Dear Author,

Thank you for submitting an abstract for the 2022 Asia-Pacific Conference on Giftedness, which will be held in Taipei and online July 7-10, 2022.

We are delighted to inform you that your abstract has been accepted!

Action Required

All authors are required to complete the online registration

Presentation that will be presented by more than one author, co-authors are required to register as well. Please note that online registration will be closed on **May 31**. When the registration is not complete, your qualification may be removed from the program.

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Program Information: The date and time of your presentation will be determined by the committee. Your assigned presentation time slot cannot be changed due to programming constraints. The program will be available on the 2022 Asia-Pacific Conference on Giftedness website closer to the Conference.

We look forward to welcoming you at the conference in July!
Stay safe, happy, and healthy!

Kind Regards,

Ching-Chih Kuo

Ching-Chih Kuo, Ph.D.
Chairperson of 2022 Asia-Pacific Conference on Giftedness Organizing Committee

OIN91

The Relationship Between Intelligence and Executive Function among Gifted Adolescents

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Executive function is a term for a number of complex cognitive processes that are interdependent and critical to purposeful, goal directed behaviour (Lezak, et al, 2004). Miyake, et al. (2000), EF as a cognitive process (Working Memory, Inhibition, Cognitive Flexibility) which is a thorough coordination of processes in achieving a certain goal. (a) Working Memory is one of the main cognitive processes underlying thinking and learning. WM is necessary because it allows internal representation of information to guide decision-making and open behaviour; (b) Cognitive Flexibility /CF is often called mental flexibility, mental shift and is closely related to creativity; (c) Inhibitory control (IC). IC is the ability to inhibit attention to the distractor thus enabling selective and sustained attention. The ability to inhibit strong behavioural tendencies can help make a person flexible to changes that may occur, as well as obey social decency.

Chichekian & Shore (2017) said that gifted adolescents with this enormous potential, they have good cognitive flexibility (able to categorize problems into meaningful and able to make relevant solutions), metacognition (related to EF and self-regulation), strategic planning, prioritize complexity and troubleshooting, has an excellent memory (developed WM to solve problems), and has a broad knowledge of things. Previous studies have stated that there is a relation between EF and intelligence. As research conducted by Arffa (2007) states that full-scale IQ is significantly related to EF. EF are considered necessary to be able to better understand human behaviour in all its aspects. EF are those skills that can help the person adapt to a continuously changing environment and suppress any non-desirable behaviour, through self- regulation and adaptation, for their own benefits (Bernal, et al.2021).

But in fact, although gifted students have very high intelligence, there are also weaknesses that are owned, one of which is EF. Some gifted children were found to have poor EF. The lack of EF ability in gifted students makes various problems that will have an impact on themselves and others. Silverman (2013) mention the problems faced by students related to EF, namely problems in planning and organizing that interfere with school performance, lack of time management, work is often done at the last moment, less able to sort verbal and written expressions, inability to express how to get answers, impulsiveness, and make decisions without careful thought. The ability to solve problems, plan and manage time in doing tasks requires good cognitive flexibility). Likewise, to control oneself and control emotions related to Inhibitory Control, as well as the ability to analyse, think, reason, and learn requires working memory.

Executive function is a term for a number of complex cognitive processes that are interdependent and critical to purposeful, goal directed behaviour (Lezak, et al 2004). Executive functions refer to a variety of correlated abilities ranging from simple voluntary initiation and inhibition of behaviour to those involving complex planning, problem solving, and insight. Planning problem solving, and insight certainly correspond to psychological and even lay concepts of “intelligent behaviour”. However, evidence for a relationship of intelligence tests to executive function measures is inconsistent and not strong (Arffa, 2007). The purpose of this research, in order to know the relationship between intelligence and executive function (EF) in gifted children. The hypothesis: (a) there is relationship between Intelligence and EF of the gifted adolescents; (b) There is a relationship between three domains (Working Memory, Cognitive Flexibility, and Inhibitory Control) in Executive Function and Intelligence in gifted adolescents.

Method

Participants in the study were students in special class for gifted students with IQs above 130, total132, they are 73 boys and 59 girls. Age of 13-15 years. IQ is measured by CFIT. EF data collection using neuropsychological test tools, namely Wisconsin Card Sorting Test (WCST) and Stroop Colour and Word Task online version of Psytoolkit.org, Trial Making Test (TMT), and Digit Span

Results

From statistical analysis. The results showed there was no significant correlation between Intelligence and Executive Function (measured by Wisconsin Card Sorting Test (WCST) in gifted adolescents (r=0,311; p>0,05). The results of statistical analysis IQ with the three domains contained in the EF showed different correlations; Likewise, the Cognitive Flexibility/CF domain as measured by the Trail Making Test (TMT) there is not find a significant correlation (r=-0.418; p>0.05). There is a significant correlation for Intelligence and Working memory/WM of the Backward Digit Span measuring instrument (r=0.347; p<0.05), and There is a significant correlation between Intelligence and Inhibitory Control/IC of the Stroop Colour and Word Task (r=0,241; p<0,05).

Discussion

The first hypothesis is not accepted. It means that there is no correlation between Intelligence and Executive Function. According to Arffa (2018) Intelligence is a concept developed in psychology and in particular the psychometric tradition, executive function is a concept created in the domain of cognitive neuroscience. It is not surprising that the two remain as parallel concepts in the explanation of human cognition. Research has shown that, when viewed as a whole, executive functions are only partially according to the psychometric concept of intelligence. Therefore, it is evident that some elements of executive function, or rather, certain executive functions clearly correspond to intelligence, while some do not refer to intelligence. If uses the key difference between metacognitive –or simply “intellectual”—executive function, and emotional/motivation – or just a non-intellectual—executive function, it becomes proven that general intelligence can be equated with metacognitive executive function but not with emotional/motivational executive function. It has recently been proposed that cognitive tests knock general-domain executive processes; executive process is intercepted overlapping across cognitive tests so that they are needed more often than specialized domains (Kovacs & Conway, 2016).

Several studies have shown that not all domains of EF are affected by intelligence. The most highly correlated with intelligence is WM (Friedman, et al, 2006; Fugate et al, 2013), especially in adolescents (Giofre et al, 2013). Gifted adolescents have better working memory than non-gifted adolescents (Leikin, et al, 2013; van Viersen et al, 2014). There is clearly a close relationship between intelligence and working memory, and both play an important role in a variety of developmental areas during childhood. Interestingly, both involve prefrontal areas of the brain. This raises the question of whether, when solving problems involving working memory, more intelligent individuals show more activity in the prefrontal brain relative to those who are less intelligent (Neubauer and Fink, 2009).

In gifted children, WM-related self-control mechanisms are also associated with Inhibitory Control (IC). Gifted children can inhibit irrelevant information and divert information processing so that new information that should be remembered can be well received. In gifted children, the corpus collosum is larger than normal children so that there is more space in the brain to channel information from one part of the brain to another and in the end the two parts of the brain can be synchronized properly (MacIntyre, 2008). WM is the capacity that underlies complex cognitive processes and this ability is possessed by gifted children (Dehn, 2011).

This study indicate that intelligence is not related to the Flexibility Cognitive (FC). Several previous studies have found that intelligence is weakly or even unrelated to flexibility cognitive (Benedek, et al 2014; Friedman, Miyake, Corley, Young, DeFries, & Hewitt, 2006). This is because, FC is able to see things from different points of view.

The results of this study indicate that intelligence has a significant correlation with inhibitory control/IC. This is probably because gifted adolescents have a larger gray matter area than non-gifted adolescents (gray matter area is the site of the cell body and is the most active site in the brain, consists of nerve cell bodies, and is a structure that houses the nucleus of neurons, which serves as a sign of self-control. Gray matter also works for higher level learning). Therefore, gifted adolescents have good cognitive control so that even though the brain demands continuous activation from other parts of the brain, gifted adolescents can still control themselves to commit to their tasks (Miyake, et al, 2010)

Carlson, Zelazo, & Faja (2013) state that EF is not influenced by intelligence, but is more influenced by socioeconomic factors, gender, culture, language, parenting, gene-environment interactions, and sleep patterns. The first factor that affects EF is socioeconomic factors. The level of education of parents also affects the EF and language development of children. In addition, children who often move places of residence, trauma, childhood stress can also affect EF. Briggs, et al (2008) conducted research on gifted children and found that they were culturally, linguistically, and ethnically different and students were not identified as gifted children.

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APCG

THE 17th ASIA-PACIFIC CONFERENCE ON GIFTEDNESS

Embracing Diversity, Blooming Talents

CERTIFICATE of PRESENTATION

This is to certify

Endang Widyorini

Presented a paper titled

OIN91
The Relationship Between
Intelligence and Executive Function among Gifted Adolescents

at the

17th Asia-Pacific Conference on Giftedness

July 7th-10th, 2022

Ching-Chih Kuo

Prof. Ching-Chih Kuo
Organizing Committee Chair, The 17th Asia-Pacific Conference on Giftedness

教育部國民及學前教育署
K-12 Education Administration, Ministry of Education

國立臺灣師範大學
NATIONAL TAIWAN NORMAL UNIVERSITY

教育學院

The 17th APCG

Asia-Pacific Conference on Giftedness

Proceedings of

the 17th Asia-Pacific Conference on Giftedness:

Embracing Diversity, Blooming Talents

Edited by Ching-Chih Kuo, Hsiao-Ping Yu, Wei-Ren Chen, Yen-Wei Chen

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Proceedings of the 17th Asia-Pacific Conference on Giftedness:

Embracing Diversity, Blooming Talents

Department of Special Education, National Taiwan Normal University
129, He-ping East Road, Section 1, Taipei 10610, Taiwan

Contents

Preface

Thanks to all of the participants who attended the 2022 Asia-Pacific Conference on Giftedness. As the Chairperson of the Organizing Committee, I would also like to extend my great appreciation to the K-12 Education Administration, Ministry of Education and National Taiwan Normal University for their full support to this international conference during this very hard time of Covid-19 pandemic. My sincere appreciation also goes to President of the Asia-Pacific Federation on Giftedness (APFG), Dr. Usanee Anuruthwong for authorizing Taiwan to host this conference. Through the sharing and discussion of professional knowledge and experience, I believe we all gained rewarding experiences and new insights into global trends in cultivating talents and encouraging talent development, which is the core of gifted and talented education.

During the four-day conference, around 1000 participants from 40 countries and regions have joined us at National Taiwan Normal University and on Cisco Webex platform. They are from Armenia, Australia, Austria, Bahrain, Brazil, Canada, China, Croatia, Germany, Hong Kong (China), Hungary, India, Indonesia, Iran, Ireland, Israel, Japan, Macao, Malaysia, Mexico, the Netherlands, New Zealand, Niger, Norway, the Philippines, Romania, the Russia Federation, Saudi Arabia, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, Ukraine, the United Arab Emirates, the United Kingdom and the United States. We have had 11 keynote speeches, 3 symposium sessions, 1 workshop session, 100 oral presentations and 34 poster presentations that are contributed by all the participants.

Words cannot express my appreciation for all the speakers and presenters for your excellent contribution and inspiration. My special appreciation also goes to people who kindly submitted full papers, which have been collected and included in this Proceedings. Your presence, together with your expertise, experience, and knowledge certainly have helped make this event an intellectually stimulating and memorable one. Again, Taiwan is most honored to host this conference. Thank you all for your participation.

Prof. Dr. Ching-Chih Kuo
Chair, Organizing Committee, 2022 Asia-Pacific Conference on Giftedness

The 17th Asia-Pacific Conference on Giftedness (APCG)

Embracing Diversity, Blooming Talents

July 7 – July 10, 2022

Ching-Chih Kuo, Chang-Hsin Liu, Wan-Hsuan Liu

The Asia-Pacific Conference on Giftedness (APCG) is a biennial event in the summer, usually in July or August providing opportunity to contribute to the global conversation about gifted and talented education. Every two years the event is held at different location and brings together hundreds of members and attendees and numerous presentations covering latest trends in the education of gifted and talented children. Previously the conferences were held in Manila (1990), Taipei (1992), Seoul (1994), Jakarta (1996), New Delhi (1998), Beijing (2000), Bangkok (2002), Daejeon (2004), Taipei (2006), Singapore (2008), Sydney (2010), Dubai (2012), Beijing (2014), Macau (2016), Bangkok (2018), Daegu (2020), and Taipei had hosted the 17th Asia-Pacific Conference during July 7 to July 10, 2022 in a hybrid event with virtual and physical attendees at the National Taiwan Normal University (NTNU), Taipei, Taiwan, and on the Cisco Webex platform.

The 17th Asia-Pacific Conference is sponsored by the K-12 Education Administration of Ministry of Education, and under the auspices of Asia-Pacific Federation on Giftedness (APFG). The conference features the theme “Embracing Diversity, Blooming Talents” and had 11 keynote speeches, 3 symposia sessions, 1 workshop session, 100 oral presentations, and 34 poster presentations on current status on gifted education in Asia highlighting the theme.

Below is the introduction of the conference held from July 7 to July 10, 2022, including the brief summary and pictures of guest addresses, keynote speeches, symposia sessions and workshop session.

THE 17TH ASIA-PACIFIC CONFERENCE ON GIFTEDNESS

Newsletter - July 7

OPENING CEREMONY

The 17th Asia-Pacific Conference on Giftedness took place on July 7th, attracting over 600 guests, scholars, teachers, and students around the world to participate. The opening ceremony was emceed by Associate Professor Christine Chifen Tseng, and the ceremony started with the brilliant piano and violin performances by Gavin Chen and Emily Tsai.

Then, Political Deputy Minister of Ministry of Education Ching-Hua Tsai gave the congratulatory address, welcoming all the attendees in Taiwan and online from 39 countries with passion. The conference gathered everyone with the theme "Embracing Diversity, Blooming Talents." Taiwan was honored to be the host of the conference and sincerely appreciated the participation of all the attendees. President of National Taiwan Normal University Cheng-Chih Wu also gave his blessing in the opening ceremony, hoping the conference to succeed and attendees to have fruitful experience during the four days.

KEYNOTE SPEECH FROM DEL SIEGLE

Subsequently, the first keynote speech invited Professor Del Siegle from University of Connecticut, USA. Professor Siegle began with "elephant in the room" to explore how to balance the identification of gifted education and provide services for the gifted students. Nowadays, the merit-based human development leads schools to spend millions identifying the qualification of the gifted, but it doesn't require schools to provide services for these gifted students, which is the question worth re-thinking at the current phase. Professor Siegle suggested "Three-Legged Gifted Education Service Approach" to conclude that providing service is more crucial than identification.

Lisa Sigafoos from University of Texas at Austin, USA gave the second keynote speech with the topic "Empowering Disability Identity and Fostering Inclusivity in Postsecondary Classrooms." She stressed on the four factors: (1) Building SAFE Learning Environment (self-confidence, acceptance, fairness, encouraging), (2) Identity Empowerment, (3) Instructional Style, (4) The Inclusive Postsecondary Classroom.

KEYNOTE SPEECH FROM LISA SIGAFOOS

INVITED SYMPOSIUM -TWICE EXCETIONALITY

Followed with keynote topics was the invited symposium with Dr. Usanee Anuruthwong from Association for Developing Potentials and Giftedness, Thailand, Professor Kyungbin Park from Gachon University, South Korea, and Professor Jan Burns from Canterbury Christ Church University, UK. They discussed the location and the importance of the twice-exceptional in special education. First, Dr. Usanee Anuruthwong suggested that in some cases with twice-exceptional Children, their high ability may not be recognized, due to problems with speech and communication, or with movement and coordination. Misdiagnosis has led to inappropriate placement, nurturing, and teaching. Understanding their uniqueness and seeking to turn on their potential to ignite their giftedness—and at the same time, overcome their weaknesses—must become a new trend in all schools.

Then, Professor Park shared with us that the topic of twice-exceptional learners is still underexplored among many societies and researchers. The lack of special attention to twice-exceptional learners may pose a challenge to their talent development and the contributions they could make to human society at large. It is important for the society and the educational field to recognize and seek for solutions to nurture twice-exceptional learners' unique giftedness. Finally, Professor Burns, an elite athlete with intellectual disabilities, shared that success for them is not just about athletic talent, and having the mind-set, determination, support and opportunity. The race might be more challenging, beset with inequalities, low expectations and less opportunities, in addition to compensating for what having intellectual disabilities actually means for sporting performance. In every journey, it is all about placing a marker in history, becoming a role model, and inspiring a whole generation of youth.

KEYNOTE SPEECH FROM ROBERT J. STERNBERG

Professor Robert J. Sternberg from Cornell University, USA gave the next speech and shared that giftedness is usually conceived of a transactional personal characteristic. When identified as "gifted", people are expected to perform well in all aspect, and in exchanged, they receive special benefits. The problem with this transaction between the individual and the school is that it takes into account the egocentric needs of the individual but not, sufficiently, the common good of the world. We should pay more attention to the identification and especially the development of transformational giftedness, which is giftedness directed toward creating a better world--toward making a positive, meaningful, and enduring difference to the world as a whole.

WORKSHOP FROM DR. TOBIAS SCHÜTTLER

At the same time, in the workshop, Dr. Tobias Schüttler shared aerospace-related school student research projects, which indicate that stimulating project with clearly defined objective groups of gifted school students can raise their limits of previous knowledge. By means of self-structured team action they are enabled to conduct targeted research and develop a defined innovative result.

