

# Creativity, Talent and Excellence



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Editor

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 Springer

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ISBN 978-981-4021-92-0                      ISBN 978-981-4021-93-7 (eBook)  
DOI 10.1007/978-981-4021-93-7  
Springer Singapore Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012954623

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Printed on acid-free paper

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*This book “Creativity, Talent, and Excellence” is dedicated to Professor Emeritus Kurt A. Heller (1931–) on his 81st birthday celebration for his lifelong engagement in creating spaces of interaction and development for international researchers in his home country, Germany.*



# Foreword

## **Creativity, Talent, and Excellence: A Window to New Insights**

*Creativity, Talent, and Excellence.* To paraphrase a piece of sage advice attributed to an anonymous writer in the 1950s, “never judge a book by its title.” If readers were to assess the present volume in this way, they would likely assume that the editor had assembled the writings of some of the foremost Western (most likely US) experts in their field. After all, the research and theorizing on creativity, innovation, and giftedness has long been dominated by American concepts, measurement techniques, and models. Yet an examination of this book’s table of contents reveals that not a single contributor hails from the US. Instead, the chapters have been authored by Australian, British, Chinese, German, Italian, Japanese, and Singaporean investigators and theorists, attendees, or collaborators at conferences, symposia, and meetings that took place in Asia and Europe. Is this, then, a volume focused on cross-cultural studies of creativity? Might not a title incorporating this cross-cultural aspect have been more appropriate? Not exactly. Whether deliberate or unconscious, Editor Ai-Girl Tan’s decision to leave culture out of the title (and American scholars out of the list of contributors) signals a new, exciting, and long overdue turning point in the study of creativity. An examination of the titles of a few other influential volumes tells the story best.

In 2001, Aik Kwang Ng published an extremely well-researched and comprehensive book bearing the provocative title *Why Asians Are Less Creative than Westerners* (Ng, 2001). The primary goal of this project, as described by Ng, was to explain why the demonstration of creativity is much harder for Asians than it is for their counterparts in the West. Toward this end, Ng emphasized the impact of cultural and societal influences and their role in shaping personality, behavior, and most especially creative performance. Many researchers and theorists working during this time period had become fascinated by collectivistic/individualistic distinctions like those offered by Ng. His book fueled the fire and helped set the stage for years of cross-cultural comparisons and empirical investigations dominated by Western values, concepts, and theories.

Research asking whether empirical findings reported in the US and other so-called individualistic nations could be replicated in Asia, was inevitable and instructive. Studies of this type have taught us a great deal about the influence of culture on the development of self-concept, thinking processes, and creative behavior. But in many important respects, such investigations were by their very nature one-sided and biased. More often than not, the diverse cultural traditions of nations like Hong Kong, Japan, Mainland China, Singapore, and Taiwan were equated, and even many Asian researchers appeared comfortable adopting Western viewpoints and assessment tools.

Driven by deeply felt concerns about the direction the research in their field was taking, Hong Kong investigators and theorists Sing Lau, Anna Hui, and Grace Ng published in 2004 *Creativity: When East Meets West* (Lau, Hui, & Ng, 2004). In their introduction to this edited volume, Lau and his coeditors called for a reexamination of commonly held conceptions of the nature of creativity, most especially within the context of culture. And contained within the many thought-provoking and carefully crafted chapters in this volume were important questions as to the conception of culture as well as questions as to whether creativity can and should be operationalized in the same way across nations.

My path first crossed with Ai-Girl Tan's when each of us was asked to serve as a contributor to *Creativity: When East Meets West*. Researchers and scholars were beginning to move beyond the quest for universals in the creative process or the simplistic description of differences between so-called individualistic and collectivistic groups, and chapters in that volume reflected an increasingly nuanced approach to the study of creativity and culture. As a field, we had progressed from the question of why Asians can't be more like Westerners to a consideration of what labels like "East" and "West" really mean and how culture might influence the perceived value of creativity or the development of assessment tools used to measure it.

The evolution of research on the interface between creativity and culture now continues with the 2012 publication of *Creativity, Talent, and Excellence*. In recent years, the study of personality, educational, cultural, and social psychology in Asia and around the world has begun to come into its own. No longer are American theories and measures held as the gold standard against which all investigations and models are judged. Questions of cross-cultural differences are gradually being replaced by efforts to tie research findings to the solution of local and real-world problems. As evidenced by the chapters in the present volume, whether their focus is on the classroom or the workplace, scholars from around the globe are showing an exciting and newfound commitment to the construction of models that best capture the development and cultivation of creativity in their own nations. Yet, at the same time, the important work reported here is in no way insular or culturally bounded. In our comprehensive review of the creativity literature published in the *Annual Review of Psychology* (Hennessey & Amabile, 2010), my coauthor Teresa Amabile and I observed that while research into the psychology of creativity has grown theoretically and methodologically sophisticated, investigators in one subfield often seem unaware of advances in another. What are needed are systems views of creativity that recognize a variety of interrelated forces operating at multiple levels. The chapters presented here make important contributions toward reaching this goal.

We have come a long way. From questions of why Asians are less creative than Westerners, to attempts to find meeting points between East and West, to worldwide investigations of creativity, talent, and excellence that incorporate a consideration of culture without allowing simplistic dichotomies to dominate the discussion. Where will we go from here? What will be the title of the next important collection of papers exploring creativity across cultures? Only time will tell. But a careful reading of the chapters in the present volume offers a valuable window into some of the exciting new insights and questions driving researchers and theorists around the world today.

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Beth A. Hennessey

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# Foreword

## **Broadening Creativity: From Testing to Systemic Understanding**

In a book dedicated to Professor emeritus Kurt A. Heller in conjunction to his 81st birthday, I would like to make a brief overview of research on creativity between China and Germany (see Shi & Zha, 2000). Especially, I focus on a move to broaden the boundaries of creativity, from testing to systemic understanding, a dedication to Professor Kurt A. Heller for providing us creative space of communication among international colleagues for academic exchanges (see the lineup of authors and contributors of this volume).

