divergent thinking and obligations to themselves and to society. However, in terms of academic achievement the Chinese students had higher scores in mathematics than their American peers who had higher scores on self-concept, attitudes and values. They attributed the differences to the China's tendency to "be more collectivistic compared to the United States, emphasizing conformity and obedience" (Zha et al 2006, 363), which blocks the creativity.

This literature advances the proposition that Chinese students are not relatively creative, due largely to China's collective press towards conformity. The opposite is claimed for students from the USA whose personal attributes of individual freedom

and self-centeredness lead to creativity. It seems all too obvious that this research confirms the capability of Chinese relative to US students to be creative by confirming the incapacity of China has for creativity relative to the USA. This would justify international research students from China being provided compensatory research education to redress their relatively inability for originality. Even so, compensatory education typically involves cutting back on the knowledge provided students.

In Torrance's (1993) terms these researchers' conclusions compare the Personal attributes of American students against the societal Press of Chinese students while ignoring the Process and Product dimensions of creativity. However, following Carr's (1964, 32) argument, US society moulds "the character and thought of its individual members, and [produces] a certain degree of conformity and uniformity among them", just as China or any society does so. Carr (1964, 33) contends that the "cult of individualism" is a Western myth, which fails to recognise individualisation as a function of Western societies press for getting the most productivity out of individuals.

Florida (2005a, 32) defines "creative capital" as the "ability to create new ideas, new technologies, new cultural forms … that really matter." Florida's (2005a, 274, 275) Global Creativity Index indicates the ability of a country to harness and mobilise creative talent for innovation for long-run prosperity. According to this index, Australia ranks twelfth but China ranks thirty-sixth in the world. Florida (2005a, 147) claims that international students are "the canaries of the global competition for talent, and the countries that succeed in attracting them gain advantages on multiple fronts". So despite the argument about their lack of creativity, a host of countries are stepping up efforts to recruit international students, especially

from China (Bradley 2008). Australia recruits “half as many Chinese students (32,000) as the United States (64,700)” (Florida 2005a, 147). Increasing numbers of international students from China seek advanced study and research education in Western universities.

Florida (2005a, 32) assumes that “each of us has creative potential [irrespective of] gender, race, ethnicity, sexual orientation, and outward appearance”. This suggests international educators can begin with the presupposition that international students from China are equally intelligent and reasoning beings who have the capability for creativity. What if the starting point for a Western educator who knew nothing about China and Chinese creativity, was that each Chinese research student was equal to any other in having the capability for making an original contribution to knowledge? The international educator presumes an equality of creative intelligence rather than an inequality, and sets out to verify this (Ranciere 1991). That is, the educator assumes that like every other person, the student “is endowed with an incredible capacity for innovation, a by-product of the innate human capability to evolve and adapt” (Florida 2005a, 34). The pedagogical problem is then to reveal the student’s creative intelligence to herself and others. This would entail having the student work with what she already knows about creativity as a basis for learning to make an original contribution to knowledge.

Further, while postgraduate students have been studied, none of this research makes the important link between creativity and the need for research students to make an original contribution to knowledge. To study what it means to produce original research, and how such originality might be encouraged in research, we use a biographical method.

Biographical research method

Biographical research (Grumet 1981) makes it possible to explore creative experiences in the life of a research student from China in a way that helps to extend and deepen the capability for making an original contribution to knowledge. Bouma (2000, 171) states that biographical research is "designed to provide an impression; to tell what kinds or types of 'something' there are; to tell what it is like to be, do or think something". According to Thomas (2003, 29) biographical research is based on

> a person's story of his or her own life prepared entirely by that person [to] provide readers an insider's view of a life by describing how events are interpreted by the person who has lived those events and who is the product of their influence.

A biographical method was employed in this study to explore the creativity of Tiantian, a Chinese university teacher who is currently undertaking her doctoral studies in Australia. The analysis of this biographical evidence provided this research student a self-educative process. It enabled the portrayal of creativity from the research student's perspective, and provided her an analytical framework for what she might do to make an original contribution to knowledge. The evidence in this paper is personal, retrospective and represents Tiantian's perspective on creativity.