The first day of the conference also had six venues for paper and poster presentations. The inclusive education of "Embracing Diversity, Blooming Talents" has been the critical issues we are working on. The speakers and presenters of this international conference come from 40 countries worldwide. The research results fully demonstrate the value for creating high-quality learning environment, and inspiring students' talents.

PAPER PRESENTATION

POSTER PRESENTATION

Sharing and discussing with partners for gifted and inclusive education from different countries online and in person must ignite more inspirations. We are looking forward that students with special needs are able to learn joyfully with peers.

THE 17TH ASIA-PACIFIC CONFERENCE ON GIFTEDNESS

08 JULY, 2022 | NEWSLETTER

BLOOMING TALENTS

WITH AN INSPIRATIONAL OPENING, THE SECOND DAY BEGAN WITH WARMTH AND ENCOURAGEMENT

The 17th Asia-Pacific Conference on Giftedness continued the enthusiasm on the first day of the opening. Crowds of people gathered at the registration office waiting before the opening of the event. A review film prepared by the Department of Special Education warmed up the event today in 202 Auditorium of the General Building. Through the post-competition interviews with athletes with disabilities, their uncompromising attitudes towards life were recorded. One athlete stated, “Whether I win or lose, the competition let me forget the troubles of life, and enjoy the great happiness of living in the moment.” Such spirit is worth learning by all.

FOURTH KEYNOTE SPEECH FROM PROFESSOR JONATHAN A. PLUCKER OF JOHN HOPKINS UNIVERSITY

The professor led the audience to review the current state of the research on causes of excellence gaps and strategies for shrinking and eventually eliminating them. The first paper on excellence gaps was published in 2010. In the dozen years since that original report, researchers and educators have learned a great deal about excellence gaps.

FIFTH KEYNOTE SPEECH FROM DOCTOR APICHART PHOLPRASERT OF CHULALONGKORN UNIVERSITY

Doctor explained to the audience that art education should be promoted, especially for every child and advanced in those who have special talent. Contributions of art to children's development in diverse skills was highlighted. Formal school curriculum and structure often have limitation in providing fulfilling enrichment for the needs of talented and gifted students. Thus, he shared the major talented art educational programs in Thailand. With the support of the officials, the programs successfully enhanced the creativity and imagination of talented students. Students’ education and personality development require everyone’s diligence.

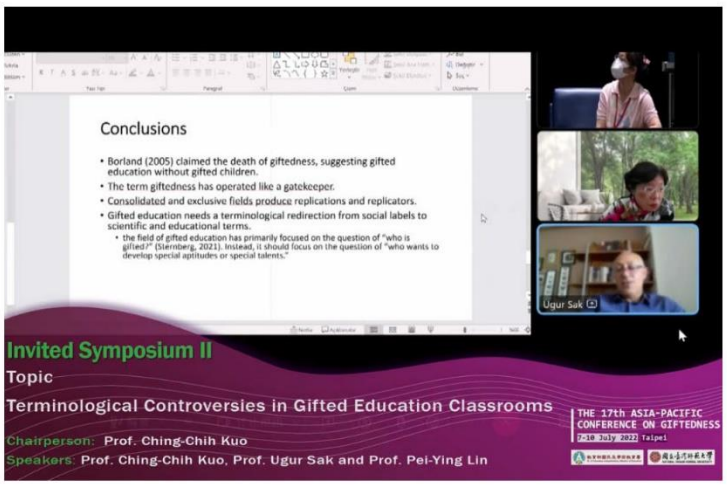
HIGHLIGHTS OF SYMPOSIUM 2

PROFESSOR CHING-CHIH KUO FIRST PRESENTED HER IDEAS .

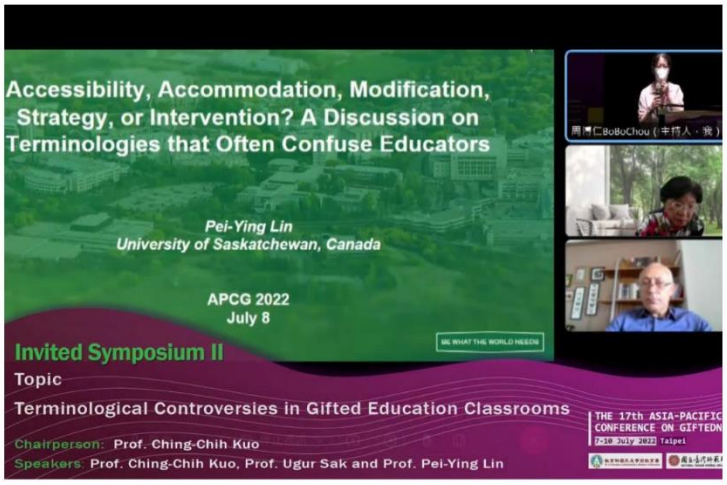
She mentioned that to determine if a person is gifted or not, the government sets the criteria of identification since giftedness is an abstract concept. However, the standard has always been decided and affected by the attitudes of the education authority and the allocation of resources. The opportunities for some potential learners to participate in gifted programs are often closed because of high identification criteria on standardized tests, especially intelligence tests. To bridge the achievement and the opportunity gaps between regular and gifted students with disabilities or different cultural backgrounds, educators are encouraged to apply the talent development model to develop hidden potential rather than focus on identification or labeling students as gifted. It is time to change the rigid concept of giftedness and expand the concept to discover multiple talents.

PROFESSOR UĞUR SAK FURTHER SHARED HIS INSIGHTS

He said that the term “Giftedness” in gifted education is criticized. Researchers have tried to restructure an amorphous construct to adopt it to educational settings rather than inventing or using scientific or educational terms preferred in many disciplines to signify human abilities.

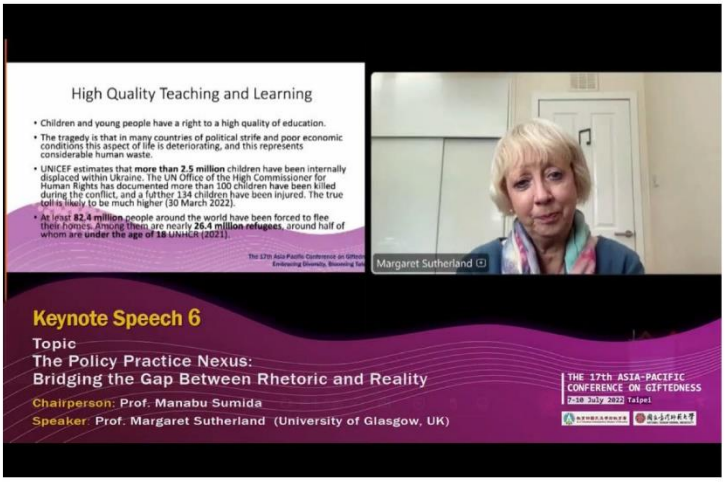


FINALLY, ASSOCIATE PROFESSOR PEI-YING LIN BROUGHT US SOME SUGGESTION.



She suggested that in the past few decades, the relative institutions provided students with examinations and classroom assessment. Such changes to test management ensure that students with special needs to have fair access to teaching and assessment. However, relevant terminologies are often misunderstood and misused by educators at K-12 and higher educational institutions over time. Thus, based on the theories and practices of special education, assessment, and educational measurement, the professor used practical examples to help audiences better understand the distinctions among the terminologies that often confuse educators.

SIXTH KEYNOTE SPEECH FROM PROFESSOR MARGARET SUTHERLAND FROM THE UNIVERSITY OF GLASGOW



Professor shared many issues related to the career development of Asian gifted students, especially about cultural values, family influence, income, sense of security, prestige, gender role expectations, career indecision, interest, enjoyment. In addition, the professor also compared the factors affecting the career development of gifted students in Asian and non-Asian environments, and shared important issues worth thinking about for the future career development of Asian gifted students.

The wonderful sharing brought by many professors fully demonstrated the educational field's emphasis on creating a high-quality learning environment and inspiring students' talent development. With all the physical and virtual sharing and discussions, the path to future gifted education must be promising.

WHAT IS NEXT?

HIGHLIGHT ONE

What could we do for high potential students in low income and the minority groups?

HIGHLIGHT TWO

Well-being has become an ESSENTIAL issue these days. What should we do for these gifted learners?

HIGHLIGHT THREE

A new PERSPECTIVE for gifted identification?! What is the FUZZY THEORY? How do we do it?

HIGHLIGHT FOUR

Give me a booster and I will learn faster. What are the boosters for talent development?

The 17th Asia-Pacific Conference on Giftedness

09 July, 2022 Newsletter

The 17th Asia-Pacific Conference on Giftedness has gone through half of the event, and the third day of the conference still attracted many scholars, teachers and students in the field of gifted education. Today's warm-up video was a wonderful dance performance by students from Dongmen Elementary School and a piano performance by Emily Tsai, kicking off today's speech with the beautiful dance moves and piano sounds of the artists!

Professor Joseph Renzulli from University of Connecticut shared his ideas.

He shared with us that a major controversy facing the field of gifted education is the underrepresentation of low income, minority, and dual language students. The assessment for learning examines traits such as interests, instructional preference styles, preferred modes of expression, and executive function skills, although sometimes these referred as the “soft skills,” they have gained much more attention on the parts of college admission officers and employers, especially for higher level leadership positions. Instruments that assess these traits are often completed by the students themselves; and technology and artificial intelligence now allow us to administer and analyze them with the same ease used for traditional standardized tests.

Symposium III - Career Development and Well-being of Gifted Learners

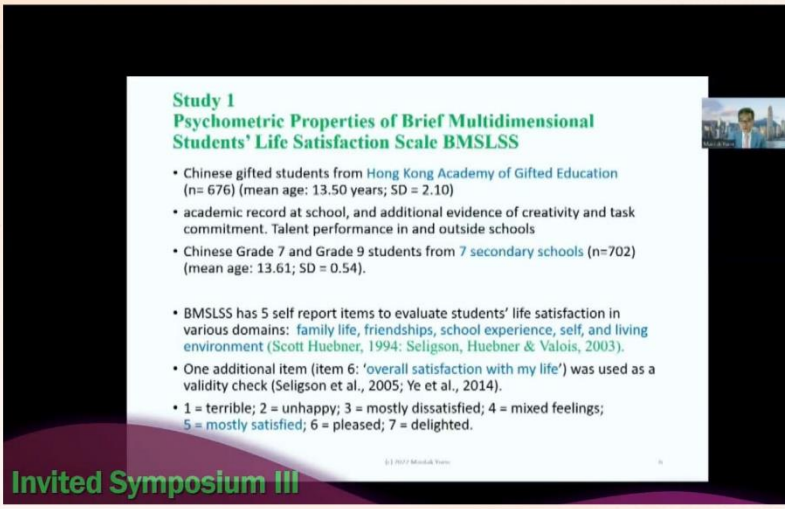
Dr. Mantak Yuen from Hong Kong University shared critical review of literature on life satisfaction of adolescents and with details from two studies. From the studies, we knew that perseverance was linked to higher levels of life satisfaction, while adaptability was indirectly linked to life satisfaction via career development self-efficacy.

Dr. Jae Yup Jung from University of New South Wales talked about the career development of gifted students in the Asian context, and in particular, the role of factors including cultural values, family influence, income, security, prestige, gender role expectations, career indecision, interest, enjoyment, and intellectual stimulation. He concluded the presentation with the possible future of career development of gifted students in Asia.

For more information
https://www.apcgtaipei2022.org/home.php

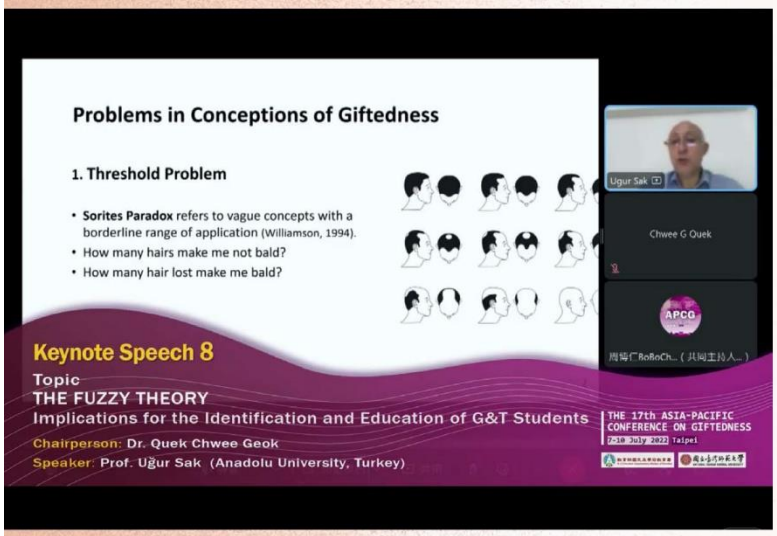
Symposium III - Career Development and Well-being of Gifted Learners

Eventually, Dr. Serene Chan from Hong Kong University investigated how early career awareness activities can be useful for children's growth and development, specifically from the creative cross-disciplinary workshop held for primary school students as a starting-point. It was known that having increased knowledge about adult occupations may affect children's talent development in positive ways; it could heighten children's self-awareness and help develop their talents.



Professor Uğur Sak from Anadolu University, Turkey shared the Fuzzy Theory of Giftedness (FTG)

Professor Uğur Sak suggested that the concept of giftedness is vague. Based on this concept, the professor shared the identification and education the practices of giftedness. According to the FTG model, the selection of gifted students should be a two-phase process: (1) natural selection and (2) adaptive retention. Professor Sak suggested that gifted education should evolve into person-environment interactions that foster talent development.



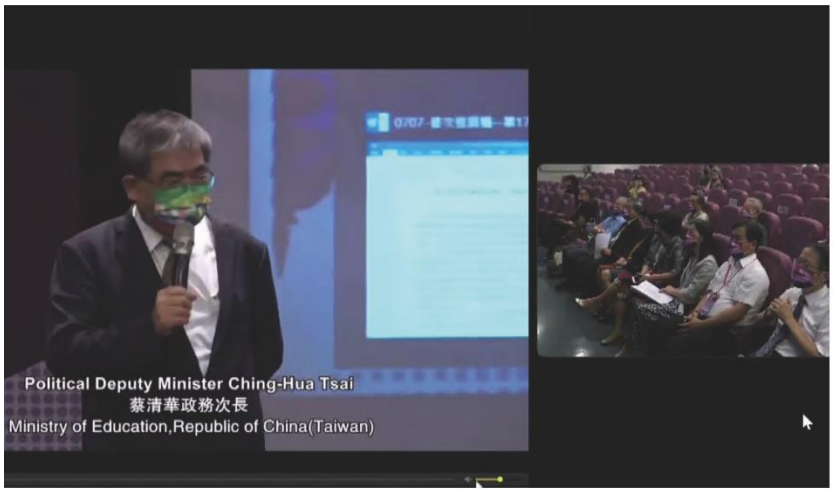
Professor Albert Ziegler from University of Erlangen-Nuremberg shared nativist talent models.

He thought that talent cannot be developed without a stimulating environment. Yet, what specifically characterizes a stimulating environment was never established. To be sure, it quickly became clear that certain people, objects, settings, and systems play a crucial role for talent development. However, no elaborate theory has never been presented that encompassed the element of such environments, as well as their interaction and the ways in which they can be regulated. Professor Ziegler first suggested what distinguishes effective from less effective environments is educational and learning capitals.

Second, he explained the benefits of stimulating environment to develop talents, drawing from an environmental typology which has two poles--an "atope" and a "megatope". Last, Professor concluded his speech with several maxims on the future course of talent education.

The 17th Asia-Pacific Conference on Giftedness

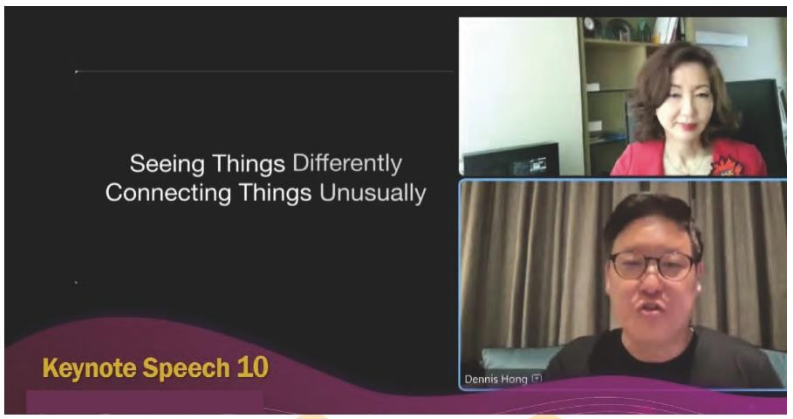
JULY 10TH NEWSLETTER



Tenth Keynote Speech from Professor Dennis Hong

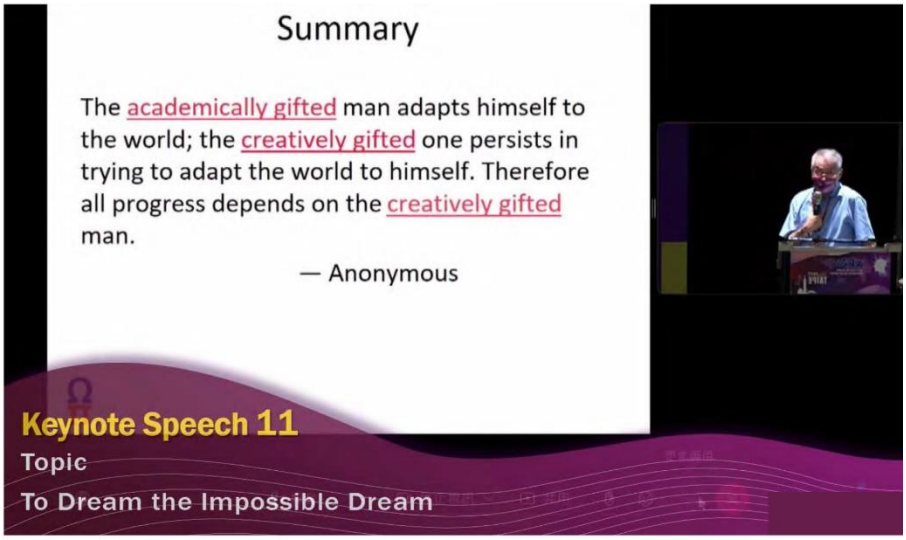
He focuses on discovering the multi-directionality of things as the main idea to share the related experiments of lab RoMeLa in the UCLA (Robotics & Mechanisms Laboratory) and how to lead students to continuously challenge existing technologies to develop more novel robots. Walking, rolling, jumping robots with two, three, four, six legs or a robot that can move in all directions with just a single wheel, robots with never-before-seen morphology capture the imagination and inspire people. Lab RoMeLa believed that creativity is not necessarily the ability to come up with something new that has not existed before, but rather the ability to connect things that are not directly related.