The studies on creativity started in 1978, by Professor Zixiu Zha, a developmental psychologist from Institute of Psychology at Chinese Academy of Science, and other four educational psychologists from Shanghai, Wuhan, and Sichuan. They initiated a research group called National Cooperative Research Group of Study on Supernormal (Gifted and Talented) Children in China (CRGSCC). Zha led the CRGSCC for two decades. The main purpose of the CRGSCC group is to study on giftedness or supernormal children (a term created by some Chinese psychologists which means gifted and talented children). Psychologists of CRGSCC group looked creative thinking as an aspect of giftedness (Shi & Xu, 1998; Zha, 1983, 1993a, 1993b) as some western psychologists thought (Guilford, 1986; Renzulli, 1978; Torrance, 1984). Zha and her colleagues developed a psychological test named Cognitive Ability Test for Identifying Supernormal Children (CATISC) (Zha, 1983). There were several subtests in this CATISC test. One of these subtests is creative thinking test including typical match stick tasks (moving one or two match sticks to make an equation mathematically true), divergent thinking skills, problem-solving skills, and open-ended storytelling (Li, 1984; Zha, 1983, 1993a, 1993b). A series of studies was conducted with this creative subtest in 1980s and early 1990s. Unfortunately, there were no clear definitions of creativity.

## Cross-Cultural Studies

In 1987, an international collaboration took place, with a funding from Volkswagen Foundation in Germany. Psychologists from University of Munich of Germany and Institute of Psychology of Chinese Academy of Sciences of China started a cross-cultural follow-up study on intellectually gifted and average children in China and Western Germany at that time (Heller, 1995; Heller & Hany, 1997). A total of 244 children from China and 196 children from Western Germany participated in this study. This was the first cross-cultural study on creativity in Mainland China after the Cultural Revolution. Participants from both countries were selected with same test instruments. Children were from grade 5 and 7; half of them were intellectually gifted. They were equal numbers of boys and girls. The studies were conducted for 3 years (Hany, 1994; Heller, 1995). Both samples from Germany and China were tested with technical creativity test (TCT) with five subtests and two questionnaires. The five subtests were technical problem comprehension, unusual usage, mental folding, geometrical analogies, and numerical equation. The two questionnaires were interests in sciences and technology and learning motivation. The TCT test had three parallel versions to make it possible to test the participants every year during three academic years.

Main findings of the project were summarized in the following three aspects. (1) Generally, the performances on TCT of both intellectually gifted and average students either from China or from Germany, no matter what gender and age they are, gradually increased with their grade increased. (2) The performances of gifted groups from both countries are significantly better than the average groups with the same age from same country. (3) Cultural effects were found on different subtests. Specifically, German students performed better than their Chinese counterparts in aspects of producing unusual usage ideas and attending technical activities, while Chinese students performed better than their German counterparts in aspects of finding geometric analogies, learning motivation, technical problem-solving, and mental folding. For the better performance of Chinese students on mental folding and geometrical analogy, researchers assumed that Chinese students might be benefited from the Chinese language as figural language (more about this project see Hany, 1994; Heller, 1995; Heller & Hany, 1997; Shi, Zha, & Zhou 1995, Zha, 1998; Zhou, Zha, & Shi, 1995).

## A Systematic Model of Creativity

“A Systematic Model of Creativity” was published in a Chinese journal of *Developments in Psychology* in 1995 (Shi, 1995). The model defined a human individual’s creativity as a manifestation of one’s intellectual activities that are influenced by the environment and culture in which one grows up. Creativity that is influenced by one’s personality is composed of creative attitude, creative behavior, and creative products. The core of creativity is one’s creative behavior, including creative thinking,

creative habits, and creative activity. According to this model, one's creativity can mathematically be treated as a function of one's active intelligence, personality, tasks, factors from social environment, and the time one is engaged in creative activity (Shi, 1995; Shi, & Xu, 1997). The active intelligence refers to that part of one's intelligence that is involved in or directed to the creative activities. Shi and his colleagues called this active intelligence as Intelligence Current (IC) (Shi & Xu, 1997). And the IC can be looked upon as a function of one's intelligence level (or intellectual potential), personality, social factors, and the time one spends on a specific task. And one's creativity is a function of one's IC and the task on which one is working. So, the functions can be expressed mathematically as  $f(Ic) = f(I, P, S, Tm)$ , and  $f(C) = f(Ic, Ts)$ . Here  $C$  stands for one's creative performance,  $Ic$  for one's intelligence current in a specific creative task,  $P$  for one's personality traits,  $S$  for the factors from the society or environment one lives in,  $Tm$  for the time one is absorbed in a specific creative task,  $I$  for one's actual intelligence level or intellectual potential, and  $Ts$  for the specific creative task. It was the first time that creativity and intelligence were clearly united into the same category.

### ***Studies on Relations Between Creativity, Intelligence, and Motivation***

According to a systematic model of creativity, the relations between intelligence and creativity cannot be well predicted with the correlation coefficient of scores on creativity test and intelligence test. In other words, the correlation coefficient of scores on creativity test and intelligence test cannot tell the real relationship between creativity and intelligence. A very important variable called "attitude" (Shi, 1995) plays a key role in the relations between one's intellectual potential and creativity performance. And the "attitude" is influenced by one's motivation either intrinsically or extrinsically. In this sense, the authors assumed that there should be some relations between motivation and creativity. In order to test this assumption, 244 students (half of them are intellectually gifted and the rest are average) aged between 10 and 12 years old were investigated with creative thinking test revised by Zhou and Shi (1996) and learning motivation questionnaire. The correlation coefficients between creativity and intelligence and between creativity and motivation and interests were calculated. As a result, significant correlation coefficients between creative thinking and interest and motivation were found in both intellectually gifted children and normal children, while a moderate correlation between creative thinking and intelligence were found too. It was also found that the correlation between creative thinking and intelligence in average children was higher than that of in intellectually gifted children. The authors explained that it indicated the lower the individual's intelligence, the more possible for people to predict his/her creativity through intelligence (Shi & Xu, 1998).

## ***Instructional Studies***

From a holistic view of creativity, Shi and his research team spent several years on developing systematic model of creativity (Shi, 1995; Shi & Xu, 1999) and “iceberg model” of creativity cultivation (Shi, 2000; Qu & Shi, 2003). The systematic model of creativity is mentioned previously. The iceberg model comes from an illustration figure of the notion of programs for cultivating creativity. Creativity is placed at the top of illustration figure, and two most important features, originality and usefulness (see Mayer, 1999), are beneath and then followed by cognitive, noncognitive, and social activities as three main aspects for designing training activities. Under these three aspects a larger base with two categories, physical situation and psychological mode, is considered in creativity cultivation. But physical situation and psychological mode do not directly connect to creativity but play very important roles in constructing a background for the creativity. Their function is like the large base of an iceberg under water. According to this iceberg model, Qu and Shi (2003) designed a program with many activities categorized in three aspects, say cognitive, noncognitive, and social aspects. In cognitive aspect, divergent thinking and critical thinking skills were emphasized; in noncognitive aspect, self-challenge, task commitment, openness to experience, and so on were concentrated; and in social aspect, team building, collaboration, and communication were essentially emphasized. A kind of activity in the training courses was unique to many training programs. According to the authors, it is helpful to be creative if the information is processed across different information processing channels. Cross-channel processing means that one kind of information, for example, acoustical information, is processed in another kind of information, for example, visual information.