This biographical study focuses attention on four dimensions: "inward and outward, backward and forward" (Clandinin and Connelly 1994, 417). By taking an inward focus, Tiantian explored her creative feelings, hopes, reactions and depositions. By taking an outward focus, Tiantian took the environment affecting her creativity into consideration. The backward and forward foci enabled Tiantian to link her past and future with her present research project. Biographical research offered Tiantian a means for going back into personal experiences of creativity to explore lines of potential originality required of research (Giddens 1991, 72). This study uses the "4 Ps of creativity" (Torrance 1993, 232) (see Table 2) and inventory of creative

traits (Selby, Shaw and Houtz 2005, 303) for analytical purposes (see Table 3). The next section presents an analysis of journal entries made by Tiantian who recorded her reflections about creative incidents she had experienced.

Analysis of reflections on creativity

While capturing real-life experiences, Tiantian's reflections are limited in so far as they are self-chosen instances (see Table 1). All these reflections are interpreted in terms of our concept of ECR-originality, because they provide insights into Tiantian's developing capability for using her formal and informal knowledge to make an original contribution to research.

When categorising Tiantian's reflections we found that there were instances in her study or teaching which demonstrate conceptual flexibility, for instance, by drawing together ideas from apparently different sources to help generate new ideas or to reconfigure her understanding in a different way (reflections 2, 4, 6, 11). Likewise, there were instances when Tiantian acquired new knowledge that helped her to teach, do research or solve practical problems in innovative ways (reflections 7, 12). Further, there were examples where Tiantian's investment of time, energy and other resources helped in her pursuit of ideas that were not known or fully understood previously but acquired because she was curious and enjoyed such challenges (reflections 2, 3,5, 10, 11). Other reflections illustrated Tiantian's ability to think about, reflect upon or evaluate the way she learned, the way she taught and the way she did research (reflections 1, 9). Finally, there were occurrences of intellectual debate and exchange of ideas in which Tiantian participated in and contributed to (reflections 2, 8).

INSERT TABLE 1 HERE

Tiantian's twelve reflections were analysed using Torrance's (1993) 4 Ps creativity framework (see Table 2). Ten of the twelve reflections showed at least one aspect of creativity. There were two examples with either one or four aspects of creativity. However, most of the reflections involved two or three overlapping aspects of creativity. For instance, her translation, redesigned shoes, and new clothes were the results of creative, problem-targeted thinking that took what she had learnt in one domain to develop new knowledge in another.

INSERT TABLE 2 HERE

Selby, Shaw and Houtz' (2005, 303) twenty-nine creative personality characteristics have been used to categorise Tiantian's reflections. Table 3 indicates Tiantian's openness to pursue ideas which her "inner voice" valued despite external discouragements.

INSERT TABLE 3 HERE

The analysis of these reflections reveals that Tiantian exhibited nineteen of the characteristics categorised by Selby, Shaw and Houtz (2005, 304) as creativity, though it should be noted that "no one person can be expected to exhibit all of the characteristics". Tiantian's creative characteristics favour listening to her inner voice (11 items out of 15) over openly questioning ideas (8 items out of 14). This data indicate that Tiantian has the characteristics required for making an original contribution to knowledge through research. She uses her experiential knowledge and questions received ideas, including re-interpreting her assumptions. With an appropriate research education and a supportive research culture Tiantian will be able to dig deeper into her creative potential. Given these reflections by a first year doctoral student from China, it is possible that provided time and effort, and sustained

the interest and motivation, Tiantian's characteristics of curiosity, confidence and open-mindedness are especially pertinent to making an original contribution to knowledge.

K+i — being original in knowledge production

Let us consider the concept of ECR-originality by using the formula "K+i" (Sternberg and Lubart 1995) to analyse two reflections. "K" refers to the knowledge one has acquired through formal study or work-related training, while "i" refers to the informal knowledge that one comes to know through such experiences. By combining "K" and "i" it is possible to create novel ideas or original concepts. The reflection, "a mathematical question" shows that Tiantian is creative—having the capability to combine mathematical knowledge with her good sense.