The 17th Asia-Pacific Conference on Giftedness came to the last day of the event. After three days of speeches and symposiums from scholars, it was believed that both on-site and online participants learned a lot. The last day of the conference kicked off with the five-year retrospective video of Asia-Pacific Forum for Science Talented. The efforts of countries in the Asia-Pacific regions to discover students' potential and cultivate students' multi-faceted abilities are obvious to all.



The professor also took his son or student for examples in his presentation to show the process of creation and how these methods can be applied to education and the family.

The closing speech of the conference from Academician Wing-Wuen Ip of the Academia Sinica

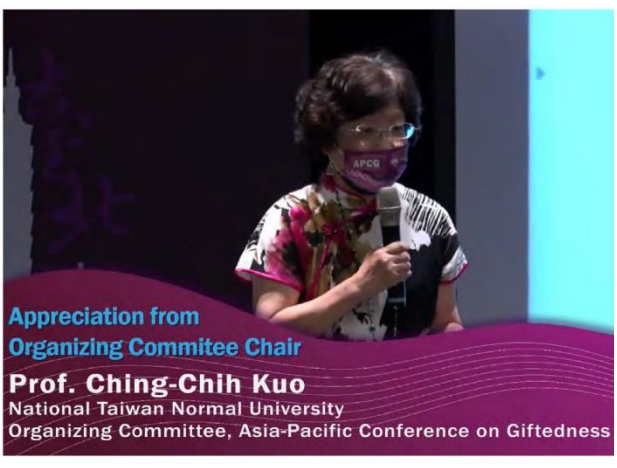


Academician Ip shared with the audience what is the impossible dream of being an educator, especially a science educator. He supposed that we all want one if not more of our young students to one day be a Nobel prize winner or Fields medalist. Or, some of them could be like Elon Musk or Mark Zuckerberg heading world-shaking high-tech companies. The basic ingredients and shared traits of Nobel prize winners include creativity, open-mindedness, persistence and collaborative spirits. As for Elon Musk and Mark Zuckerberg, the common denominator would probably be empire building mentality, vision, hyper-productivity and individuality. We educator should know these critical elements of academic achievements and entrepreneurship, injecting them into the curricula and extra-curricular activities of our students. In this way, whether gifted or not, realizing the dreams is no longer impossible.

Remarks and Awards at the closing ceremony

At the closing ceremony, Political Deputy Minister of Ministry of Education Ching-Hua Tsai and Executive Vice-President of National Taiwan Normal University Yao-Ting Sung were invited to give remarks and awarded the best paper and poster presentations. Among the five winning papers and three winning posters, Taiwan won three awards.

At the end of the closing ceremony, Professor Ching-Chih Kuo from National Taiwan Normal University, who is also Organizing Committee Chair of this year's APCG, expressed her gratitude to everyone, and invited all the staff to make a curtain call. The event ended successfully in a warm and touching atmosphere.



Full Papers

Part A

Conception and Characteristics of Giftedness

Differences in psychological correlates between talented and typical undergraduate students in Hong Kong: Some preliminary findings

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ABSTRACT

The talent development process involves four important elements: definition of talent, relationships between faculty members and students, how the curriculum transforms talent, and how talent students and typical students develop along with one another (Subotnik, 2004). Based on the best practices in identifying academically gifted and talented students (Worrell & Erwin, 2011), outstanding academic achievement is one of the criteria that screens students into talent programs. The student profile with personal characteristics, self evaluation, learning strategies, and perceived competence may also inform what types of programs (enrichment, acceleration, dual programs in specialized academic domains and etc.). The present study aims at examining the educational experience and outcomes of undergraduate students in programs with talent development features. This paper will share the baseline measures of a longitudinal study on the learning experiences of typical and talented students in a public university in Hong Kong. The whole study will complete in the end of 2022. It is hypothesized that students' academic engagement and performance, core self-evaluations, study and learning strategies, and perceived holistic competencies will be significantly higher in talent programs, when comparing with students from typical programs. A sample of 76 talented and 39 typical undergraduate students is recruited. Significant differences were found in conscientiousness, neuroticism, LASSI, cultural sensitivity and global citizenship, interpersonal and leadership competencies, problem-solving and critical thinking skills, self-understanding and resilience, information literacy and general health. Implications will be discussed.

KEYWORDS

Talent development, Equity and excellence gaps, Personality and psychological characteristics

LITERATURE REVIEW

Many prior works of literature have proven the disparities in academic performance, personality traits, and learning strategies between talented and average-ability students. García-Perales and Almeida (2019) stated that enrichment programs during school hours designed for talented students helped them enhance their overall adaption as well as personal, school, and social levels, with some students even boosting their academic performance. Another study done by Olszewski-Kubilius (2004) concluded that special accelerative programs after Talent Search, which is a program that identifies and evaluates talented students with above-grade-level testing and delivers educational assistance tailored to their tested capabilities, can have many positive effects in terms of academic performance. Additionally, Rinn (2007) pointed out that the academic success and academic self-concepts of talented college students enrolled in an honors program are much greater than those of talented university students who are not registered in an honors program.

Examining the distinction in personality and well-being of the intellectually gifted and the general population, Dijikstra et al. (2012) found that gifted individuals were characterized by lower extraversion levels, agreeableness, conscientiousness, and emotional intelligence. A meta-analytical study of Ogurlu and Özbey (2021) indicated that when it came to Openness to Experience, talented individuals scored higher than their non-gifted peers, but there were no significant differences between talented and their counterparts in other variables such as agreeableness, extraversion, conscientiousness, or neuroticism. Loundsbury et al's (2003) study found that personality traits were significant predictors of course grade in university students. Moreover, core self-evaluation (CSE) will be one of the variables for analyzing self-perception of individuals. It is an all-around personality attribute that reflects people's most essential and universal beliefs about themselves (Judge et al., as cited in Chamorro-Premuzic et al., 2008). According to Chamorro-Premuzic et al. (2008), individuals' CSE contains four parts, including individual differences in self-esteem or one's opinion of one's worth, significance, and importance, generalized self-efficacy or one's standard amount of confidence in one's ability to perform successfully, locus of control or one's sense of control over life's occurrences and circumstances, and also neuroticism/emotional stability or one's tendency to encounter negative mood, higher levels of concern, and pessimism. Another variable,

perceived holistic competency, is each individual's self-view of generic skills, positive values, and attitudes, which are necessary for the growth of the entire person (Chan & Luk, 2020).

Tallent-Runnels et al. (1994) revealed that gifted learners employ more learning and study tactics than pupils of average aptitude. Anxiety appeared as the most significant differentiator between the groups, with average-ability students experiencing higher anxiety using the Learning and Study Strategy Inventory (LASSI) in Tallent-Runnels et al. (1994). Another investigation by Ricca (1984) displayed marked contrasts between talented and general population learners on choices for learning techniques. More so than the general population, the talented learners were more self-motivated, tenacious, accountable, adult, and teacher-motivated, and also preferred learning alone and tactile learning utilizing the Learning Style Inventory. Furthermore, compared to general population learners, the talented exhibited a remarkably more significant preference for independent study.

The present study aims at examining the educational experience of undergraduate students by program features (talents program and typical program) and student-learning outcomes. The talents program offers interdisciplinary program options, scholarships, enriched courses, and experiential learning through competitions and internships to academically talented undergraduate students.

METHODOLOGY

Participants

Participants were recruited freshmen and sophomores from different academic disciplines from a public university in Hong Kong. A number of 115 cases was valid after data cleaning procedure, 76 (66.1%) students from the talented program and 39 (33.9%) students from the typical program. 30 (39.5%) males and 46 (60.5%) females among the talented students (age M=18.45, SD=1.42) and 12 (30.8%) males and 27 (69.2%) females among the normal students (age M=18.87, SD= 1.21) were identified.

Procedure

Questionnaires were created using QuestionPro and distributed through Email and the university's internal system for data collection. A supermarket cash coupon of $100 will be granted if they completed both the pretest and posttest questionnaires and $50 more if participants have been randomly chosen for focus groups interview. Course credits (partial) will also be granted if students were from the sample pool of

students taking a basic psychology course. Ethical approval was obtained from the Research Committee of the University. Participants were voluntary to participate in this study and free to drop out without penalty.

Measures

Big Five Personality

This study adopted Maples-Keller et al.'s (2017) IPIP-NEO-60 items to measure the personality trait of participants, using a 5-point Likert scale of 1 to 5 (1= strongly disagree and 5= strongly agree) on agreeing the suitableness of the positively and negatively worded statements (e.g., worry about things versus make friends easily). Higher the scoring of each facet indicates the further towards the spectrum of a trait (α = .74).

Core Self-evaluation (CSES)

Judge et al.'s (2003) scale for measuring oneself ability-related personality trait was adopted, a 5-point Likert scale scoring from 1 to 5 (1= strongly disagree, 5= strongly agree) on agreeing the description of thirteen positively and negatively coded items (e.g., I am confident I get the success I deserve in life versus sometimes I feel depressed). Higher the score indicates higher the belief towards oneself's ability (α = .78)

Learning and Study Strategy Inventory (LASSI)

Weinstein et al.'s (1998) scale was used to measure student's learning profile in which contains ten sub-variables, with a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) in terms of the appropriateness of the 55 positively and negatively coded items (I always find the classes confusing versus I will read the assigned textbooks from class) (α = .77).

Perceived Holistic Competencies

Chan and Luk's (2021) scale were used to measure participants' perceived holistic competencies. It included 39 positively coded items scale (e.g., Communicate with others effectively in different contexts) with a 5-points Likert scale (1=very poor and 5=very good). Higher scores on the item level indicate that participants perceive themselves to have a higher level of competency in a certain domain (α = .93).

General Health Questionnaire

Goldberg and Williams' (1988) questionnaire was used to measure participants' psychological distress and health condition. Participants responded to a 4-point Likert

scale ranging from 1 to 4 in terms of the frequency of the occurrence of the twelve statements (e.g., been able to concentrate on whatever you're doing and lost much sleep over worry), higher the score indicates worser of the health condition in the past one month (α = .87).

Demographic variables

Participants were asked to report their age, gender, college major, CGPA, history of participation in academic-oriented enrichment activities and future intention to participate in these activities.

RESULTS

This paper reports the baseline measures of a longitudinal study on the learning experiences of typical and talented students. An independent sample t-test was performed to compare the mean differences among a list of variables between talented students (TS) and normal students(NS). Table 1 displays the descriptive statistics and the results of independent sample t-test. On personality characteristics, there was a significant difference on conscientiousness was also detected between TS (M=3.65, SD= .47) and NS (M=3.31, SD= .58), t(113) = 3.41, p = .00, Cohen's d= .51. In the results of LASSI, there were three out of ten sub-variables found to be significantly different between TS and NS, namely Attitude from TS (M=3.68, SD= .58) was significantly different than NS (M=3.29, SD= .71), t(113) = 3.17, p = .00, Cohen's d= .63; Concentration among TS (M=3.13, SD= .74) was significantly higher than NS (M=2.81, SD= .82), t(113) = 2.16, p = .03, Cohen's d= .77; and Test strategies was significantly higher among TS (M=3.65, SD= .51) than NS (M=3.33, SD= .74), t(57.38) = 2.39, p = .02, Cohen's d= .60. For core self-evaluation, a significant difference between TS (M=3.19, SD= .53) and NS (M=2.98, SD= .53), t(113) = 1.99, p = .05, Cohen's d= .53.

On holistic competencies, significant differences were evident in five out of six variables between TS and NS. Cultural sensitivity and global citizenship, a significant difference was detected between TS (M=4.36, SD= .47) and NS (M=3.99, SD= .63), t(60.52) = 3.29, p = .00, Cohen's d= .53. For interpersonal and leadership competencies, TS (M=3.78, SD= .59) was significantly higher than NS (M=3.28, SD= .89), t(55.87) = 3.15, p = .00, Cohen's d= .70. For problem-solving and critical thinking skills, there was a significant difference between TS (M=4.09, SD= .62) and NS (M=3.63, SD= .75), t(113) = 3.48, p = .00, Cohen's d= .67. A significant difference was detected in information literacy between TS (M=3.86, SD= .67) and NS (M=3.48, SD= .75), t(113) = 2.80, p = .01, Cohen's d= .70. Lastly, a significant difference was

found in self-understanding and resilience between TS (*M*=3.77, *SD*= .61) and NS (*M*=3.41, *SD*= .87), *t*(113) = 2.58, *p* = .01, Cohen's *d*= .71.

DISCUSSION

With reference to the baseline differences of personality traits and learning characteristics between talented and typical undergraduate students, there are three observations. First, talented students were higher in conscientiousness when compared with typical students. The finding is consistent with five studies included in the meta-analysis of Ogurlu and Özbey (2021). A significant difference was found in openness to experience in eleven studies but not in this sample. The gifted and non-gifted samples in their studies were mainly from America, Europe and Middle East and the current study involve students from an Asian city. A high neuroticism score was found in the East Asian sample in a cross-cultural study among 56 countries done by Schmitt et al. (2007). The high neuroticism scores of the typical students were in line with typical Asians. Talented students were less neurotic and they could remain calm and emotionally stable when facing the stress from class assignments and tests. However, Schmitt et al. (2007) did not find significant differences in conscientiousness scores among different cultures. Meanwhile, conscientiousness incorporates traits such as the ability to execute self-control, well-organized and reliability. Individuals who are high in conscientiousness tend to be more self-discipline, organizing things in order and feeling strong obligation towards their assigned tasks and goals. As talented students reported higher level in conscientiousness, they tended to be more capable of resisting temptations which distracted them from their academic goals, as well as their superior ability in organization for achieving academic goals.

Second, in the LASSI results, variables of attitude, concentration and test strategies were found to be significantly different between the talented and the typical students. The finding is consistent with the study of Tallent-Runnels et al. (1994), Rinn (2007), and Ricca (1984). Talented students had more positive learning attitude, higher concentration in class and better test strategies. They could prevent distractions from the environment which help them focus on their studying. They were more knowledgeable in terms of types of test strategies for handling the tests, they also tended to be more willing to spend more efforts in preparation for the tests, which could help them perform better on the tests.

Third, regarding perceived holistic competency, talented students also demonstrated higher core self-evaluation and higher competency across areas including cultural sensitivity, leadership, problem solving skills, resilience and information literacy than their typical counterparts. Their respective scores of the five dimensions are also higher than the average scores reported in Chan and Luk's (2020) study of 2192 Hong Kong undergraduate students that represented a typical sample recruited from six universities.

In conclusion, the baseline comparison has shown that talented students had different personality traits, better learning and study strategies, and higher competence than typical students in the freshmen year. Whether these personality and learning characteristics can predict academic success and better personal development depends on how well they make use of the learning opportunities and further tracking across their second year or more studies in the university.