The program was applied in both highly gifted and normal students in a high school. It lasted four months and 76 students aged between 14 and 16 participated. Conventional creativity test, as well as students’ products, was employed to evaluate the effect of instructional experiment. After the experiment researchers concluded that creativity could be enhanced through sophisticatedly designed programs mainly related to cognitive, noncognitive, and interpersonal variables. But the conventional creativity test hardly can evaluate students’ creativity in a holistic way.

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## **Remarks**

Preparation of this article is supported by NSFC Grant (No. 30670716), key project of Knowledge Innovation Engineering of Chinese Academy of Sciences (No. KFSHZ-2007-10). For requests or discussion pertaining to this paper, please contact Jiannong Shi (shijn@psych.ac.cn) Institute of Psychology, Chinese Academy of Sciences, Beijing 100101.

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# **Preface: Reflections on Creativity, Talent, and Excellence**

## **Introduction**

### *Reflections*

The authors of this volume participated in a series of conferences, symposiums, and academic meetings that collectively addressed the importance of nurturing creativity, developing talent, and attaining excellence. These meetings coincidentally took place in Asia and Europe. In 2009, European Union and Indonesian government declared the year of creativity and innovation. Activities, seminars, meetings, and discussions on creativity and innovation have since received renewed attention and participation. The same year in November, an international conference on creativity and innovation was organized in Xian, a Chinese ancient city (Vialle, 2009). Prior to and after the year of creativity and innovation, two conferences were organized at the University of Munich, Germany (Tan, 2011; Tan & Urhahne, 2008). The design creativity interest group of the Design Society organized its first conference in Japan (2010) and will hold its second conference in Europe (2012). Other conferences in Asia and Europe included the International Conference on Creativity and Innovation for Sustainable Development (2011) in Kuala Lumpur, Malaysia, the 12th European Conference on Creativity and Innovation in Portugal, and the 15th UNESCO-APEID International Conference focusing on inspiring education, creativity, and entrepreneurship in Jakarta, Indonesia.

In the United States of America, the Annual Review of Psychology released two chapters of creativity in 6 years. The first chapter on creativity organizes the contents with reference to the person, process, product, and press or environment (Runco, 2004) and highlights the interdisciplinary approaches to the study of creativity. The second chapter of creativity allocated sufficient coverage to international studies. The authors use a systems model to guide their review (Hennessey & Amabile, 2010). Some converging effort in making meanings of research was observed at the 2011 annual conference of American Educational Research Association (AERA). The meeting highlights included interdisciplinary understanding of inquiry

(Artiles, 2011), cultural education science research (Luke, 2011), and resilience in ecologies as a new science of learning (Gutierrez, 2011). The 2012 AERA conference theme is about “the use of research to improve education and serve the public good.” The increasing enthusiasm and engagement in creativity and related studies suggests timely reflections on alternative theorizing, programming, and services for inclusive learning, education, and life.

### ***Incomplete Representation***

The first reflection is related to the multifactorial models of creativity (e.g., Amabile, 1983), talent (Heller, 2004; Heller, Moenks, Sternberg, & Subotnik, 2000; Renzulli, 1978) and excellence (Heller, 2008; Ziegler & Perleth, 2011). The models conceptualize creativity as components of creative processes, domain-relevant processes, and task commitment (Amabile, 1983). Talent is an overlap of three components: Creative thinking, intelligence, and task commitment (Renzulli, 1978). Excellence is a construct comprising innovation, leadership, and motivation. Often creativity, talent, and excellence are measured from the observable behavior, self-reported scales, and correlational research designs. The multifactorial models of creativity, talent, and excellence represent part of our epistemological presentation of the phenomena. Systems views of creativity deserve a revival interest. Arieti (1976) suggests a two-system model of creativity, highlighting the interactive effect of the person and his/her culture. Csikszentmihalyi (1996), Ponomarev (2008a, 2008b), Hennessey and Amabile (2010), and Ziegler and Phillipson (2012) adopt three or more systems views of creativity and talent that highlight multilayer-systemic interactions (with significant others, resources, etc.). Creativity, talent, and excellence development are contextual. Development of creativity and talent is based on actions and interactions between the person and his/her social institution and culture of organization and society (Ponomarev, 2008a, 2008b).

### ***Unconscious Processes***

The second reflection is related to the use of psychometric measures of creativity which have informed us about conscious processes of creative thinking. Emergence of creativity, talent, and excellence goes beyond conscious thought and cognitive processes. There are some essential processes that are more important than cognitive and conscious processes. Human beings sense, perceive, and feel the existence of the objects and worlds around us. Creativity includes conscious processes such as will power (May, 1975), nonvoluntary processes such as intuition (Ponomarev, 2008a, 2008b), and feeling (see Vygotsky, 2004). Creativity involves processes of being with oneself and the world, doing something meaningful, and interrelating the person with his/her world, nature, and cosmo (May, 1975; Mu, 1989). In action,

interaction, play, and activity we associate images we perceive, relate to the objects and people around us, and connect to the nature, cosmo, and life.

### ***Connection and Integration***

The third reflection is related to how far can our understanding and knowledge of our existence and representation of our worldviews lead to enhancing of our quality of life and development of life identities (Marsella, 2012). Shall we explore ways to understand our being in interconnected worlds and ways to create knowledge and to enhance excellence in life (Hwang, Creativity and knowledge creation, personal communication, December 27, 2011)? There have been conscious calls to creativity and talent/gifted researchers and educators to be mindful of dark sides (Cropley, Cropley, Kaufman, & Runco, 2010) and possible dogmatic orientations in their discourses and practice (Ambrose & Sternberg, 2012; Ambrose, Sternberg, Sriraman, 2012). Cross-disciplinary and intercultural studies are relevant methodological orientations (Hennessey, Creativity and collective identities, personal communication, January 27, 2012). Interdisciplinarity allows “any form of dialogue or interaction between two or more disciplines: the level, type, purpose, and effect of this interaction remain to be examined” (Moran, 2002, p. 16). Cross-disciplinarity is a gradual process in which the research group moves in the direction of integration (Aagaard-Hansen, 2007). Marsella (2012) advocates development of life identities fits wells to being aware of dark sides (Cropley, Cropley, Kaufman, & Runco, 2010) and dogmatism (Ambrose & Sternberg, 2012; Ambrose, Sternberg, & Sriraman, 2012) in studying creativity and talent.