A mathematics question

> *When I was in Year 2 in elementary school, we had a mid-term maths examination. I remembered the question that was asked: "A page of a book can be typed with 232 words. There is an article with 1392 word, how many pages will be used?"*
>
> *At that time, the aim of the question was to test if we learned division well. The correct answer was: 1392 ÷ 232 = 6 but I was the only person did in another way: (1392 ÷ 232) ÷ 2 = 3 and I argued with the teacher that usually the page should be typed on both sides.*
>
> *The teacher was in dilemma because she tried to keep her authority in one way and what recognised I was also reasonable. At last, she refused to correct the key to the question but encouraged me to study hard (**15 July 08**).*

Tiantian had learned about division from her school teachers and textbooks. She also knew that the pages of books are printed on both sides, common-sense knowledge she acquired incidentally as a result of studying textbooks. It was this informally acquired knowledge that helped her to produce this instance of personal

creativity (Boden 2004). As a Year 2 pupil, Tiantian knew enough about mathematics and books to come up with her novel calculation method.

Booking on-line tickets in Paris

Tiantian's reflection on her travels in France shows how she dealt with a problem by connecting knowledge from different domains. Buying tickets on a French-language website stimulated Tiantian's openness to problem-solving. She solved the problem using her knowledge of computers, and previous travel experiences of buying tickets on-line in China. This ordinary, everyday knowledge gave Tiantian the resources to creatively solve this problem.

> *When I studied in Holland in 2006, I travelled to Paris with a friend. We booked the train tickets on line in Amsterdam then started our journey. After arriving in Paris, we decided to continue the journey to Nice. Unfortunately, the train tickets sold in the railway station were much more expensive than we expected. The staff told us that if we booked on line, the price was half. My travelling partner was ill at that time, so I went to the internet bar by myself and tried to book the tickets. When I found the website—voyages-sncf.com, I was stunned. The webpage was in French and I have never learned French. Thinking of the half price train ticket, I encouraged myself to try. Since I had some experience of booking train and air tickets on line before, and some French words are similar to English, I tried filling in the on-line form item by item. After finishing the form, I clicked the button to submit but it failed. Then I tried a second time but with the same result. I dare not to ask for help because my credit card number was on the webpage. I have no way but solve the problem by myself. Initially, I assumed there could be a problem with the computer, and then I went to another internet bar. After filling in the form, the same problem appeared; I could not submit the booking requirement. Therefore, I checked again to find the solution. I don't know any French at all, but I knew there should be some mistake in the form. I became worried but I was more determined to book the on line ticket. I observed the webpage carefully and finally I found a small tag on the right bottom of the page, I presumed it asked if I accept the conditions or not. I made no hesitation to click "accept" though I didn't understand any of conditions on the website. After that, the booking was successfully submitted. It took more than one hour. (**July 29, 2008**).*

Reflections from Tiantian's life indicate her capability to make previously unconnected, or even unusual conceptual associations. Novel concepts arose from her random association of distant or atypical connections between ideas. Researchers undertake the reading and writing, the study and the learning, the fieldwork and the networking, and conceptually-informed data analysis in order to link the formal and informal (K+i) knowledge necessary for these creative connections to be made. Of course, the K and i domains differ from researcher to researcher, from monolingual to bilingual researcher, they can use to make an original contribution to knowledge through their research. As indicated in the next section, these reflections provide insights into how ECRs might build their capabilities for drawing on "K" and "i" knowledge to produce original research.

Strategies for producing *original* research

Tiantina's reflections on prior experiences of creativity and what she had learned are useful for her to learn about making an original contribution to knowledge. The forgoing analysis suggests three possibilities are worth considering.