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Table 1 Results of the Independent Sample T-test between Talented Students and Typical Students

	Talented students (*N*=76)		Normal students (*N*=39)				
	Mean	*SD*	Mean	*SD*	*t*	*p*	*Cohen's d*
CGPA	3.38	.42	3.15	.50	2.56	.01	.45
Neuroticism	2.70	.59	2.93	.64	-1.94	.054	.61
Extraversion	3.39	.53	3.20	.62	1.70	.09	.56
Openness	3.51	.53	3.38	.41	1.29	.20	.49
Agreeableness	3.64	.40	3.53	.38	1.38	.17	.40
Conscientiousness	3.65	.47	3.31	.58	3.41	.00	.51
Core Self-evaluation	3.19	.53	2.98	.53	1.99	.05	.53
LASSI-Attitude	3.68	.58	3.29	.71	3.17	.00	.63
LASSI-Anxiety	3.27	.61	3.08	.60	1.59	.12	.60
LASSI-Motivation	3.44	.38	3.27	.58	1.74	.09	.45
LASSI-Time Management	3.25	.64	3.19	.75	.45	.66	.68
LASSI-Concentration	3.13	.74	2.81	.82	2.16	.03	.77
LASSI-Information Processing	3.73	.46	3.58	.57	1.50	.14	.50
LASSI-Selecting Main Ideas	3.49	.79	3.34	.84	.92	.36	.81
LASSI-Study Aids	3.14	.49	3.04	.69	.99	.32	.56
LASSI-Self Testing	3.41	.50	3.23	.55	1.75	.08	.51
LASSI-Test Strategies	3.65	.51	3.33	.74	2.39	.02	.60
Cultural sensitivity and Global Citizenship	4.36	.47	3.99	.63	3.29	.00	.53
Interpersonal and Leadership Competencies	3.78	.59	3.28	.89	3.15	.00	.70
Problem-solving and Critical Thinking Skills	4.09	.62	3.63	.75	3.48	.00	.67
Self-understanding and Resilience	3.77	.61	3.41	.87	2.58	.01	.71
Information Literacy	3.86	.67	3.48	.75	2.80	.01	.70
Moral Values	4.42	.50	4.24	.65	1.64	.10	.56
Health State	2.96	.47	2.76	.58	2.02	.05	.51

Using Metaphors to Examine Preservice Teachers' Opinions on Creativity

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ABSTRACT

Creativity is a key 21st-century skill and teachers play a key role in developing students' creativity in school. Understanding how preservice teachers perceive creativity and what their views are may help develop policy and practices for improving creativity in teacher training programs. Therefore, this study aimed to find out what preservice primary and preschool teachers think about the concept of creativity and obtain their views on how to support creativity in school. A total of 103 preservice teachers took part in the study. The researchers prepared a three-part data collection form (demographic information, a sentence for producing metaphor (i.e., "Creativity is like…. because…."), and an open-ended question about how they support creativity in school) to collect the data for the study. The preservice teachers' metaphors were categorized under the four main themes, namely, product, person, process, and press. They also suggested using appropriate teaching strategies, creating a supportive learning environment, supporting creativity in some areas (art, music, etc.), and educating teachers and families on how to support creativity in the classrooms. Based on the findings, the researchers suggested that creativity-related courses and seminars should be included in teacher training programs for increasing preservice teachers' awareness of how to teach creativity effectively.

KEYWORDS

Creativity, Metaphor, Perceptions, Preservice Teacher

Using Metaphors to Examine Preservice Teachers' Opinions on Creativity

Since the end of the 20th century, great and rapid changes have taken place in the economy and technology. Experts from different fields have identified 21st-century skills to raise individuals who can adapt to the changing conditions of the 21st century (Gündoğan & Can, 2020; Partnership for 21st Century Learning [P21], 2022). P21 (2022) includes three categories of skills: learning and innovation skills; information, media, and technology skills; and life and career skills. Learning and innovation skills are further broken down into creativity and innovation, critical thinking and problem solving, and communication and collaboration. Therefore, creativity, which includes thinking creatively, working creatively with others, and implementing innovations, has been identified as a key 21-st century skill.

Although there are many definitions of the concept of creativity, the concepts of originality and effectiveness (usefulness, fit, or adaptability) stand out as two standard criteria (Runco & Jaeger, 2012). However, Rhodes (1961) examined the definitions containing the concept of creativity and concluded that "when analyzed, as through a prism, the content of the definitions form four strands" (p. 307). These strands are referred to as the four P's of creativity: "*person* as a human being"; "the mental *processes* involved in creating ideas"; "ecological *press* on the person and his mental processes" (press); the ideas or *product* "form of language or craft" (Rhodes, 1961, p. 307).

Starko (2014) highlighted the following factors from models of *creativity in the classroom* that affect creativity: Risk-taking, tolerance for ambiguity, self-determination, self-assessment, process and content knowledge in the discipline(s), intrinsic motivation, persistence, passion, creativity skills, habits, playfulness, flexibility, and an environment in which creativity can emerge (often collaborative). She also highlighted (1) teaching the skills and attitudes of creativity, (2) teaching the creative methods of the disciplines, and (3) developing a creativity-friendly classroom as three keys she considered important for supporting creativity in the classroom.

Teachers play an important role in developing creativity in the classroom. Understanding how preservice teachers perceive this concept and their opinions on it can offer clues as to how creativity can be included in undergraduate teacher education. Furthermore, it can help identify pre-service teachers' misconceptions, if any. Metaphor is one of the many methods used to examine how teachers perceive creativity. A review of the literature found studies that used metaphor to examine preservice teachers' perceptions on this topic (Işıkçı-Başkaya & Sevimli-Çelik, 2020; Pekdoğan & Kanak, 2015; Tok, 2015; Yavuz Açıl & Kanlı, 2018).

The purpose of the study

The preschool and primary school years are the years when children are first introduced to school and are known as the years in which the teacher plays an important role in the child's development. With this in mind, this study aimed to find out how preservice pre-school and primary school teachers perceive creativity and obtain their views on how to support creativity in school.

METHOD

Participants

A total of 103 preservice teachers (preschool=48; primary school=55) participated in the study and were selected using convenience sampling. Of the participants, 79 (76.7%) were females and 24 (23.3%) were males; 84 (81.6%) were in their senior year and 19 (18.4%) were junior year students. Thirty-four (33%) participants stated they had taken a course on creativity, 17 (16.5%) had attended a seminar on creativity, and 62 (60.2%) had read books on creativity. In addition, 100 students (97.1%) stated that creativity can be developed and that it should be supported.

Data collection and instruments

The researchers prepared a three-part data collection form. The first part asked for demographic information. The second part contained a sentence for producing metaphor (i.e., "Creativity is like…. because…."). The third and final part was an open-ended question about how they support creativity in school.

Data analysis

The stages of "coding the data," "finding the themes," "arranging the codes and themes," and "defining and interpreting the findings" were used when analyzing the answers to the open-ended question (Yıldırım & Şimşek, 2011, p. 228). The following stages were used to analyze the metaphors:

- The preservice teachers' metaphor sentences and personal information were listed. The metaphor sentences (f=103) were examined and 11 sentences that did not serve the purpose and nature of the study, did not have metaphors, did not contain justification, or had more than one metaphor were discarded. The 92 sentences that remained were included in the study and rearranged alphabetically.
- Sample metaphor sentences using similar expressions and thought to represent the group best were identified. These included:

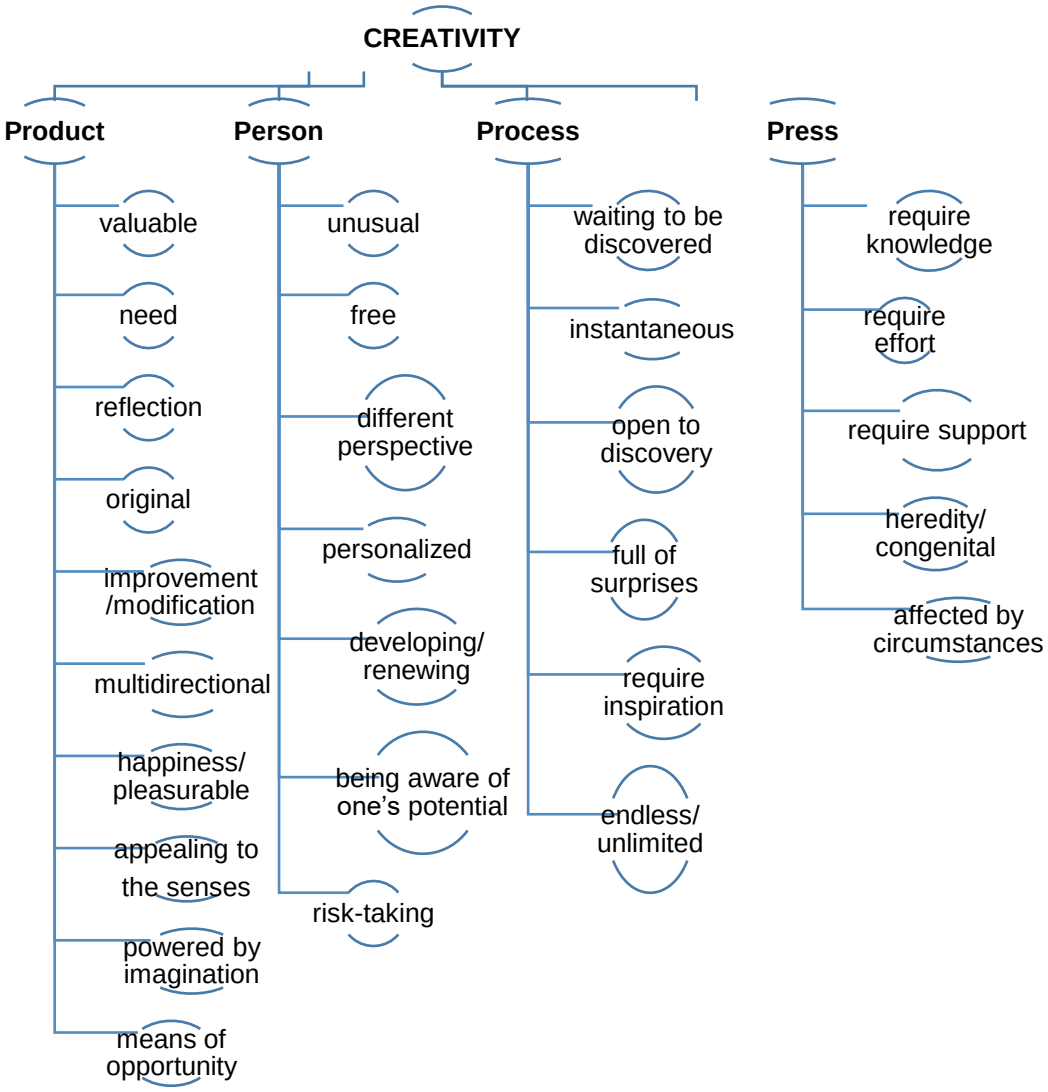
- Creativity is like the sky because it is endless, endless.
- Creativity is like cooking because we can bring all kinds of ideas together in different ways.
- Creativity is like a jungle because it contains much beauty that is waiting to be discovered.
- Creativity is like painting because as you struggle, different aspects come out.

- The subject of the metaphor (creativity), its source, and the relationship between the subject and the source were examined. A total of 92 metaphors were analyzed and grouped in terms of similarities and common features; as a result, 28 categories were identified.
- In qualitative research, it is important to report in detail how the data were collected and analyzed to ensure validity and reliability (Yıldırım & Şimşek, 2011). In line with this principle, the authors first explained how the data were collected and analyzed, giving examples of the metaphorical expressions they believe best represent their group. The two researchers then created the codes and categories separately before examining them together to reach a consensus on all codes and categories.

Findings

The authors analyzed the preservice teachers' metaphorical expressions and sorted them into the four categories of creativity, namely, "creativity in terms of production/product (Product)," "creativity in terms of being dependent on the person (Person)," "creativity in terms of depending on the process (Process)," and "creativity in terms of being associated with the environment/press (Press)." The related categories and subcategories are presented in Figure 1.

Figure1. Categories and Subcategories of Preservice Teachers' Metaphors for Creativity



The following are examples of metaphors in the four main categories:

- Product category: "Creativity is like sewing a dress because a brand-new design is created out of nothing." (Participant [P] 5)
- Person category: "Creativity is like a bubble because it should set the student free and his thoughts should be given importance." (P23)
- Process category: "Creativity is like a gift package because you don't know what will come out." (P41).
- Press category: "Creativity is like a library because there is a lot of information in it." (P 62).

The findings that resulted from the analysis of the answers given to the question "How would you support creativity in the classroom?" are shown in Table 1.

Table1. Preservice Teachers' Opinions on Supporting Creativity

Categories	Subcategories	
Teaching approaches, methods, and techniques that can be used to support creativity		• brainstorm • drama • problem-solving • open-ended questions • multiple intelligence applications • case method • experiments • projects • Socratic questioning
Creating learning environments that support creativity	Physical aspects	• student-centered • learning by doing • application/practice-oriented • support courses • creativity courses • workshops
	Psychological aspects	• comfortable • supporting the imagination • supporting different ideas • encourages curiosity • opinions are respected • listened • allowed to choose
Areas/fields where creativity can be supported		• art • music •language (creative writing, story writing, reading, completion) • science • technology • painting
Others		• raising teacher awareness • raising family awareness • referring to areas of interest, talent, and enjoyment • supporting interests, talents, and enjoyment

The pre-service teachers' opinions were sorted into four main categories: (a)Teaching approaches, methods, and techniques that can be used to support

creativity, (b) creating learning environments that support creativity, and (c) areas/fields where creativity can be supported, and (d) others.

CONCLUSION

Based on the metaphors used by the preservice teachers, the concept of creativity can be explained by product-, person-, process-, and press-related factors. The researchers concluded that the preservice teachers' concepts of creativity include the following characteristics related to product, person, process, and press: Valuable, a need, reflective, original, can be improved/modified, multidirectional, happiness/pleasure, appealing to the senses, powered by the imagination, and a means of opportunity; unusual, free, requiring a different perspective, unique, developing/renewing, requiring awareness of potential and taking risks; waiting to be revealed, instantaneous, open to discovery, surprising, inspiring, limitless; expressed as a concept that requires knowledge and effort, needs support, is innate, and is affected by conditions.

In addition, the preservice teachers drew attention to "using appropriate teaching approaches, methods, and techniques" and "creating learning environments that support creativity both physically and psychologically" when developing creativity. They also highlighted those areas where creativity can be supported during the preschool and primary school years such as increasing the awareness of teachers and families, identifying students' interests and talents, and steering them toward these areas.

Based on the findings, the researchers found that although preservice teachers have some awareness of creativity, they need to know more about creativity if they are to increase each preservice teacher's ability to integrate creativity into their classroom. Therefore, they suggest that teacher training programs include courses on creativity or seminars in support of creativity to increase preservice teachers' awareness of teaching creativity effectively.

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Gender Differences in Personality Traits of Gifted Adolescents

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ABSTRACT

Present research aims to analyze the gender differences in gifted adolescents in the context of personal traits in Yerevan, Armenia. The initial sample consisted of 500 high school students aged 16-18. Renzulli's Three-Ring Conception of Giftedness was used to reveal gifted adolescents. In the course of study 35 of 500 participants were defined as gifted. The quasi-experimental design has been used with 35 participants in the comparison and experiment group each (total sample size: 70 adolescents). The experiment group consisted of 14 females and 21 males, whereas the comparison group included 24 female and 11 male participants. To reveal psychological identity of the participants the Big Five personality test was applied. Independent T-Test, with $p < .05$, using SPSS 22 was conducted for the comparative analyses. Gifted female adolescents show neuroticism manifested through anxiety, self-consciousness, vulnerability and depression. Gifted males display self-consciousness and vulnerability.

KEYWORDS

Gifted adolescent, Gender differences, Personality traits, Neuroticism

INTRODUCTION

There are many contradictory findings about gifted children and youth. The data show, that gifted students are not different from their non-gifted counterparts relative to the numerous scales measured by the MMPI-A (Tracy L. Cross, Ch. Adams, F. Dixon, & J. Holland, 2004). However, according to other studies, there are some personal characteristics (Olszewski-Kubilius, P., Kulieke, M. J., 1989; Zohreh D.K., Shohreh S., Kambize K., 2018]. Present research aims to analyze the gender differences in gifted adolescents in the context of personal traits in Yerevan, Armenia. Our goal is to broaden the study of the personality traits of gifted adolescents and to find out if gifted adolescents have any specific personality traits, comparing with their non-gifted peers.

METHOD

The research was conducted in schools of Yerevan for six years from 2012 to 2017. The initial sample consisted of 500 high school students aged 16-18. Renzulli's Three-Ring Conception of Giftedness was used to reveal gifted adolescents. According to the former, gifted behavior is formed of and manifested through three essential components: above average ability, creativity and task commitment (Sternberg, Jarvin, & Grigorenko, 2011). The following instruments were used to measure all three components: Cattel's Culture Fair Intelligence Test with for cognitive abilities (Kosheleva, 2003) and the IQ range for the gifted adolescents was 130-144 (Gross, 2004); Picture Construction Task from Torrance Tests of Creative thinking (Tunik, 2013) and academic motivation questionnaire for high school students (Lukyanova, & Kalinina, 2004). In the course of study 35 of 500 participants (7%) were defined as gifted, the results of which were higher in the above mentioned three components. The quasi-experimental design was used with 35 participants in the comparison and experiment group each (total sample size: 70 adolescents). The experiment group consisted of 14 females and 21 males, whereas the comparison group included 24 female and 11 male participants. Independent t-Test, with $p < .05$, using SPSS 22 was conducted for the comparative analyses. To reveal psychological identity of the participants the Big Five personality test was applied. The main five characteristics are follows` Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience.

RESULTS

According to the study, we have the following outcomes (see Table 1.). Gifted adolescents have significant personality traits compared to the control group. They are the following: *anxiety (.001***), self-criticism (.003**), impulsivity (.002**),* which belong to one of the 5 personal dimensions – *neuroticism (.001***),* which as a result was also higher from the norm. These personality traits can impede personal growth, affect self-esteem, behavior, and achievements.