### **Scope of Our Volume**

Between 2008 and 2011, the contributors of the volume reflected upon their understanding and knowledge of creativity. Contributors of the volume were the participants of the second conference of creativity in Munich (June 2010, Tan, 2010), the international symposium in honor of Kurt A. Heller 80th birthday in Erfurt (September, 2011, Ziegler & Perleth, 2011), Taiwan Educational Research Association international symposium on creativity (December, 2011), Munich-Milano international symposium on creativity (November, 2008), and the Japan-Singapore international research study meeting in Miyagi, Sendai, Japan (December 2009). In one way or another, all contributors were graduate students, colleagues, visiting scholars, and scientific collaborators of colleagues of the Psychology of Excellence program at the University of Munich, Germany. Papers submitted to the conference in Munich which were in time for the review and revision process were released in conjunction to the conference in June 2010 (Tan, 2011). Papers read in the second creativity conference (June 2010) and subsequent scientific meetings (September, 2011 and December 2011) were reviewed and revised for this volume.

Adopting “the metaphor of boundaries” (Tronto, 1993), the volume embarks on discourses on creativity that are strategic (noticing the included/excluded and what shall we do if we wish to change what is included) and visionary (alternative forms of what [ethical] life should be). Accordingly, creativity conceptualization and practice shall take into consideration dynamics of the personal and the sociocultural/community, transitions of age groups, and interactions among gender, social class, and cultural groups. Creativity in learning and at work shall focus on establishing continuity in action and interaction.

We advocate that creativity is a factor indispensable in talent development and states of excellence. We conceptualize creativity as a personal human ability and collective engagement to construct, combine, select, integrate, and synthesize past and new worldviews based on our own and other shared experiences. Talent is used interchangeably with high ability, giftedness, and special abilities in attaining optimal and maximal performance. The word “excellence” can carry the meaning of “very great merit or quality” or exceptionally high quality, superiority, greatness, distinction, value, worth, goodness, and so on. Creativity, talent development, and excellence in schools and at work are social-cultural activities and processes.

The volume is organized into five parts:

- Part I: Conceptions of Creativity and Cultivating Creativity
- Part II: Studies on Creativity and Cultivating Creativity
- Part III: Conceptions and Studies on Creativity and Excellence in Organization
- Part IV: Studies on Educational Excellence
- Part V: Challenges Ahead

The five parts attempt to address the three reflective points mentioned above. Our volume hopes to relate the increasing awareness of multiplicity in perspectives, orientations, diversity, and inclusion of creativity theorizing and practices. Creativity adopts a new paradigm of research and practices that acknowledges collectiveness, integration, collaboration, and synthesis of knowledge and expertise. Studies of creativity have to consider not only the personal but also the sociocultural aspects of life that are real, relevant, ethical, and meaningful for the individual and community. Diversity is part of life. Differences are opportunities for crossing boundaries. “A boundary can be seen as a social cultural difference leading to discontinuity in action or interaction. Boundaries simultaneously suggest a sameness and continuity in the sense that within discontinuity two or more sites are relevant to one another in a particular way” (Akkeman & Bakker, 2011, p. 133).

## **Part I: Conceptions of Creativity and Cultivating Creativity**

Contributions of part I aim to reflect upon knowledge of creativity with respect to multiple paradigms, forms, and spaces/sites. Broadening creativity conceptions and studies highlight continuity and boundary crossing with respect to the subjects of research (from geniuses to all people), forms of creativity (from breakthrough/big-creativity, professional creativity, everyday/little creativity to mini/transformational

creativity), and places where these forms of creativity display (scientific communities, professional bodies, schools and formal settings, as well as home and informal settings, accordingly).

Machado and Silva (2007) highlight the role of conceptual analysis for a richer view of the scientific method. In envisaging a broadening, integrative, inclusive, cooperative, and meaningful paradigm of creativity, we shall examine the grammar, semantic clarity, and purpose and structure of argument with regard to creativity and research on creativity.

Part I comprises five chapters on conceptions or theories of creativity.

In Chap. 1, Heidrun Stoeger presents her view on learning as a creative process. According to her, creativity is often associated with extraordinary accomplishments in science, music, technology, etc. However, recently there is growing awareness that “big C” creativity has to be complemented by “little c” creativity. Indeed, the “big C” creativity accomplishments by eminent persons are preceded by myriads of “little c” creativity accomplishments, particularly in their learning process. Researchers like Anders Ericsson pointed out that even the daily learning processes of later eminent persons are based on many creative learning decisions. For example, learners have to find out how to overcome learning obstacles, have to develop more efficient learning strategies, or have to be creative when setting their learning goals. These skills are addressed by the self-regulatory learning approach.

In Chap. 2, Alessandro Antonietti and Barbara Colombo present a model of creative thinking. According to their model, creative outcomes can result by three main categories of operations: (1) *widening* the current mental framework, (2) *connecting* elements within a mental framework in unusual ways or connecting two different mental frameworks together, and (3) *reversing* the mental framework or the relationships between its elements. The chapter aims at showing that most psychological theories about creativity can be fitted in this model. Some examples of creative artifacts and solutions resulting from the implementation of widening, connecting, and reversing the mental framework are reported.

In Chap. 3, Ai-Girl Tan calls for reflection on contemporary knowledge of creativity and highlights the neglected aspects of understanding of creativity: being, life, ontology, and existence. The chapter reviews the existing theories of creativity which are multiplicity in orientations. It proposes a framework of cultivating creativity which includes the systems view, constructive processes, creativity for the common good, and creativity for life.

Heinz Neber and Birgit J. Neuhaus discuss about the relationship between creativity and problem-based learning or PBL (Chap. 4). According to them PBL is a complex approach to design and conduct instruction. It can be used for different purposes. PBL can contribute to the acquisitions of self-regulatory and reasoning skills of the students. It supports the development of strategies for productive reasoning and creative thinking for generating knowledge by solving instructional problems. The article states components of the instructional environment of PBL that contribute to achieve this goal. It reports on studies which measured the contribution of PBL to the development of creative thinking. It presents recommendations that will be derived for further strengthening the integrative approach to fostering creativity.