First, doing original research can involve having international research students reveal their critical intelligence to themselves and others. Some researchers claim that Westerners have a greater capability for 'ECR-originality' than their Chinese counterparts, supposedly because of the over-whelming determination of socio-cultural forces (Chan and Chan 1999; Niu and Sternberg 2003; Rudowicz 2004; Zha et al 2006). Shay, Ashwin, and Case (2009, 373) suggest that ECRs critically scrutinise these knowledge claims and interrogate the theoretical frames of reference and methodological approaches which have shaped them. There is no universally agreed definition of, or test for creativity. In effect these claims deny research

students from China many of the attributes they have for making an original contribution to knowledge, such as curiosity, confidence and open-mindedness.

Florida's (2005b, 4, 5) concept of creativity extends to all humans: "the vast storehouse and virtually limitless resource that is human creative capacity; it can not be handed down, and it cannot be owned in the traditional sense". Claiming that creativity is a driving force of the global economy, the "creative class" describes the one-third of the U.S. work force including "engaged in science and engineering, research and development" (Florida 2005b, 3). For Florida (2005b, 6) the creativity which contributes to economic development revolves around "technology, talent and tolerance". Therefore, it is supposed that all ECRs have the potential capabilities to make original contribution to the un-boundary regime of knowledge.

Second, demanding international research students know their own creative capabilities through engaging in reflection. This can challenge an ECR to recognise her/his creativity and imagine how this can help to make an original contribution to knowledge. Through self-reflection ECR's can draw on their past creativity to anticipate future originality. As Giddens (1991, 76), suggests, Tiantian can appropriate "her past by sifting through it in the light of what is anticipated for an [original research oriented] future." Of course, Tiantian's experiences are growing, given her an even larger body of experiential knowledge that may help her to think about creativity what it means for making an original contribution to research.

Tiantian's participation as a co-researcher in two Australian Research Council Projects, and her successful completion of a research project for local government authority as part of her University's Cooperative Education program have added to her formal and informal knowledge about doing research and being a researcher. Likewise, Tiantian's research education has engaged her in peer reviewing for

journals; reading examiners reports of other students' theses; making conference presentations at professional research associations, and working with her supervisor on jointly authored papers to improve her research literacy (O'Donnell and Tobbell 2007). Reflections on such participation in a research culture may also help Tiantian grow her capability for ECR-originality by "conquering emotional blocks and tensions that prevent [her] from understanding [creativity]" (Giddens 1991, 78).

Third, an original contribution to research-based knowledge may come from ECR's relating something already learnt to their new learning. All creativity is based on previous understandings, prior experiences and the accumulation of formal and informal knowledge. Florida (2005a, 40) is of the view that in an increasingly global world, "everyone brings unique skill sets to the table", and intellectual tolerance is needed to "breed innovation and economic advancement." Since every international research student has creative potential, a key role for Western universities is to mobilise and unleash their talent by having them link their prior learning to their current efforts at knowledge production. Tiantian's creative potential for ECR-originality comes from blending Chinese concepts into her analysis of Australian evidence. In her doctoral project, Tiantian is using Chinese concepts to theorise student outcomes from Australian reforms to Years10-12. ***Xueji* 学记** (202 BCE - 220 CE)**,** a chapter in the ***Classic of Rite* 礼记** (Confucian scholars 202 BCE - 220 CE) offers philosophical concepts concerning the function, purpose and methods of education, the role of teachers, and their relationships with students.

Tiantian proposes to test the potential of the concepts of yu 预 (protection), shi 时 (timing), sun 孙 (sequence), and mo 摩 (running-in) for generating original

insights into student learning outcomes arising from Australian Government reforms to education. “Yu” refers to diminishing wrong ideas or habits when they are in the embryonic stage such as constructing Chinese students as necessarily less creative than their Western peers. “Shi” entails identifying the appropriate time for teaching knowledge and skills. Thus, if research students from China are expected to make an original contribution to Western knowledge then embedding the teaching about their creativity during their research education is desirable. Mullins and Kiley (2002, 380) argue that originality in a doctoral project can occurs at key times—“methodology, literature review, right from the beginning it makes you see an area that you thought you knew in a way that you hadn’t thought about before”. “Sun” means to follow the logic of learning to inspire students. Exploring the literature on creativity and reflecting on one’s own experiences of creativity may inspire a research student’s creativity, and break open the problem of making an original contribution to knowledge. “Mo,” which means learning from each other to make up for each other’s deficiencies speaks to the value of blending Chinese concepts into interpretations of Western education.