Table1. Personality traits of gifted and control groups

Means, standard deviation (SD) and significance values (P-value) of the personal traits of gifted and control group adolescents

	Groups							
Personality Traits	Experiment		Comparison		Levene's Test		p	
	M	SD	M	SD	F	sig		
Neuroticism	60.40	10.683	52.71	7.379	9.175	.003	3.502	.001***
Anxiety	12.03	3.222	9.71	2.444	6.327	.014	3.385	.001***
Self-criticism	12.14	3.782	9.57	3.301	3.026	.086	3.030	.003**
Impulsivity	13.14	2.591	11.14	2.499	.106	.746	3.287	.002**
Excitement seeking	8.29	3.083	10.46	3.868	5.197	.026	-2.597	.012*
Compliance	7.51	2.801	9.80	2.699	.014	.906	-3.477	.001***
Consciousness	48.94	5.906	53.26	7.567	2.771	.101	-2.659	.010**
Self-discipline	8.11	2.928	10.06	3.421	.807	.372	-2.553	.013*
Fantasy	11.51	2.393	11.51	2.393	1.212	.275	-2.364	.021*
Feelings	9.83	2.706	11.91	3.450	2.594	.112	-2.814	.006**

*P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001

On the other hand, the adolescents in the control group are significantly different from gifted adolescents in the following ways: striving for excitement (.012*), compliance (.001***), consciousness (.010**), self-discipline (.013*), dreamer/fantasy (.021*), and feelings (.006**). Actually, they are cheerful, prefer stimulating environment, strive to achieve high standards, responsible, have a rich emotional life and fantasy. In fact, the control group adolescents are more adjusted than gifted adolescents.

As we can see from table 2, there are many differences between gifted and non-gifted girls. Girls invest the main variability of the personal traits. Girls with average ability are more attentive, disciplined, more purposeful, tend to indulge in fantasies and better control their emotions, they are emotionally stable. Gifted girls are neurotic, depressive, anxious, emotional regulation is low, their demands and discipline are comparably low, they are impulsive, and self-critical.

Table2. Gender difference among gifted and non-gifted girls

Means standard deviation (SD) and significance values (P-value) of the personal traits of gifted and non-gifted females

	Group							
Personality Traits	Experiment		Comparison		Levene's Test		p	
	M	SD	M	SD	F	sig		
Excitement seeking	8.57	3.589	11.67	3.199	.179	.675	-2.752	.013*
Compliance	7.64	3.028	10.33	2371	.409	.527	-3.045	.009**
Conscientiousness	48.50	6.630	55.29	7.031	.000	.998	-2.932	.006**
Order	8.50	3.858	11.25	3.721	.114	.738	-2.168	.041*
Self-Discipline	8.64	3.411	11.50	2.284	3.525	.069	-3.095	.011**
Neuroticism	66.29	9.715	54.29	6.740	3.016	.091	4.490	.001***
Anxiety	13.43	2.593	9.63	2.601	.041	.841	4.353	.000***
Depression	14.14	1.994	10.92	2.903	4.881	.034	3.673	.000***
Self-criticism	12.93	3.562	10.04	3.277	.292	.592	2.538	.020*
Impulsivity	14.21	1.847	11.63	2.281	2.852	.100	3.608	.001***
Fantasy	11.00	2.717	12.92	2.358	2.187	.148	-2.286	.038*
Feelings	10.50	2.565	13.29	2.312	.167	.685	-3.450	.003**

*P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001

The personality traits of gifted and non-gifted girls are more divergent from those of gifted and non-gifted boys (Table 3). In addition, gifted girls have significantly high levels of depression and anxiety, which are not registered in gifted boys. Thus, we can state that clear gender-related differences have been observed between neurotic qualities of gifted boys and girls. The boys display neuroticism and two sub traits – self-criticism and impulsiveness.

Table 3. Gender difference amoung gifted and non-gifted boys

Means, Standard deviation (SD) and significance values (P-value) of the personal traits of gifted and non-gifted males

	Group							
Personality Traits	Experiment		Comparison		Levene's Test			p
	M	SD	M	SD	F	sig		
Impulsivity	56.48	9.605	49.27	7.850	.900	.350	2.137	.032*
Self-criticism	11.62	3.918	8.55	3.267	1.938	.174	2.224	.027*
Neuroticism	12.43	2.803	10.09	2.737	.000	.989	2.258	.034*

*P ≤ 0.05, **P ≤ 0.01, ***P ≤ 0.001

These results can be explained through social factors. While boys are more often encouraged by parents, teachers and larger sodium to pursue the development of their abilities and professional growth, girls are expected to value diligence and their future family roles as mothers and wives. This fact can play a role in the expression of neurotic qualities.

DISCUSSION

The results show that gifted adolescents have tendency to be prone to psychological stress. Neurotic traits of gifted may be owing to perfectionism, limited resources to realize abilities, lack of psychological support, as well as other internal factors that require further study. Individuals with higher levels of neuroticism tend to have worse psychological well-being. They are emotionally sensitive and frequently experience negative emotions such as anger, anxiety, depressed mood, frustration etc. Such results can be conditioned not only by the specifications of the talented adolescents, but also by the absence of gifted education and support. Further studies of the psychosocial factors fueled by the social stereotypes and inner psychological limitations is required to explain the gender differences.

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Shifting Notions of Giftedness and Talent in the Digital Age

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ABSTRACT

Turing published his seminal article "Computing Machinery and Intelligence" in 1950, leading the world towards a new type of intelligent operation, and the Dartmouth Conference in 1956 confirmed the development of a new field of "artificial intelligence". Then in the Cold War period after World War II, the US Defense Advanced Research Projects Agency developed the ARPANET network for the transmission of information between different computers, which is the predecessor of the Internet, a new direction for the virtual world. This article investigates the relevant research from 1950 to the present utilizing a literature survey, and summarizes the current moment, whether the “smartest” human beings or the “smartest” machines in the world seem to have escaped the physical and physiological boundaries at the same time. It combines the emotional mind and logical operation into the vast virtual universe, forming a new type of human civilization under the collective joint consciousness, mortal vs machine, real vs virtual. The author borrows Einstein's idea of integrating time and space, matter and energy into general relativity, and describes this concept of giftedness as a new type and new era of general relative giftedness and talent. Perhaps the outstanding talents in the future will no longer be an innate trait belonging to a single individual, but a collective shared wisdom network that combines human and machine and does not distinguish between reality and virtuality. Therefore, the author believes that gifted and talent education and identification will follow a major change in the future.

KEYWORDS

Artificial Intelligence, Gifted and Talent, Digital

MORTAL AND MACHINE

The concept of giftedness and talent has evolved over time and has undergone a change in perspectives, from early theological gifts, biologically abnormal precocious, genetic superiority, to scientifically measurable cognitive ability (Kett, 1978; Kevles, 1995; Stoeger, 2009). However, after World War II, the concept of giftedness was influenced by several key events and gradually came to be different from the meaning of the individual excellent cognitive ability of human beings. First Turing published the seminal article "Computing Machinery and Intelligence" (Turing, 2009) in 1950, leading the world to a new type of machine intelligence operation, and then the Dartmouth Conference in 1956 confirmed Artificial Intelligence (AI) in this new field. The idea of man-computer symbiosis, or augmentation of human intellect through human-computer interaction, continues to evolve (Engelbart, 1962; Engelbart & English, 1968). At this time, intelligence is no longer exclusive to humans themselves, but can also exist between humans and machine systems created by humans. When the system can correctly interpret external data, learn from these data, and use the knowledge, through flexible adaptation to achieve specific goals and tasks (Haenlein & Kaplan, 2019; Kaplan & Haenlein, 2019; McCarthy et al., 2006).

On March 12, 2016, the Alpha Go algorithm designed by Google DeepMind in London, England, used the value network, strategy network, and Monte Carlo tree search program through the learning method of self-play, with a record of 4 wins and 1 loss. Defeated the top Korean Go professional player Lee Sedol, which was the first time in history that a computer program has won a Go competition in a human-computer game (Silver et al., 2016). Lee Sedol's defeat has made people aware of the gap between humans and machines, the possibility of machines producing self-learning and self-awareness, and thinking about how humans should position themselves and survive in the era of increasing technological development in the future? As of March 2022, there are more than 360,000 articles related to Alpha Go in Google Scholar, with a lot of discussion about the significance of artificial intelligence for human life in the future. On October 25, 2017, the Saudi Arabian government granted the humanoid robot Sophia citizenship, an unprecedented event in human history, not only in academia, and science but also in ethics, art, religion, morality, politically and economically have far-reaching impacts (Retto, 2017).

Perhaps Sternberg's (2018) ideas point to the difference between the future of humans and machines, and the direction of how humans and machines can coexist. Sternberg's idea implies that although today's technology can also present works similar to those created by humans through systematic programs, human creativity

and how humans can choose the environment to make changes that suit their needs, and then adapt to the environment, is absolutely unique. Sternberg proposes a model called Active Concerned Citizenship and Ethical Leadership (ACCEL), which is based on the idea of helping students learn to use their creative, analytical, practical, intellectually, and ethically-based skills to make a positive difference in the world, meaningful and lasting change (Sternberg, 2018). From Sternberg's ideas, we can see that wisdom and morality are the most important elements that distinguish human beings from machines, and the use of machines or artificial intelligence through wisdom and morality is the right direction to lead human development.

REAL AND VIRTUAL

On the other hand, in 1957, the Soviet Union successfully launched the first artificial satellite Sputnik I, which shocked everyone in the world. Then US President Dwight Eisenhower established the Defense Advanced Research Projects Agency (DARPA) to make the United States take the lead in science and technology again. With the support of the DARPA, Lawrence Roberts, in conjunction with other experts, set out to build a network that would allow multiple computers to communicate with each other to exchange and execute programs and data. In 1969, ARPANET was formally established and started to operate, which is the predecessor of today's Internet, allowing human transmission and communication to reach a higher level. However, people gradually realize that the development of transmission and communication media has allowed the media itself to form a virtual world based on reality. In 1992, Neal Stephenson's science fiction novel Snow Crash mentioned Metaverse, mobile computing, virtual reality, wireless Internet, digital currency, smartphones, and augmented-reality headsets. He is regarded as a prophet who can accurately predict the development of today's technology (Knox, 2022; Stephenson, 2003). Taking human social behavior as an example, with the development of social software, the communication between people has already shifted from physical face-to-face to virtual online communication, occupying the main mode of human communication. In October 2021, the social software company Facebook officially changed its name to Meta, announcing that social interaction has entered a new era, a new lifestyle (Knox, 2022; Kraus et al., 2022; Song et al., 2014).

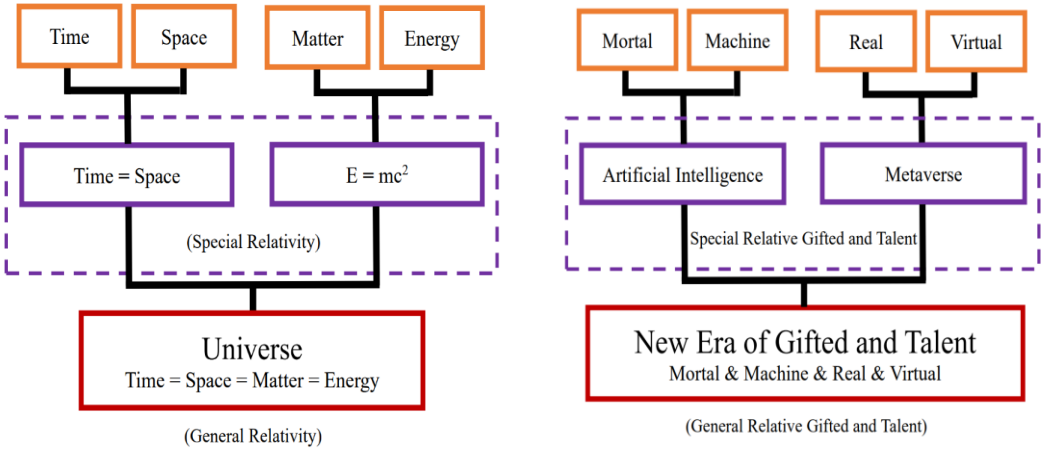
Renzulli (2020) also noticed this phenomenon and thought about the impact on gifted education. He believes that with the development of information circulation and artificial intelligence, the so-called second machine age has ushered in, that is, the digital information age. Many early work contents that cannot be replaced by computers, such as doctors, lawyers, architects, engineers, writers, etc., and even

business models, have been replaced by new technologies, new models, and new technologies. It has become a fact that is happening. To this end, Renzulli proposed the Catch-A-Wave theory, which believes that learners not only need to acquire knowledge and skills, but also must learn how to continuously and independently acquire new knowledge and skills, and flexibly adjust themselves as opportunities arise. Therefore, the five core competencies emphasized by this theory are (1) Higher Level Analytic Thinking Skills. (2) Creativity Skills. (3) Basic Investigative Research Skills. (4) Executive Function Skills. (5) Learning-How-To-Learn Skills in Technology (Renzulli, 2020).

GENERAL RELATIVE GIFTEDNESS AND TALENT

Einstein proposed the general theory of relativity in 1915. From a macro perspective, it perfectly interprets the four phenomena in the current universe, time and space, mass and energy, to complete the integration of the grand unity. Because of the explosion covid-19 epidemic has accelerated the development of new forms of human life, in which human and machine, real and virtual, these four concepts are just like Einstein's general relativity, which is towards the integration of the grand unity.

Figure 1 General Relativity and General Relative Gifted and Talent



At the present moment, the world's most "smart" human beings or the most "smart" machines seem to have jumped out of the physical and physiological boundaries, combining emotional intelligence and logical operations into the virtual universe, forming a collective union under the consciousness, the human body and the machine, the real and the virtual new type of human civilization. The author borrows the idea of Einstein's general relativity and calls it a new type of general relative giftedness and talent in the new era (Figure 1). The concept of giftedness and talent in the future will

no longer be a cognitive ability or trait that belongs to individual human beings alone, but a collectively shared civilization development and wisdom achievement.

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The Relationship Between Intelligence and Executive Function among Gifted Adolescents

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Executive function is a term for a number of complex cognitive processes that are interdependent and critical to purposeful, goal directed behaviour (Lezak, et al, 2004). Miyake, et al. (2000), EF as a cognitive process (Working Memory, Inhibition, Cognitive Flexibility) which is a thorough coordination of processes in achieving a certain goal. (a) Working Memory is one of the main cognitive processes underlying thinking and learning. WM is necessary because it allows internal representation of information to guide decision-making and open behaviour; (b) Cognitive Flexibility /CF is often called mental flexibility, mental shift and is closely related to creativity; (c) Inhibitory control (IC). IC is the ability to inhibit attention to the distractor thus enabling selective and sustained attention. The ability to inhibit strong behavioural tendencies can help make a person flexible to changes that may occur, as well as obey social decency.

Chichekian & Shore (2017) said that gifted adolescents with this enormous potential, they have good cognitive flexibility (able to categorize problems into meaningful and able to make relevant solutions), metacognition (related to EF and self-regulation), strategic planning, prioritize complexity and troubleshooting, has an excellent memory (developed WM to solve problems), and has a broad knowledge of things. Previous studies have stated that there is a relation between EF and intelligence. As research conducted by Arffa (2007) states that full-scale IQ is significantly related to EF. EF are considered necessary to be able to better understand human behaviour in all its aspects. EF are those skills that can help the person adapt to a continuously changing environment and suppress any non-desirable behaviour, through self- regulation and adaptation, for their own benefits (Bernal, et al.2021).

But in fact, although gifted students have very high intelligence, there are also weaknesses that are owned, one of which is EF. Some gifted children were found to have poor EF. The lack of EF ability in gifted students makes various problems that will have an impact on themselves and others. Silverman (2013) mention the problems faced by students related to EF, namely problems in planning and organizing that interfere with school performance, lack of time management, work is often done at the last moment, less able to sort verbal and written expressions, inability to express how

to get answers, impulsiveness, and make decisions without careful thought. The ability to solve problems, plan and manage time in doing tasks requires good cognitive flexibility). Likewise, to control oneself and control emotions related to Inhibitory Control, as well as the ability to analyse, think, reason, and learn requires working memory.

Executive function is a term for a number of complex cognitive processes that are interdependent and critical to purposeful, goal directed behaviour (Lezak, et al 2004). Executive functions refer to a variety of correlated abilities ranging from simple voluntary initiation and inhibition of behaviour to those involving complex planning, problem solving, and insight. Planning problem solving, and insight certainly correspond to psychological and even lay concepts of “intelligent behaviour”. However, evidence for a relationship of intelligence tests to executive function measures is inconsistent and not strong (Arffa, 2007). The purpose of this research, in order to know the relationship between intelligence and executive function (EF) in gifted children. The hypothesis: (a) there is relationship between Intelligence and EF of the gifted adolescents; (b) There is a relationship between three domains (Working Memory, Cognitive Flexibility, and Inhibitory Control) in Executive Function and Intelligence in gifted adolescents.

METHOD

Participants in the study were students in special class for gifted students with IQs above 130, total132, they are 73 boys and 59 girls. Age of 13-15 years. IQ is measured by CFIT. EF data collection using neuropsychological test tools, namely Wisconsin Card Sorting Test (WCST) and Stroop Colour and Word Task online version of Psytoolkit.org, Trial Making Test (TMT), and Digit Span.

RESULTS

From statistical analysis. The results showed there was no significant correlation between Intelligence and Executive Function (measured by Wisconsin Card Sorting Test (WCST) in gifted adolescents ($r=0,311$; $p>0,05$). The results of statistical analysis IQ with the three domains contained in the EF showed different correlations; Likewise, the Cognitive Flexibility/CF domain as measured by the Trail Making Test (TMT) there is not find a significant correlation ($r=-0.418$; $p>0.05$). There is a significant correlation for Intelligence and Working memory/WM of the Backward Digit Span measuring instrument ($r=0.347$; $p<0.05$), and There is a significant correlation between

Intelligence and Inhibitory Control/IC of the Stroop Colour and Word Task (r=0,241; p<0,05).