## Part II: Studies on Creativity and Cultivating Creativity

Learning involves creativity (Guilford, 1950). “All learning involves boundaries.” (Akkeman & Bakker, 2011, p. 132) Five chapters are included into this section. All chapters are related to the studies of creativity in the educational contexts. Creativity education explores the possibilities to enhance interests of the learners in the domains in which they are efficacious and creative. Paola Pizzingrilli and Stefania Molteni (Chap. 5) conducted an exploratory study to examine the what and the how of creativity among young children. They analyzed children’s naïve conceptions of a creative person and creativity. Results showed that all pupils were able to outline a profile of the creative person and were also able to express their own creativity.

Anna N.N. Hui, Mavis W.J. He, and Elaine S.C. Liu-Au examine creativity and early talent development in the arts in young and schoolchildren (Chap. 6). Their chapter argues and provides research evidence that creativity can be nurtured in young schoolchildren through early arts education in preschools and primary schools. The data presented in this chapter lend supports to the hypotheses that early arts education inside the classrooms and outside the schools are associated with creativity in typical schoolchildren. Implications and limitations for implementation will be discussed.

In Chap. 7, Mayumi Oie, Yasuhiko Fujie, Yu Okugawa, Shinichiro Kakihana, Shoko Itaka, and Hisashi Uebuchi studied self-regulated learning and creativity related to age and gender in the transition from elementary to junior high schools. This chapter attempts to explore the possible links between learning and creativity, as well as between self-regulation and creativity.

Ai-Girl Tan, Tianchang Li, and Heinz Neber report on a study on creativity self-efficacy and its correlates (Chap. 8). Five hundred and forty five Chinese students participated in study aimed to examine multidimensionality of creativity self-efficacy and its personal (e.g., personality) and contextual (e.g., classroom environment) correlates. Nearly all aspects in the Big Five model (openness, extraversion, conscientious, and agreeableness) were found to have significant, positive correlations with creativity self-efficacy. It was inconclusive if mastery approach or performance approach was a good predictor of creativity self-efficacy. Individualistic value was better than collectivistic value as a predictor of various dimensions of creativity self-efficacy. Students high in creativity self-efficacy scored higher in after-school academic group activities and entertainment than their low-creativity self-efficacious counterparts did.

In Chap. 9, Ji Zhou, Jiliang Shen, and Detlef Urhahne examined personal epistemology and its relationship with creativity. A total of 135 undergraduates in China were investigated by questionnaires on their creativity and personal epistemology. Results showed the characteristics of their personal epistemology and its relationship with creativity. Chinese undergraduates considered knowledge uncertain, improvable, and complex and considered learning speed as gradual and learning ability as incremental. They tended to use objective evidence and tend to categorize knowledge. However, they could use limited methods to justify them. Some dimensions of

personal epistemology were correlated with creativity. High-creativity individuals tended to consider knowledge as more uncertain, improvable, complex, and influenced by subjective and situational factors. They tended to use objective evidences and more justification skills. They also categorized knowledge, considered learning speed as gradual, and considered learning ability as incremental, but the degree was less than low-creativity ones. The epistemological characteristics of high-creativity students indicated that they were more on a higher developmental stage of personal epistemology.

### **Part III: Conceptions and Studies on Creativity and Excellence in Organization**

*Excellence in education and organization* encompasses the will or motivation of the learners/workers and the teachers/supervisors to construct environments that support extraordinary experience, relevant expertise, and self-worth. Allport (1962) suggests studies of the person from the general and the unique perspective. He commented on the limitation of the actuarial prediction (prediction based on general or dimensional information) and suggested the morphogenetic prediction (clinical prediction, self-knowledge, personal structure analysis, intensive interview, direct questioning, setting anchoring scale) and the semi-morphogenetic prediction (use of checklist to discard irrelevant dimension, a therapy case over two years of study). Echoing Allport's (1962) views, Mischel (2004) highlights the importance of dynamics and organization in studying human personality. An "integrative science" is suggested in Mischel's (2004) proposition of investigating a person.

To attain organizational excellence, processes of boundary crossing that are creative likely emerge in the course of team interactions at work: Reflection (perspective making, making clear one's understanding and knowledge of a particular issue, and perspective taking, taking of the other into account) (Akkeman & Bakker, 2011, p.145) and transformation (e.g., hybridization – combining ingredients from different contexts into something new and unfamiliar) (Akkeman & Bakker, 2011, p.148). Broadening conceptions and practices of creativity is essential in the contexts of work or organization. We regard creativity as a prerequisite of innovation and an important component of organizational excellence. Factors that influence organizational excellence include innovation in team work and creativity of working partners within an organization (e.g., supervisors, coworkers, and entrepreneurs).

In Chap. 10, Dominika Dej, Meir Shemla, and Juergen Wegge report on a validation study on entrepreneurs' creativity and innovation. They focus on a central agent of creativity and innovation in society – the entrepreneur. They review literature on key entrepreneurial activity and performance success factors. They also present entrepreneurs' subjective views of success, as based on a qualitative study with 243 entrepreneurs. In this chapter, the authors address creativity and innovativeness and their impacts on business creation and business performance.

In Chap. 11, Meir Shemla, Dominika Dej, and Jürgen Wegge explore another theme related to organizational excellence: Creating an innovative team. The authors pose a question: What can ensure that the positive effects of team diversity on innovation outweigh the drawbacks frequently found to be associated with diversity? They define diversity. They consider primary theories underlying organizational diversity: information processing, social categorization, and similarity-attraction. They review the contingency approach to diversity research, which currently guides the majority of work in the field. Finally, they introduce a contingency model of diversity and innovation that comprises three central groups of moderators that determine and shape the impact of diversity in teams on team innovation.

Jürgen Wegge and S. Alexander Haslam examined the impact of failure in group goal setting on task difficulty and supervisor fairness (Chap. 12). Group goal setting is a common leadership strategy that is used to improve work motivation, creativity, and excellent performance in organizations. The author tried to answer two important questions: (1) Why do challenging group goals improve group performance? (2) Are there any important (pre)conditions for group goal-setting techniques to be effective? To learn more about potential mediators of group goal setting, they investigated cognitive process variables (e.g., individual problem-solving) and team motivation variables (e.g., group identification) that could function as a causal mechanism. To learn more about potential moderator variables, they analyzed the impact of task difficulty and the fairness of a supervisor in negotiating performance goals with the team.