Conclusion

The idea of creativity has been explored in this paper to extend our thinking about what it means for an early career researcher (ECR) from China to make an original contribution to knowledge in a Western country. It is valuable for ECRs in any society to learn its research conventions and what it requires to conform to these, as much as it is to learn where the spaces for originality arise. This study used a biographical method to develop the concept of ‘ECR originality.’ Tiantian’s reflections on her creativity focused on instances when she was troubled or

challenged. ‘ECR originality’ suggests possibilities for research students from China to pose problems that can lead to making an original contribution to knowledge.

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Table 1 Overview of data set

Topic of reflection	***Key issue/s***	***Analytical concepts***
1. From limelight to shade	try to be different for being noticed by parents in childhood and develop the characteristics of being different when growing up	creative person individual differences self-awareness of creativeness willingness to grow
2. Translation practice	try to find most suitable English words in translation based on the context	creative process and product integration of dichotomies
3. Book on-line tickets in Paris	buy the tickets on French website without knowing French	creative press and process self-directed persistence self-confident adaptability openness to experience absorption in work
4. Study abroad with Chinese consciousness	explore construction grammar in linguistics with Chinese concepts	creative person, press and process adaptability independence of thought integration of dichotomies
5. Learning PPT from no knowledge of computer	grasp computer skills by self-learning	creative person, press and process hard-working persistence energetic curiosity absorption in work
6. Teaching life	finding novel methods to motivate students' interest in learning English based on different students and context	creative person, press and process hard-working rejecting of stereotypes independence of thought openness to experience
7. I am an excellent tailor	not learnt from school but design and make cloths based on the knowledge of geometry	creative person, product, press and process energetic aesthetic sensibility absorption in work
8. A mathematical question	challenge the authority and common sense of the teacher	creative person and process unwillingness to accept authoritarian independence of thought
9. "Once you have the necessary capability, you will be qualified to do anything"	develop one's own characteristics by learning from others	field theory reflective introspective
10. Five "whys" helps me deal with difficulties	develop her problem-solving skills	field theory reflective introspective curiosity
11. The internship for Home-based business survey	complete research report in new field—business which she never studied before and publish on government website	creative process and product self-confident hard-working persistence energetic integration of dichotomies
12. Redesign sandals	DIY to beautify sandals, solve practical problems with previous knowledge	creative process and product rejecting of stereotypes fantasy thinking aesthetic sensibility

Table 2 Attribution of "4Ps creativity" in Tiantian's reflections

	One aspect of "4 Ps creativity	**Two aspects of "4 Ps creativity**	**Three aspects of "4 Ps creativity**	**Four aspects of "4 Ps creativity**
Number of reflections	1	5	3	1

Table 3 Attribution of creative characteristics in Tiantian's reflections

Characteristics associated with openness and courage to explore ideas	Times characteristics motioned in reflections	Characteristics associated with listening to one' s inner voice	Times characteristics motioned in reflections
• Sensitivity to problem		• Self-awareness of creativeness	1
• Aesthetic sensibility	2	• Persistence	2
• Curiosity	2	• Independence of thought	3
• Sense of humour		• Self-disciplined	
• Playfulness		• Self-directed	1
• Fantasy thinking	1	• Autonomous	
• Tolerance for ambiguity		• Self-confident	1
• Openness to experience	2	• Reflective	2
• Adaptability	2	• Introspective	2
• Intuition		• Internal locus of control	
• Willingness to grow	2	• Rejecting of stereotypes	2
• Openness to feelings		• Energetic	2
• Unwillingness to accept authoritarian assertions without critical examination	1	• Hard-working	3
		• Absorption in work	
	2	• Unsociable	
• Integration of dichotomies			

Note: total words 6517