DISCUSSION

The first hypothesis is not accepted. It means that there is no correlation between Intelligence and Executive Function. According to Arffa (2018) Intelligence is a concept developed in psychology and in particular the psychometric tradition, executive function is a concept created in the domain of cognitive neuroscience. It is not surprising that the two remain as parallel concepts in the explanation of human cognition. Research has shown that, when viewed as a whole, executive functions are only partially according to the psychometric concept of intelligence. Therefore, it is evident that some elements of executive function, or rather, certain executive functions clearly correspond to intelligence, while some do not refer to intelligence. If uses the key difference between metacognitive –or simply "intellectual"—executive function, and emotional/motivation – or just a non-intellectual—executive function, it becomes proven that general intelligence can be equated with metacognitive executive function but not with emotional/motivational executive function. It has recently been proposed that cognitive tests knock general-domain executive processes; executive process is intercepted overlapping across cognitive tests so that they are needed more often than specialized domains (Kovacs & Conway, 2016).

Several studies have shown that not all domains of EF are affected by intelligence. The most highly correlated with intelligence is WM (Friedman, et al, 2006; Fugate et al, 2013), especially in adolescents (Giofre et al, 2013). Gifted adolescents have better working memory than non-gifted adolescents (Leikin, et al, 2013; van Viersen et al, 2014). There is clearly a close relationship between intelligence and working memory, and both play an important role in a variety of developmental areas during childhood. Interestingly, both involve prefrontal areas of the brain. This raises the question of whether, when solving problems involving working memory, more intelligent individuals show more activity in the prefrontal brain relative to those who are less intelligent (Neubauer and Fink, 2009).

In gifted children, WM-related self-control mechanisms are also associated with Inhibitory Control (IC). Gifted children can inhibit irrelevant information and divert information processing so that new information that should be remembered can be well received. In gifted children, the corpus collosum is larger than normal children so that there is more space in the brain to channel information from one part of the brain to another and in the end the two parts of the brain can be synchronized properly

(MacIntyre, 2008). WM is the capacity that underlies complex cognitive processes and this ability is possessed by gifted children (Dehn, 2011).

This study indicate that intelligence is not related to the Flexibility Cognitive (FC). Several previous studies have found that intelligence is weakly or even unrelated to flexibility cognitive (Benedek, et al 2014; Friedman, Miyake, Corley, Young, DeFries, & Hewitt, 2006). This is because, FC is able to see things from different points of view.

The results of this study indicate that intelligence has a significant correlation with inhibitory control/IC. This is probably because gifted adolescents have a larger gray matter area than non-gifted adolescents (gray matter area is the site of the cell body and is the most active site in the brain, consists of nerve cell bodies, and is a structure that houses the nucleus of neurons, which serves as a sign of self-control. Gray matter also works for higher level learning). Therefore, gifted adolescents have good cognitive control so that even though the brain demands continuous activation from other parts of the brain, gifted adolescents can still control themselves to commit to their tasks (Miyake, et al, 2010)

Carlson, Zelazo, & Faja (2013) state that EF is not influenced by intelligence, but is more influenced by socioeconomic factors, gender, culture, language, parenting, gene-environment interactions, and sleep patterns. The first factor that affects EF is socioeconomic factors. The level of education of parents also affects the EF and language development of children. In addition, children who often move places of residence, trauma, childhood stress can also affect EF. Briggs, et al (2008) conducted research on gifted children and found that they were culturally, linguistically, and ethnically different and students were not identified as gifted children.

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Part B

Twice-Exceptionality

Strength-Based Approaches for Supporting Twice-Exceptional Learners: Preliminary Findings from a Systematic Quantitative Literature Review

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ABSTRACT

This paper outlines findings from a systematic quantitative literature review (SQLR) of empirical literature about strength-based practices—and the ways this is explained and translated into practice for supporting twice-exceptional learners. The aim of this SQLR was to explore strength-based approaches and their potential impact on improving twice-exceptional student engagement and achievement. Education databases and Google Scholar were the sources of literature for this review. Articles were selected for review on the basis that they primarily addressed strength-based teaching (or a focus on talent development), for twice-exceptional learners, and considered the outcomes in terms of under/achievement and/or student engagement. In all, 62 research articles met the criteria for review out of 174 papers screened, and the former were analysed by categories, including country of study, research methodology, point of view, participants, and findings. This short paper provides an overview of the preliminary findings. The review highlights the complexity of perspectives, conditions, and approaches that the subject of strength-based approaches to learning draw together. There are also identified research gaps, particularly around student engagement. A basic tenet of teaching to students' strengths is student learning through advancing their interests, and hence their engagement, and is an area ripe for further research.

KEYWORDS

Twice-exceptional, Strength-based, Gifted, Twice-exceptionality, Talent development, Engagement, Systematic quantitative literature review

INTRODUCTION

In Australia approximately seven percent of school children are considered to be twice- exceptional (Ronksley-Pavia, 2020); these learners possess combinations and characteristics of both disabilities and giftedness (Ronksley-Pavia, 2015). In many countries, including Australia, this cohort remains under researched and underserved. Researchers argue that strength-based approaches, based on positive psychology can support the unique learning needs of these students (Missett, 2018). This is in contrast to deficit approaches, that focus on what twice-exceptional students cannot do. Research indicates the value of strength-based approaches in promoting academic, social, and emotional progress, for twice-exceptional learners: "Research from 2e students' experiences and observations of parents and teachers, suggests that twice-exceptional students need ownership in their learning, higher-level thinking skills, compensation strategies, and strength-based, talent-focused learning environment" (Lee & Ritchotte, 2018, p. 78).

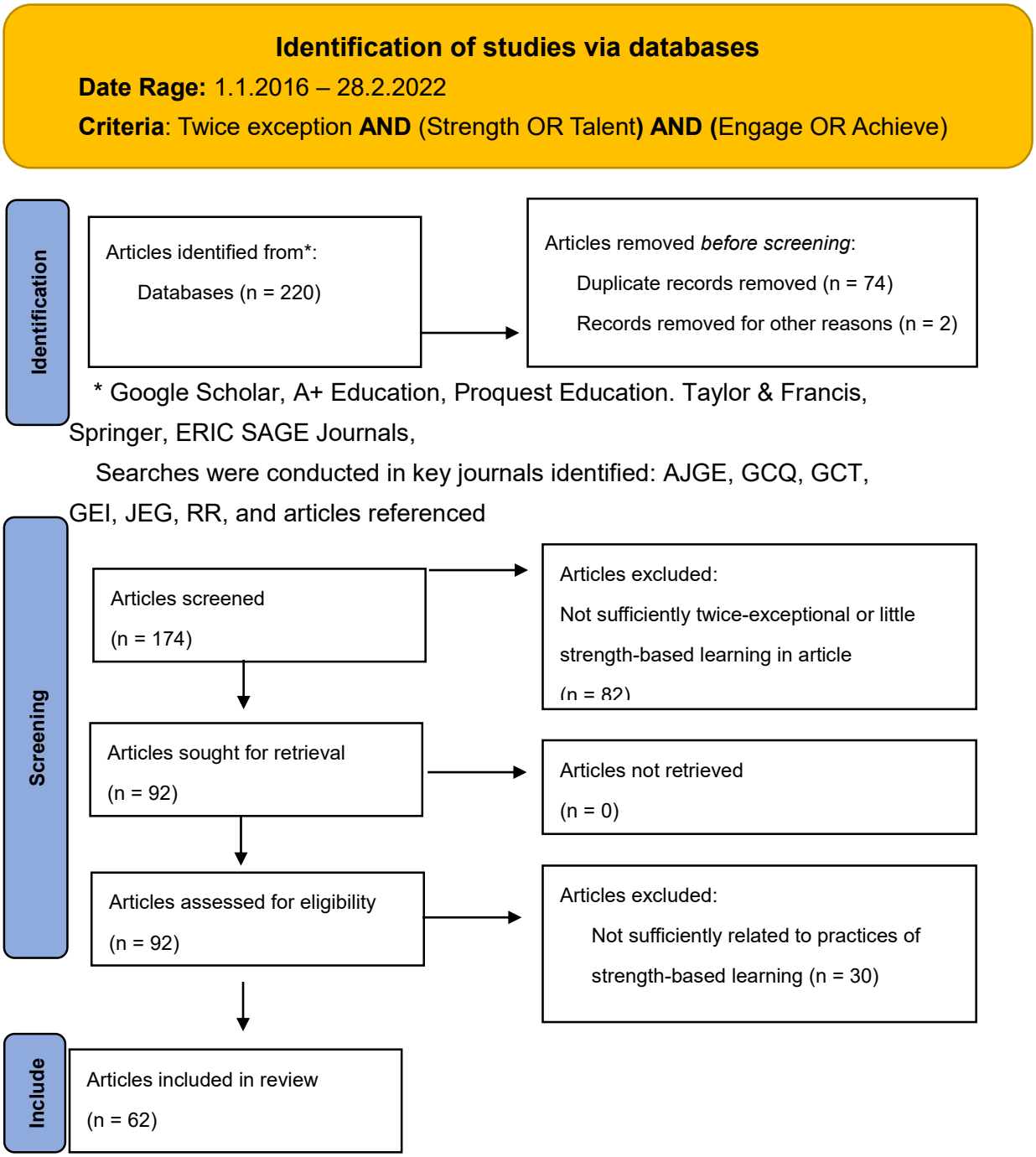
Focusing on, and amplifying strengths enables both student engagement and talent development, empowering the students in their learning. While strength-based learning offers new ways to support this disadvantaged population of high potential learners, its application in classrooms is constrained by limited knowledge regarding the ways these approaches can be translated into 'real world' action. As such, this literature review sought to review prior studies of strength-based practices to identify:

1. How and in what ways strength-based approaches are **translated into practices** for supporting twice-exceptional learners; and,
2. What **impact these practices have** on twice-exceptional students' engagement and achievement.

METHOD

A Systematic Quantitative Literature Review (SQLR) was undertaken following PRISMA guidelines (Page et al., 2020). Articles were selected based on being about twice-exceptional learners in conjunction with strength-based approaches to learning, that address under/achievement and/or student engagement. Figure 1 depicts the PRISMA selection process conducted for this review.

Figure 1 Journal article selection process, adapted from Page et al. (2021)



The abstracts of 174 articles that were found (after duplicates were removed), were screened and assessed for eligibility, arriving at 62 papers for review that met the inclusion criteria related to practices of strength-based learning for twice-exceptional students. One researcher conducted the detailed rating of journals with oversight of resulting selection by the lead-researcher.

FINDINGS

Publication of full findings is in preparation; nevertheless, this paper provides a preliminary exploration into articles that were reviewed. The following provides a breakdown of the papers reviewed by journal source, country, methodology, school context, study foci, study perspective and disabilities discussed.

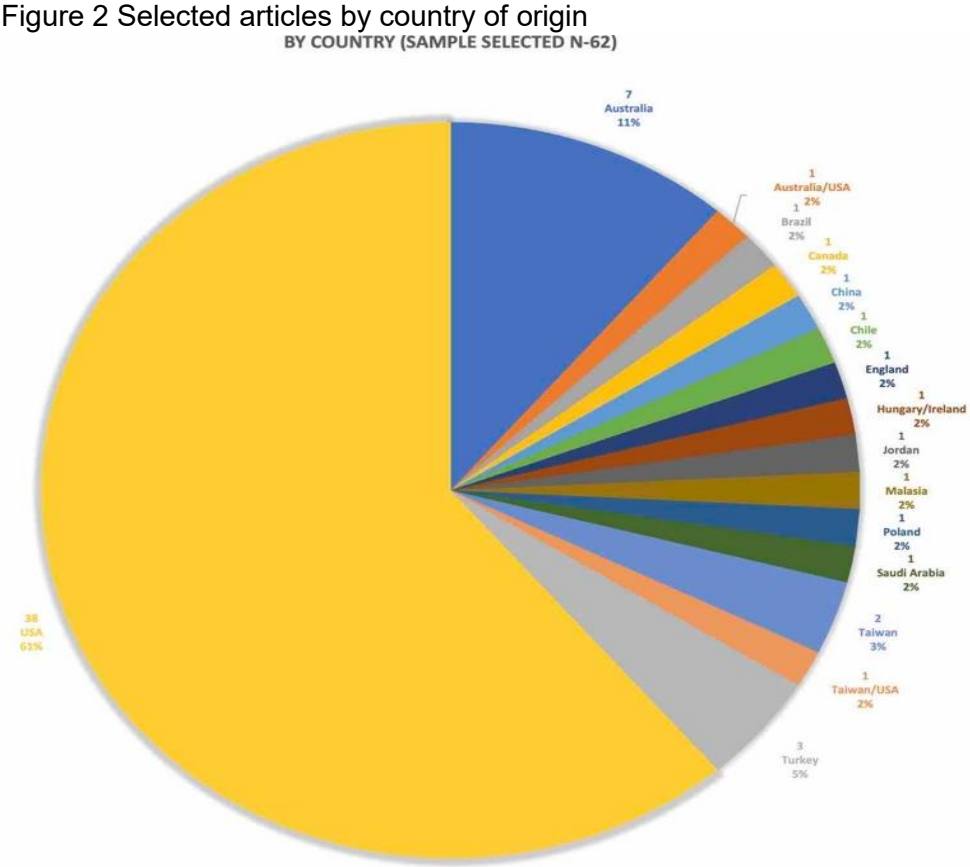
Journal sources

Content was drawn from 37 journals. Thirty-seven (60%) of the articles came from 12 journals, 25 (40%) articles were single articles drawn from their journal. The main three journal sources were *Gifted Education International* (9), *Journal for the Education of the Gifted* (5), and *Education Sciences* (4), together representing 30% of the journals selected.

Country of origin

In terms of country of origin, the United States of America (USA) dominated, with 38 (60%) of the articles originating there. It is a large jump to second place—Australia with 7 articles (11%). Third place went to Turkey (3), fourth Taiwan, then single articles from the rest of the countries, Canada, China, Chile, England, Hungary, Jordan, Malaysia, Poland, Kingdom of Saudi Arabia.

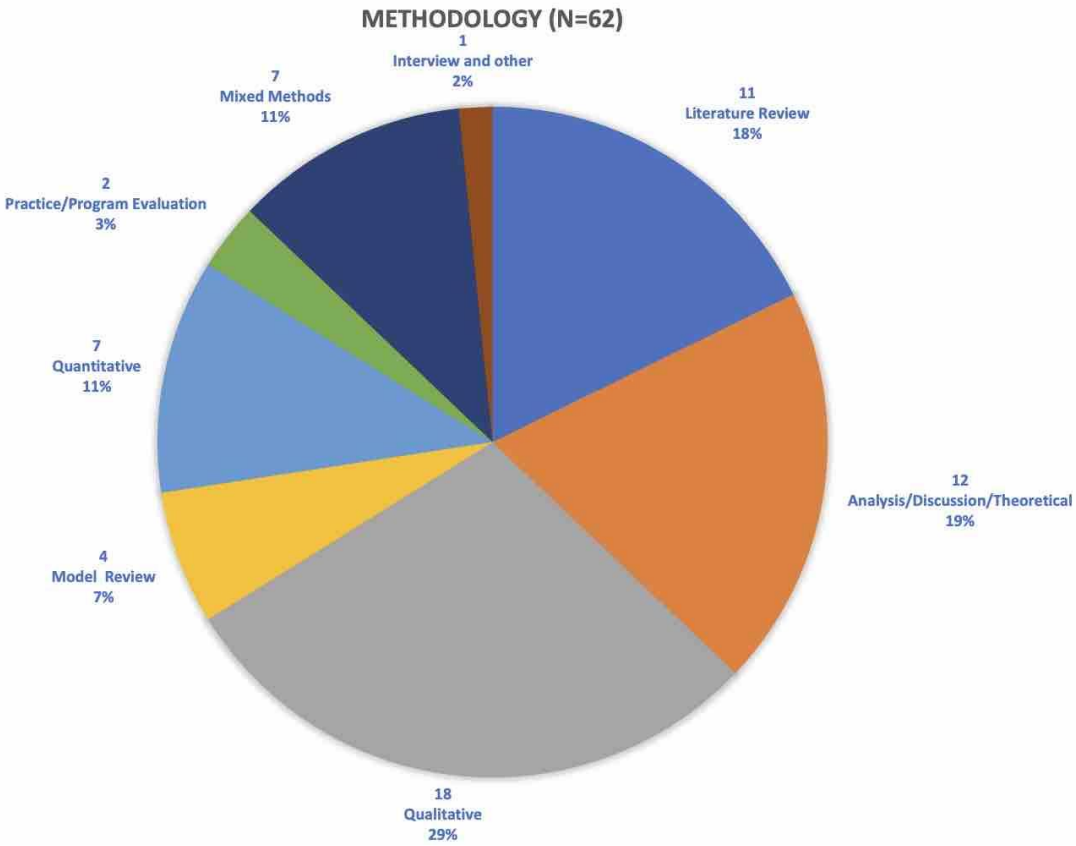
Figure 2 Selected articles by country of origin



Methodologies used across studies

There was a comparatively even spread of articles in terms of methodology. The largest group were qualitative studies, making up 30% (18). Articles that provided an analysis, theory or discussion made up 19% (12). A large chunk, 18% (11) of the article were literature reviews. There were 11% (7) quantitative and mixed method studies.