## **Part IV: Studies on Educational Excellence**

Part IV comprises chapters that report on ways to create opportunities to attain excellence. States of excellence are likely to be attained when a person is provided with opportunities for learning that nurture his or her strengths and that recognize his or her individual differences. Our minds are experiential, fluid, and dynamic. Excellence is likely to be present when the person receives ample space to grow and when educators and leaders show high commitment in maximizing the growth of every person. Inclusion facilitates self-transformation. In an inclusive learning context, individuals are determined to work through differences among them. They attempt to establish diversity in interest and competency. The development of excellence is supported by well-structured research programs and caring services. The outcomes of excellence include high-quality performance which goes beyond the expected behavior, flow in experience, well-being, good health, contentment, high self-efficacy, passion in learning, sustainable interest, tenure at work, peace in society, and harmony in group. Programs of excellence adopt definitions suitable for the vision, mission, and values associated with as well as the goals and objectives of a learning organization. A program of excellence should be specific enough to allow for the establishment of procedures and criteria for improving even upon the state-of-the-art learning and work practices. The program curricula should be challenging

enough to match the learners' levels of learning, and should generate interest in learning among the learners. The program aims to develop the competencies and abilities of the learners and takes into consideration the learners' motivations, emotions, and styles of thinking and learning.

In Chap. 13, Kurt A. Heller reports on the Hector-Seminar: A new enrichment program for MINT/STEM-talents. The Hector-Seminar, an initiative of the Hans-Werner and Josephine Hector Foundation, the School Authority in the Northern Badenia Regional Administration, and the University of Karlsruhe (TH), was launched first as a pilot project in 2001. The main objective is to encourage highly talented grammar school (German Gymnasium) students in the fields of mathematics, informatics (computer science), natural sciences, and technology (MINT resp. STEM). More than 500 talented students are now participants in the Hector-Seminar. In the pilot phase from 2001 to 2008, a project team of the Ludwig Maximilian University of Munich conducted a scientific evaluation. The findings confirm clear encouragement effects in the MINT-related areas of competency. MINT talents are encouraged sustainably in the Hector-Seminar not only in their main areas of talent but also in their entire personality development.

Yanhua Zhao and Rudolf Tippelt examined joint function of perceived classroom goal orientations and personal achievement goals on student school excellence (Chap. 14). A structural equation model encompassing classroom goal orientations, personal achievement goals, and school success (well-being and achievement) is proposed. The model posits that perceived classroom goal orientations and personal goals play integrative functions in explaining school success, which was examined with a sample of Chinese secondary school students. Results indicated that classroom mastery orientation positively predicted personal mastery goals and school success but negatively predicted performance-approach goals. Classroom performance orientation positively predicted the adoption of both personal goals. Classroom and personal performance-approach goals led to negative affect. Mastery goals partially mediated the effects of classroom mastery orientation on positive affect and achievement and partially mediated the effects of classroom performance orientation on school success indices. The mediation effect of personal performance-approach goals was only observed between classroom performance orientation and negative affect. Findings suggest that the integrated functions of classroom-level goal orientations and personal-level achievement goals are instrumental to understand student motivation, emotions, and school-related outcomes.

Mongsong Goh, Ai-Girl Tan, and William Choy investigated effects of video source presentation and cue retrieval on analogical problem-solving (Chap. 15). A total of 315 students (age 17–19 years old) of a vocational college in Singapore participated in a study to find out the effectiveness of multiple source representations of emotions in analogical problem-solving. Four experiments were designed with multiple source representation: In experiment 1, the participants read a story (source analogue) and solved a social interaction problem; in experiment 2, a video; in experiment 3, a video with scaffold annotations; and in experiment 4, a script and a video. In each experiment, two conditions were used: With cue to the source analogue and without cue to it. In each condition, there were 35 participants. A group

of participants ( $n=35$ ) who did not expose to the source analogue served as the control group. The performance of analogical problem-solving of the participants was measured in three ways: Selection of appropriate solutions, identifying reasons for the selected solutions, and articulating surface similar vocabulary. The participants scored significantly higher in the cue condition than in the without cue or control condition. When emotions were represented using video with annotations, there was significant improvement in scores of performance in all aspects. The findings suggest the essentiality to choose and use creative and effective designs of multimodal source analogue presentations in analogical problem-solving.

## Part V: Challenges Ahead

Creativity, talent, and excellence are forward looking, constructive, contextual, collective, cooperative, and collaborative. Our proposed volume aims to provide space for new discourses and refreshed understanding of what constitute and how we can foster creativity, talent, and excellence. Nurturing talent and attaining excellence demand community-based engagement, collective motivation, and co-constructive space for inclusive education and collective resilience.

Kurt A. Heller (Chap. 16) reexamines perspectives on gifted education in the third millennium. Different sources of information enrich our knowledge regarding the individual needs and effects of the promotion of giftedness or talent. Relevant sources include the psychometric (status) vs. cognitive (process) paradigms, the descriptive vs. explanatory approaches, and prospective (status diagnostic) vs. retrospective (e.g., expertise) research paradigms. Giftedness or talent research (US-preferred terms) is known as high ability (European preferred term) research. According to Julian Stanley, we know more about the “Whats” than we do about the “Whys.” This statement summarizes the status quo of our understanding of giftedness or talent, high ability or expertise, etc. This ascertainment leads to a challenge of gifted education in the 3rd millennium. Gifted education and related concepts shall explain the claim in details.

For the past decades, we have believed that East Asian students including those from China and Japan were less expressive and creative. Recently, creativity education and research has given a priority in East and Southeast Asian societies. The move complements insufficient spaces of learning in these societies for creative imagination and innovation as they have been focusing on academic excellence in the forms of international competitive assessments and national examinations. There are many aspects in learning that affects creativity of students and teachers and that influence school excellence.

Makio Taira (Chap. 17) reviews a study on resilience and school transition gaps in Japan. The author developed an inventory: School Diagnosis Chart. The participants were 119 secondary school freshmen. The author categorized participants into three groups according to their change of metacognitive ability: The uptrend, the same, and the downtrend. The downtrend group was overconfident in their metacognitive judgments as compared to the uptrend group. The former did not judge their weak

points from the start of their school year. The participants who evaluated their metacognitive abilities from the lowest among the three groups improved to a moderate metacognitive ability level. They became efficient students in terms of metacognitive judgments at the end of the school year. The group-oriented factor, metacognitive ability, and higher-order learning strategies contributed positively to the study motivation of math. Good use of higher-order learning strategies contributed to “academic excellence” which could prevent them from losing motivation to study.

## Concluding Remarks

A paradigm shift refers to a change in basic assumptions of a theory that a community of scientists shares (Kuhn, 1962). Paradigm shifts advance knowledge of humaneness and knowledge for common good. Human psychological phenomena are systemic (all parts of an organism are connected in complex relationships), dynamic (how things change or maintain themselves as the same), and social (reorganizing all the existing parts by creating a new whole) (Wagoner, 2007, p. 70). Giftedness refers to above average intellectual abilities, intense interests in specific tasks, and creative abilities (Renzulli, 1978). For decades, models of giftedness or gifted education (e.g., Three Rings Model, Renzulli, 1978; and Munich Model of Giftedness, Heller, 2004) have focused on interactive effects between cognitive (e.g., intelligence and creativity) and noncognitive (e.g., motivation and perceived support) factors of giftedness. Recent reviews and reflections on gifted research and gifted education (e.g., Subotnik, Olszewski-Kubilius, & Worrell, 2011) suggest among others “expanding the conception of giftedness to include factors that promote social capital and a greater concern for the well-being of people and the Earth’s resources.” (Renzulli, 2002, p.73) The above statement is consistent with the review by A. Ziegler and S. Phillipson (2012) on giftedness research and practice. Charles W. Kneupper (1949–1989) advocates that to be a human being is to be rhetorical. According to him, the historical goal of rhetoric in education was the pursuit of excellence in creating order, in symbolizing, in sharing discovery, in forming judgments, and in fashioning persuasive communications (Kneupper, 1980). Kneupper (1980, p. 160) uses the term “excellence *in*” to indicate the possible states of excellence in various activities of life and the inclusive condition “with wisdom or some continuity between tradition and creation.” New paradigms of creativity, talent, and excellence shall study social contexts *in* an individual’s mind or how society gets “inside” the developing person (Wagoner, 2007). It shall relate to the process of how our perception of humanities changes the world (觀乎人文以化成天下).

Creativity is recognized as an indispensable human ability to work with changeable, unpredictable, futuristic, and novel situations, relationships, and experiences. There have been calls of policymakers for years of creativity and innovation and growing numbers of scientific and academic meetings on creativity. Activities related to creativity have been broadened to include conceptualization of creativity within mainstream theories or concepts, conducting creativity and related research

across age, professional, sociocultural groups, to developing talent programs and psychometric and other measures for assessing excellence. Increasing awareness has been seen in identifying gaps of learning, expanding boundaries of research, as well as reexamining theories of creativity and practices in facilitating meaningful teaching and learning. In line with contemporary researchers to reexamine current knowledge of giftedness, creativity, talent, and excellence (Renzulli, 2002; Subotnik, Olszewski-Kubilius, & Worrell, 2011; Ziegler & Phillipson, 2012), our volume focuses on redefining and reconstructing creativity, talent, and excellence as processes and priorities in everyday life. Creativity has to be a component of talent development and excellence programs. Toward excellence shall be a value of learning and working. Our conceptions and studies of creativity, talent, and excellence have to be inclusive and open to new realization of our existence and capacity to create new perception of our changing worlds.

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# Acknowledgements

I have been thankful to Professor Emeritus Kurt A. Heller (1931–) who was my Ph.D. supervisor, senior colleague, and mentor for the past decades. When I first met up with Professor Heller, he was a chair professor of the Department of Educational Psychology at the Ludwig-Maximilians-Universität of Munich, Germany. In the 1980s, Professor Heller and team has engaged in international academic exchanges with international scholars through activities such as cross-cultural research projects (see Foreword, Shi, this volume), editing an international handbook, organizing an international conference, and graduates' and visiting scholars' supervision. A volume on excellence was released in conjunction of Professor Heller's 80th birthday (Ziegler & Perleth, 2011). Contributors included scholars in the field of talent and gifted education. "Creativity, talent, and excellence" is a volume specially dedicated to Professor Heller in conjunction to his 81st birthday. This volume collected contributions mainly from scholars who have been affiliated with an international program founded by Professor Heller: the Psychology of Excellence international program (1998–2011; renamed the Learning Sciences program, from 2012 onward). The following lines described dedication of Professor Heller to the Psychology of Excellence program and its creativity conferences.

## Psychology of Excellence

Professor Kurt A. Heller is a leader, scientist, and mentor in the field of gifted and talented education in Germany and the world (see Heller, Moenks, Sternberg, & Subotnik, 2000). He is an emeritus professor and the director of the Center for the Study of Giftedness at the Ludwig-Maximilians-Universität (LMU), Germany. Ziegler and Perleth (2012) compile Heller's scientific contributions to the field of gifted and talented education. Their volume of essays in honor of Heller's scientific contributions was released shortly after an international scientific meeting in Germany. Contributions of Heller to talent development of international students are compiled in this volume. The volume is titled "Creativity, Talent, Excellence"

intending to highlight the unrecorded creative influence of Heller in developing talents and encouraging excellence through the first international psychology program he founded. The “Psychology of Excellence” was established at the LMU. It attracted hundreds of applicants each year (1998–2011) from the world including Arabian-speaking countries, Africa, Asia, Europe, America, and Russian-speaking countries.

In its early stages the Psychology of Excellence study program (hereafter, Excellence Program) received financial support from the German Academic Exchange Service (DAAD). The study program enjoyed a supportive lineup of faculty from the Department of Psychology of the university. It attracted visiting professors from various countries: Professors Drs. Heinz Neber (University of Essen, Germany), Neville J. Schofield (University of Newcastle, Australia, 1998–1999), Leticia Hernandez de Hahn (National University in San Diego, California, USA), Tock-Keng Lim (PsychoMetrics International Singapore, October 2003–March 2004), Wilhelmus A. M. Peters (KUN in Nijmegen, Holland, April 2004–September 2004), and Ai-Girl Tan (Nanyang Technological University Singapore, April 2008–March 2009).

The Excellence Program was the first English language program in psychology succeeded in the selection from over 100 applications received by the German Academic Exchange Service (DAAD) (Heller, 2008). The study program of Psychology of Excellence has experienced two phases of development. Under the leadership of Kurt A. Heller (1998–2001) and the appointed director Heinz Neber (2002–2004), the program focus was on high ability or gifted education. The subsequent director, Juergen Wegge (2005–2007), enriched the contents of excellence with an additional area, that is, excellence in organization. The study program aspires to prepare the students for excellence in learning, science, research, and profession. Since October 2007, the study program has received advice from Frank Fischer (2007–) and overseen by his appointed director Detlef Urhahne (2008–2010). In 2012, Psychology of Excellence international study program was integrated into a new international study program on learning sciences. Frank Fischer is the chair professor who oversees the new program.

## **Creativity Conferences**

The creativity conference series aims to discuss the state of art of creativity in education and organization, two core disciplines of the international master study program “Psychology of Excellence in Business and Education,” and the possible themes for international collaboration on creativity research in Europe, Asia, and other parts of the world.