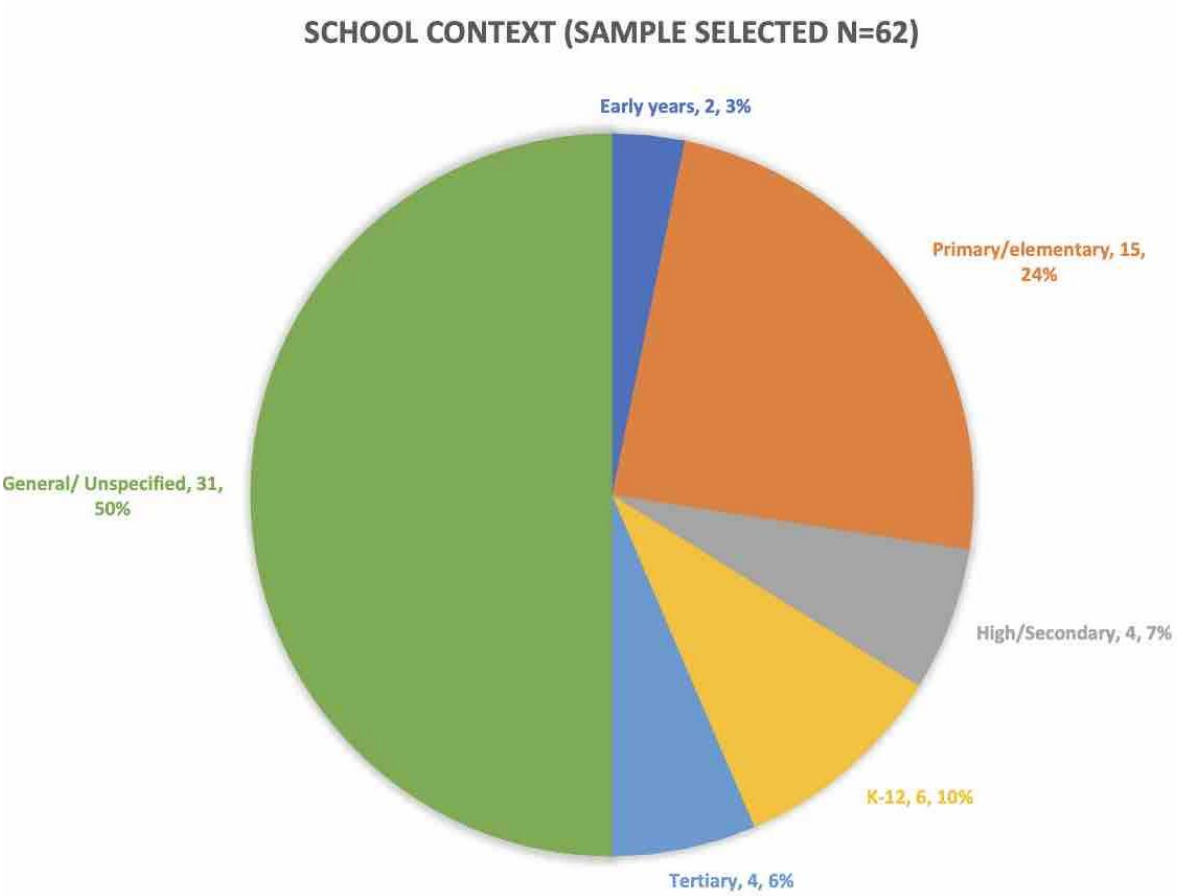
Figure 3 Spread of methodologies across the selected sample



School Context

In half the studies the school context was not specified, and to be expected give the large proportion of literature reviews in the grouping. By far the largest group was primary/elementary schooling at 24%. This is almost half the number of studies where the context was given. This large number may potentially point to where more specific gifted services are offered.

Figure 4 School contexts across sample



Study Foci

As part of the SQLR process, the focus of each study was identified. Figure 5 graphs the spread of focal areas of articles reveiwed. The list grew organically and was then grouped according to affinities. Six groupings emerged, with the foci relating to the student, teacher, and programming, learning context, external support, interactions, and content/skills. The groupings relating to student, and teaching/programming account for 63% of the studies. Still, there is a broad range of topics, which shows how inter-related these are. Highlighted in the diagram (Figure 6) are subjects directly related to the focus of this review. However, other related topics are entangled, and are important for serious consideration of the issue of strength-based learning for twice-exceptional students and are not separable.

Figure 5 Key focus areas of papers

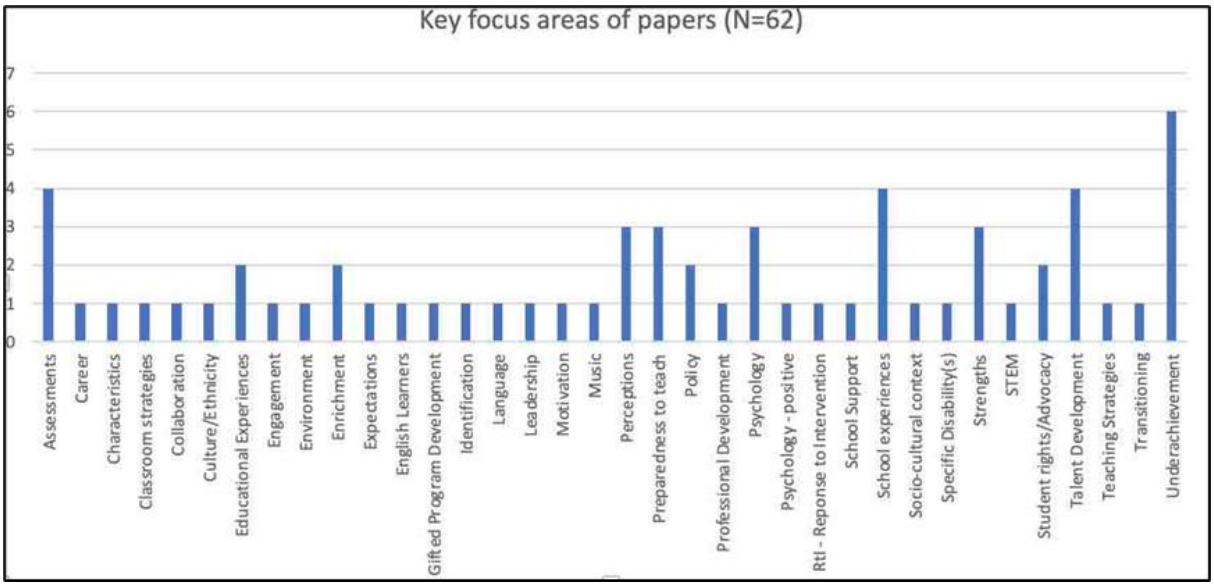


Figure 6 Analysis of the focus of papers reviewed

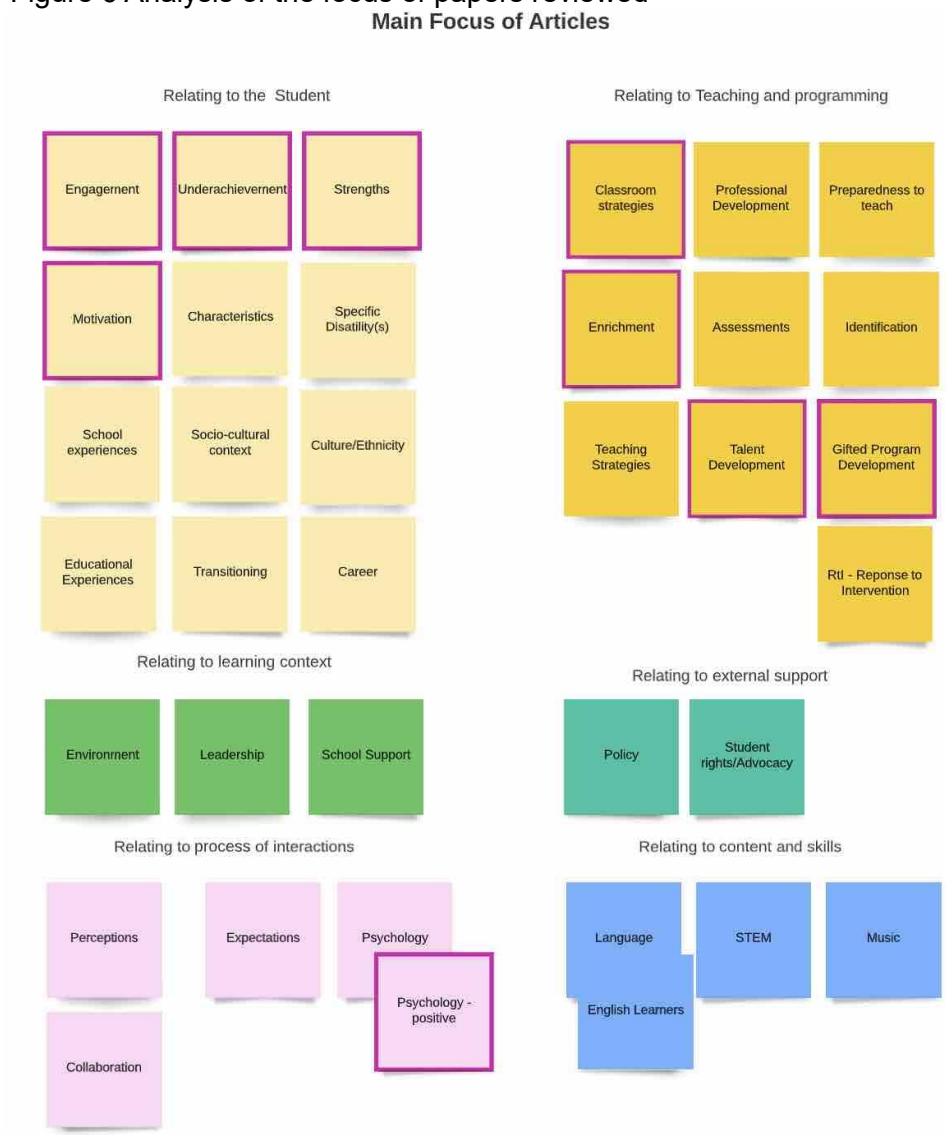
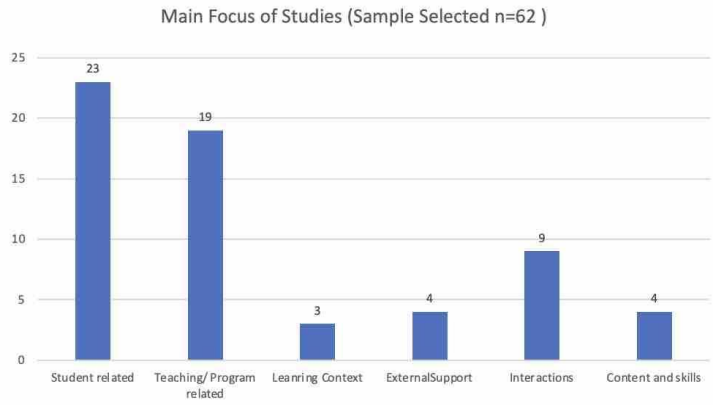
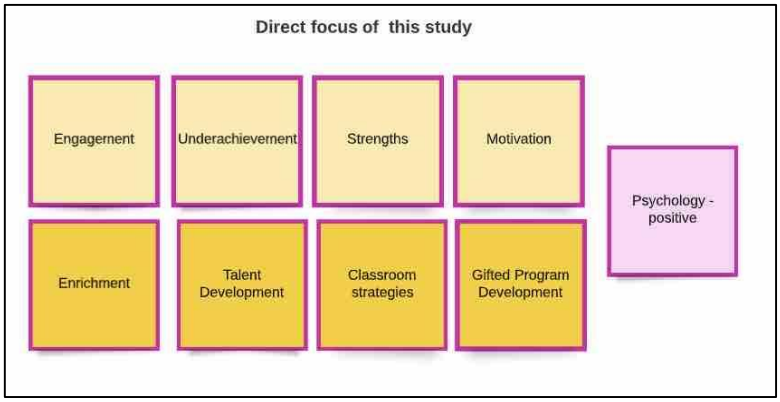


Figure 7 Analysis of the focus of papers reviewed (Continue)

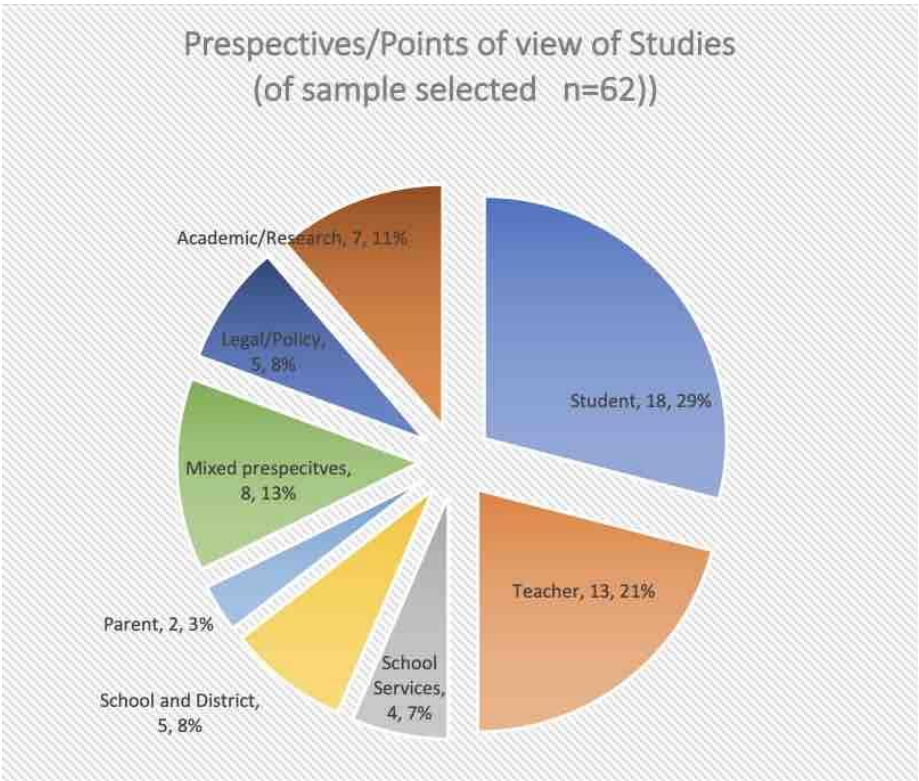




Study Perspectives

As well as the focus, the perspective of each article was determined based on whose point of view was being considered in each article. The main perspectives taken were of the students (18), followed by teachers (13), together representing almost 50% of the studies. Eight studies had mixed perspectives, and seven were from an academic/research perspective, mainly literature reviews. Five articles referred to legal or policy perspectives.

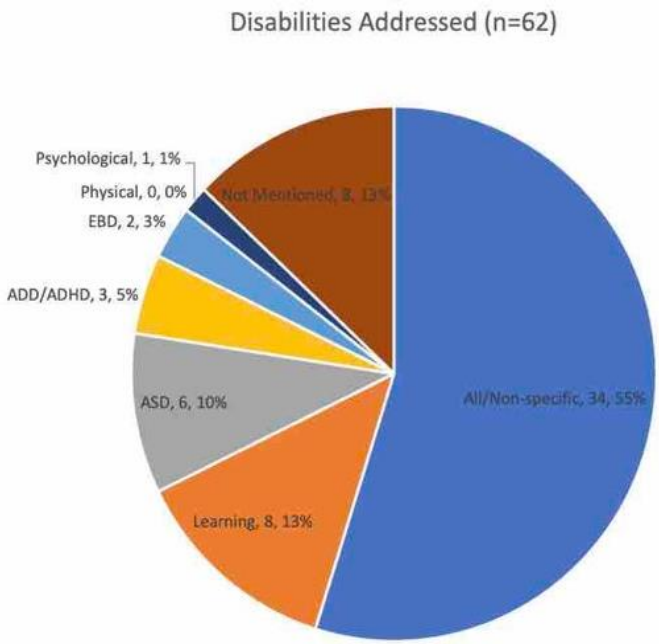
Figure 8 The point of view of the research study



Disabilities

Twenty-eight articles were directed to a specific disability. The terms for disabilities used in the articles were not necessarily discrete but are included in terms of what the authors expressed. Over half the articles (34 or 53%) were not specific in terms of elaborating on specific disabilities. In eight articles, disability was not mentioned at all—these were the articles mainly focused on giftedness, where twice-exceptionality was mentioned, rather than being the focus. When specific disabilities were the focus, learning disabilities (6 or 13%) were the largest group, followed by ASD (6 or 10%). None of the articles focused on physical disabilities.