The aims of the conference series are:

- Broadening the repertoire of competencies of the course participants of the international program for Master in Psychology of Excellence in Business and Education

- Providing a platform for graduates and colleagues of other disciplines, faculties, universities, and industries to explore and share diversified views of creativity and talent development in business and education

The nature of the conferences is evidence based and practice oriented. The focus of the conferences is on sharing experiences in the field at work and in schools. Graduate researchers (doing dissertations), professionals, and faculties are welcome to present their findings and studies related to the themes listed below:

- Frameworks of creativity and talent development
- Identification of the talented and leaders
- Discovery, innovation, and invention
- Culture and excellence
- Personal and organizational excellence

## **First Conference: Creativity and Talent Development**

The inaugural conference cum workshop on Creativity and Talent Development took place on 3–4 September 2008 in Munich. This special event was sponsored by the German Academic Exchange Service (Deutscher Akademischer Austauschdienst) as part of Ai-Girl Tan’s visiting professor program. Creativity is the theme of the excellence program. In conjunction with the European Year of Creativity and Innovation (in 2009), the German Academic Exchange Service (DAAD, 2008) sponsored a 2-day conference cum workshop event focusing on the theme “Creativity and Talent Development” (September 3 and 4, 2008). The conference was organized by the Psychology of Excellence Program Office, University of Munich, Germany. The chairpersons of the conference were Ai-Girl Tan and Detlef Urhahne. The program included two keynotes and five lectures from international scholars (Germany, Italy, Singapore, and Sweden) and six paper presentations from our graduates and colleagues of other organizations (see Tan & Urhahne, 2008). The event stimulated an international seminar entitled “Toward the European Year of Creativity and Innovation” between my research group and our counterpart in Italy (November 14). Eight presentations were scheduled including my keynote address, two short research finding sharing sessions from Germany, and four from Italy.

## **Second Conference: Creativity in Business and Education**

Recognizing the significance of creativity research and creative activities in schools and at work, Professor Ai-Girl Tan initiated the second conference entitled “Creativity in Business and Education: Interdisciplinary and Intercultural Aspects.” The Creativity in Business and Education Conference was cochaired with Detlef Urhahne and Ai-Girl Tan and sponsored by the Münchner Universitätsgesellschaft.

It took place on 24th and 25th of June 2010 in Munich. This special event was a follow-up effort of the inaugural conference aiming to promote creativity research among colleagues from various disciplines and across different cultures (see Tan, 2010; Tan 2011 for details of papers presented in the conference).

## **International Symposium in Germany (September 2011)**

On September 30, 2011, an international symposium entitled *From High Ability to Creativity in Talent Development and Excellence* was organized in honor of Kurt A. Heller's 80th birthday and contributions to the fields of high ability, creativity, and excellence. Three former graduate students of Professor Heller who are professors in Asia and Germany worked together to ensure the success of the event: Ernst Hany (University of Erfurt, Germany), Christoph Perleth (University of Rostock, Germany), and Ai-Girl Tan (Nanyang Technological University, Singapore). The symposium and conference were held at the University of Erfurt. Ernst Hany provided the administrative and technical support. The international symposium was chaired by Ai-Girl Tan and was part of the program of an annual conference of Arbeitskreises Begabungsforschung und Begabtenförderung e.V (ABB) organized by Christoph Perleth. The publicity of the international symposium was released through the websites of the ABB and University of Erfurt. As a tradition, the ABB worked closely with an organization that promotes the study of excellence in mathematics and science (Verein Mathematisch-Naturwissenschaftlicher Excellence-Center an Schulen e.V. or MINT-EC). The audience of the symposium included members of these two organizations. Professor Heller has mentored eminent scholars of high ability in both China and Germany. Three of them who were founder and executive members of the International Research Association of Talent Development and Excellence (IRATDE) were in audience: Heidrun Stoeger (vice president), Albert Ziegler (secretary), and Jiannong Shi (treasurer). The international program was divided into four parts, with alternate German and international presentations. The first part of the international symposium was led by the German team with an introduction of Kurt A. Heller by Ernst Hany, followed by a brief presentation of the outline of a book entitled "Excellence" edited by Albert Ziegler and Christoph Perleth, and a short message from Kurt A. Heller. The edited book "Excellence" comprises 17 chapters (at the stage of writing) contributed by scholars who have worked with, supervised by, and known Kurt A. Heller. It was edited in honor of Kurt A. Heller's contributions to the fields of high ability, creativity, and excellence. The second part of the international symposium was led by the Asian team with two presentations: Creativity in excellence by Ai-Girl Tan (Singapore) and Self-regulation by Mayumi Oie (Japan). The third part was led by Heiner Rindermann (Chemnitz, Germany) on "Ergebnisse der Internationalen Mathematik-Olympiaden" and by Albert Ziegler (Erlangen-Nürnberg) on "Erziehung Hochbegabter." The fourth part was led by Jiannong Shi on "Gifted Studies and Education in China" and Langfeld (Äthiopien) on "Aktivierung von Bildungsreserven – Back to the Grass Roots."

## Appreciation

We are thankful to Professor Kurt A. Heller for constructing space of learning for talented students around the world. The program allowed many to grow and to experience excellence in learning. My deep appreciation goes to contributors of this volume who were directors of the Psychology of Excellence program (Kurt A. Heller, Heinz Neber, Juergen Wegge, and Detlef Urhahne) and presenters of the creativity conferences (Munich, 2008 and 2010; Alessandro Antonietti, Paola Pizzingrilli, Jiannong Shi, Heidrun Stoeger, Ai-Girl Tan, Albert Ziegler, Ji Zhou, and Yanhua Zhao). I am indebted to authors who were presenters of international (creativity) symposiums (Sendai, 2009; Taipei, 2011; Tokyo, 2011; and Xian China, 2011; chaired/participated by the editors Anna Hui, Mongsong Goh, Mayumi Oei, Makio Taira) for their timely submission to this volume. Juergen Wegge initiated three chapters on themes important in organizational excellence. His team's (Dominika Dej, S. Alexander Haslem, and Meir Shemla) contributions enhance the quality of this volume. Beth Hennessey's foreword is encouraging and reflective. It is in line with the practice of creating spaces for intercultural and international exchanges that Professor Heller has been dedicated in his lifelong, professional career. Her voice channels the importance of creative engagement in nurturing talents and promoting excellent scholarship beyond cultural boundaries.

Ai-Girl Tan

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