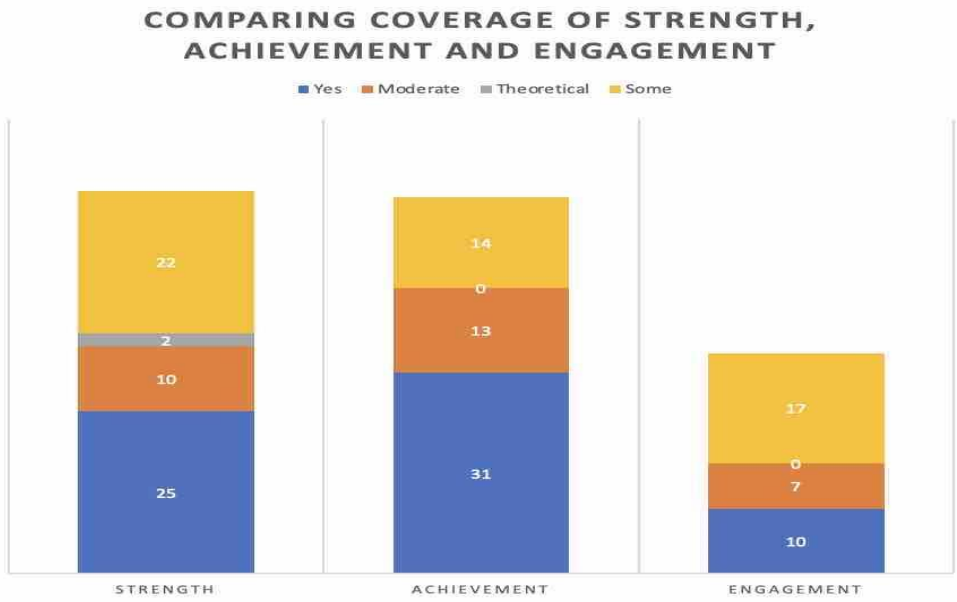
Figure 9 Disabilities addressed in the studies selected



Strength-based Approaches, Achievement and Engagement

In comparing the coverage of papers reviewed in terms of strength-based approaches, achievement and engagement, it was clear that consideration of learner engagement was lacking.

Figure 10 The degree of coverage of Strength-based learning, achievement, and engagement in the studies



DISCUSSION AND CONCLUSION

This SQLR offers a range of topics and ways to consider the ways strength-based approaches are translated into practices relating to supporting twice-exceptional learners. As preliminary findings, this article offers a starting point for considering these practices. The following articles provide a sample of approaches and issues raised in articles that were ranked highly in this study in terms of strength-based learning approaches, student' achievement and engagement.

Reis and Peters (2021) (USA), provides a four-decade overview of their Schoolwide Enrichment Model (SEM), summarising how their approach offers a special haven for creative and talented students who want to learn in an active and engaging way, pursuing their interests and completing products that are personally meaningful… [and at the same time] has the power to instill in teachers the same kind of enjoyment, engagement, and enthusiasm for learning they hope for their students to experience. (p. 133). Reis and Peters express that this goes beyond students' creative, productive experiences and enthusiasm for learning at school, and further, as students continue to pursue these experiences, the world will benefit from their contributions.

Wu et al. (2019) (Canada)**,** explored positive educational opportunities for 'highly able' learners diagnosed with ASD. Fifty-two individuals participated in the study, which used a success case method in exploring a supportive school context. Data

were categorised based on curriculum flexibility, strength-based approaches and a safe learning environment. Wu et al.'s study noticed an increase of learning engagement, agency, and self-efficacy, simply through honouring students' individual learning preferences and styles. Although learning styles have become contentious and rejected as neuromyths by other studies (see for example, Kirschner, 2017). Teachers' capacities for meeting the needs of twice-exceptional students are an essential key identified in this study, pointing to the need for quality professional development. Wu et al. also explored positive psychology by using students' learning preferences, providing demonstration opportunities, and designing enrichment curriculum that corresponded with the ability for students to thrive and cultivate what is best in themselves. This study supports the paradigm of teachers building students' competence and amplifying strengths. Although this study focused on benefiting twice-exceptional participants, the authors argue that "all students would benefit from many of the elements elicited from their analysis because each student comes to school with a unique learning profile that includes both strengths and weaknesses" (p.236).

Several articles addressed barriers beyond disability. For example, **Siegle et al. (2016)** (USA), found that insights were brought to strength-based learning when barriers to underserved students in gifted programs, particularly for black students, were addressed. They suggest a "'reverse hierarchy of instruction' that starts with the difficult, conceptually oriented learning, and teaching the large global concept before specifics, and employ special support strategies, including the use of graphic organizers, checklists, instructional transparency, explicit directions, and instruction to fill gaps in student knowledge" (p.106). Siegle et al. proposed a talent development model, and in summarising the outcomes of the model, they noted that there was no consensus on academic outcomes for gifted students generally. They found all students responded to interventions, increasing communication and multi-cultural acceptance; further, that working with others seemed to increase impact and meaningfulness of learning activities, and benefits went beyond just academic success. Siegel et al. stressed the importance of accommodating students with potential, that may not have requisite background knowledge. They suggested exposure to meaningful advanced content was essential for maximum growth, and that students' social and emotional needs also need to be met.

The **Fugate and Gentry (2016)** (USA) study on adolescent gifted girls with ADHD, focused on motivational needs, highlighting the 'living complex' of talents and barriers students face, which can be more daunting than being twice-exceptional. For

example, participants reported that they sometimes associated school with feelings of confusion, tension and shame that brought lower self-esteem and motivation. At the same time, they expressed dealing with these challenges through accommodations from teachers, and support from families helped to motivate them to achieve. The authors suggested differentiated instruction can “provide the motivational support they [students] need to increase their achievement, self-esteem, and self- efficacy…learning experiences that put discrete skills into a larger context that they can relate to and understand” (p.101). Furthermore, this study found that distractedness and boredom could be mitigated when students felt understood by teachers. Parents were a good support, however, their high expectations were found to be frustrating at times. Fugate and Gentry suggest a paradigm shift that changes the focus from ‘gifted with ADHD’ to ‘ADHG (Attention Divergent Hyperactive Gifted, highlighting their motivation, strengths, perseverance, and resilience.

CONCLUSION

This small sample outlined previously, of four of the articles reviewed for this SQLR, already reveal a multiplicity of dimensions for twice-exceptional students: additional barriers they face; the complexity of considerations in a strength-based approaches; and, even more that goes beyond the classroom; the results of this SQLR offer significant learnings. Fugate and Gentry (2016) suggest a paradigm shift, that removes labels of twice-exceptional and ADHD, highlighting instead “motivations, strengths, perseverance and resilience; those innate qualities that make them so very special” (p. 105). In short, strength-based approaches to learning are an iterative cycle of building these talents and qualities.

This SQLR demonstrates there is some work that has already been done, through studies large and small, that can offer an intricacy of methods to rise to the challenge of supporting twice-exceptional learners in realising their potential (whatever that may be). Existent research can be improved through further focus on student engagement, particularly through the four engagement dimensions: Behavioural (e.g., presence and participation); Affective (attitude and interest); Social (sense of belonging and involvement); and, Cognitive (Self-regulation and goal-setting), (see Ronksley-Pavia and Neumann, 2021 for further details). Furthermore, it would be informative to see greater prevalence of studies conducted beyond the context of the USA, with a greater spread across other countries, to better support learner diversity and multi-culturalism across a variety of contexts.

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Investigating the Metaphorical Perceptions of Pre-school and Classroom Teacher Candidates Toward Twice-Exceptionality

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ABSTRACT

This research investigates the metaphorical perceptions of pre-school and classroom teacher candidates toward twice-exceptionality. The study group of the research, in which phenomenology, one of the qualitative research designs, was used, consists of 50 pre-school and 50 classroom teacher candidates studying at Uşak University in the academic year 2021-2022. The prospective teachers were asked to create and explain metaphors by completing the sentence " Twice-exceptionality is like ... Because ....." completed. The data obtained were subjected to content analysis, and the results were discussed with the relevant literature.

KEYWORDS

Twice-exceptionality, metaphorical perception, prospective teachers

INTRODUCTION

James J. Gallagher came up with the term "twice-exceptionality," which is described as having both a extraordinatory talents one or more disabilities at the same time (Nicpon et al., 2011; Reis et al., 2014). Learning disabilities, language and speech disorders, emotional/behavioral disorders, physical disability, autism spectrum disorder, or attention deficit and hyperactivity disorder are examples of disabilities associated with giftedness (Reis et al., 2014).

Ability may hide disability in individuals twice exceptionality. On the other hand, disability may obscure an individual's ability (Johnsen, 2004). This is a common occurrence in gifted students with learning disabilities. Learning disabilities can hide giftedness and vice versa. As a result, they are branded as lazy, forgetful, and sloppy students (Baum et al., 1991; Reis & Renzulli, 2004). As a result, twice exceptional persons who have several challenges in their academic lives due to diagnostic difficulties may be excluded by their surroundings due to incompatibility with their peers. Their relationships with their teachers, in particular, are often problem-oriented

(Bildiren, 2018). By focusing on their twice-exceptionality children's attitudes and behavior problems, teachers may fail to see their great potential (Neumeister et al., 2007; Reis & McCoach, 2000; Wormald et al., 2014). Twelve twice exceptional persons with learning difficulties and giftedness were interviewed in the case study conducted by Reis, Neu, and McGuire (1997). Individuals who took part in the study claimed in interviews that they could not benefit from learning disability support services because they were perceived as lazy by their teachers during their primary and secondary school years. Gari et al. (2015) aim to explores classroom teachers' attitudes towards the twice exceptional people in their study. A total of 225 Greek and 158 Czech teachers took part in the study. Based on the findings, it was determined that clasroom teachers had difficulty comprehending the characteristic of pupils with twice-exceptionality.

In this context, determining teachers' perceptions, which play a critical role in the early recognition of twice-exceptional individuals, is critical. Metaphors can be utilized in educational research to disclose people's perspectives, ideas, and thoughts (Dikmenli, et al., 2012). Only one study (Şakar, & Köksal, 2021) addressed the metaphorical perception of twice-exceptional individuals when the literature was surveyed. Şakar and Köksal (2021) investigated special education teachers' metaphorical perception towards twice exceptionality in their study. There hasn't been a study examining the metaphorical perspectives of pre-school and clasroom teacher candidates regarding twice-exceptional people. Because the pre-school and primary school years are the initial stages in an individual's formal education, it's critical to learn about teachers' attitudes regarding twice-exceptional students at these levels. Therefore, the aim of this study is to examine the metaphorical perceptions of pre-school and classroom teachers candidates towards twice exceptionality.

METHOD

One of the qualitative research designs employed in the study was phenomenology (Yıldırım & Şimşek, 2018). The phenomenology design is used to develop a detailed and in-depth understanding of known phenomena.

Study Group

In the academic year 2021-2022, the study group consists of 50 pre-school and classroom teacher candidates studying in the first grade at Uşak University. Table 1 shows information about the teacher candidates who make up the study group.

Table 1 Information about teacher candidates

	Sex		The state of being aware of the concept	
Department	**Male**	**Female**	**Yes**	**No**
Classroom Teacher Education	16	34	6	44
Pre-school Teacher Education	5	45	4	46
Total	21	79	10	90

There are 21 males and 79 females among the teacher candidates taking part in the study. When the awareness of the notion of twice-exceptionality among teacher candidates was studied, it was discovered that 90% (f=90) were unaware of it.

Data Gathering Instrument

Before the data was collected, the teacher candidates who would be participating in the study were informed about the notion of twice-exceptionality. The statement was then completed with the phrase "twice-exceptionality is like..... because....." The description of the constructed metaphors aids in avoiding any misunderstandings that may arise throughout the interpretation process (Sözer & Aydın, 2020).

Data Analysis

Before the data was collected, the pre-service teachers who would be participating in the study were informed about the notion of twice-exceptionality. The statement was then completed with the phrase "twice-exceptionality is like..... because....." The explanation of the constructed metaphors helps in the prevention of any misunderstandings (Sözer & Aydın, 2020). Content analysis was performed on the data collected from teacher candidates. The content analysis aims to find concepts and relationships that can explain the data collected. A set of sequences are followed during the content analysis process. To begin, the data is coded and a code list is made. The second stage involves determining similarities among the revealed codes, creating categories, and developing themes. The data is then sorted in detail and presented in a language that readers can understand in the next step. The reported findings are then interpreted in the final step (Yildirim & Simsek, 2018). The research data was first transferred to a computer environment, where the metaphors created by pre-service teachers were alphabetically listed. The study's non-meaningful metaphors were discovered and deleted, and the remaining metaphors were coded to emerge at the themes. The inter-rater reliability coefficient of Miles and Huberman

was used to determine the study's reliability (1994). Using the formula [***reliability***= *number of agreements/(number of agreements + disagreements) x100*], the inter-rater reliability coefficient was calculated to be 96 percent.

FINDINGS

The review investigated over 100 metaphors created by teacher candidates, and the 59 metaphors which were found to be valid were classified into three main themes. "Disabilities, oppositeness, and being special" are the three themes. Tables 2, 3, and 4 show how teacher candidates' metaphors are distributed across the different themes and how frequently each metaphor was used.

Table 2 The distribution and frequency of metaphors produced by the teacher candidates on the theme of disabilities

Codes	**f**
Bird with a broken wing	3
Autism spectrum disorder	2
Shackles	2
Multiple disabilities	1
A baby who doesn't know he's looking for attention	1
Queen bee	1
Total	10

There are ten metaphors developed by teacher candidates when it comes to the issue of disabilities. A bird with a broken wing (f=3), autism spectrum disorder (f=2), and shackles (f=2) are among the most frequently used metaphors. The following are some examples of metaphors:

T38: "Twice-exceptionality is like a broken wing in a bird. Because the fractured wing signifies incompetence, and the solid wing represents tremendous ability."

T55: " Twice-exceptionality is like autism spectrum disorder. Because, while these individuals have giftedness, they also have problems with social skills."

T15-4: "Twice-exceptionality is like shackles." Because the disability of these individuals can make it difficult to use their potential."

Table 3 The frequency and distribution of the metaphors that teacher candidates used to talk about the theme of oppositeness

Codes	**f**
Day and night	5
Pluses and minus	4
Seesaw	3
Two different poles	2
Half-full glass	2
Black and white	2
Fire and water	2
Two sides of a coin	2
Pessimism and hope	1
Imagination and reality	1
Reality and imagination	1
Merging of opposites	1
two sides of life	1
Ex-lover	1
As one place increases, another decreases	1
Rose with thorns	1
Total	33

Most metaphors relating to the theme of oppositeness were provided by teacher candidates (f = 33). The most common metaphors used by teacher candidates in connection with the theme of oppositeness are night and day (f=5), pluses and minus (f=4), and seesaw (f=3). The following are some examples of metaphors:

T31: " Twice-exceptionality is like a night and day. Because these people experience both the good and bad sides of life."

T67: "Twice-exceptionality is like a plus and a minus. Because opposites attract."

T74: "Twice-exceptionality is like a seesaw. Because while these individuals have extraordinary talents in one area, they have a disability in the other area.”

T7: "Twice-exceptionality is akin to having two opposing poles. Because opposites attract."

T44: "Twice-exceptionality is a rose with thorns. Because, despite having difficulties in some areas (thorn), he can overcome these obstacles and continue his life thanks to his ability (rose)."

Table 4 Distribution and frequency values of metaphors produced by teacher candidates regarding the theme of being special

Codes	**f**
The colors of the rainbow	3
Being a diamond in a coal mine	3
Albert Einstein	3
Stephen Hawking	2
Matryoshka Doll	2
Citrus tree	1
Green	1
An asteroid falling to earth	1
Looking at the world from different perspectives	1
Twice a miracle	1
Curiosity rover	1
Total	16

The colors of the rainbow, a diamond in a coal mine, and Albert Einstein are among the 16 metaphors created by teacher candidates on the theme of being special. The following are some examples of metaphors:

T96: "Twice-exceptionality is like the rainbow's colors. Because every color is unique, just like two different people."

T42: "Being twice-exceptional is similar to finding a diamond in a coal mine. Because, while everyone is focused on the individual's shortcomings, his outstanding potential may go unnoticed."

T20: "Twice-exceptionality is like Albert Einstein. Because Einstein was also a gifted scientist with ASD."

T87: "Twice-exceptionality is like a citrus tree. Because two different fruits can grow on one citrus tree."

T27: "Twice-exceptionality is similar to the Mars Curiosity Rover. Because the technological features of Rover represent the ability and part of which malfunction is disability of twice exceptional individuals."

DISCUSSION AND RESULTS

This study aimed to examine the metaphorical perspectives of pre-school and classroom teacher candidates toward people who are twice-exceptional. The study found that 90 of the 100 pre-service teachers who participated were unaware of the idea of twice-exceptionality. The fact that the concept of twice-exceptionality has not yet been incorporated into legislation in Turkey (Ministry of National Education, 2018), as well as the lack of a course on this topic in pre-school (Council of Higher Education, 2018) and classroom teacher education (Council of Higher Education, 2018), indicate a low level of awareness of the concept.

The teacher candidates who participated in the study came up with 100 metaphors, of which 59 were found to be valid after an examination. The metaphors created by teacher candidates were grouped under the themes of disabilities, oppositeness, and being special due to the content analysis. When looking at the distribution of metaphors created by teacher candidates, it is clear that 10 metaphors were created on the topic of disabilities, 33 on the theme of oppositeness, and 16 on the theme of being special. As a result, the metaphor was primarily based on the topic of oppositeness. This study's finding aligns with Şakar and Köksal's (2021) research, which looked at the metaphorical conceptions of special education teacher candidates concerning the term of twice-exceptionality. According to the research result, the theme that special education teachers produced the most metaphors is contrast.

When the metaphors created under the theme of disabilities are explored, it is clear that teacher candidates place emphasis on the disabilities of twice-exceptional individuals, believing that these flaws occur before outstanding ability. Studies in the literature claim teachers focus on the disabilities of twice-exceptional people (Neumeister et al., 2007; Reis & McCoach, 2000; Reis et al., 1997; Wormald et al., 2014). However, rather than being in the risk category, these individuals should be viewed as promising (Nielsen, 2002).

When the metaphors created based on the theme of being special are studied, it is clear that teacher candidates highlight twice-exceptional individuals' ability as well as their potential. Teachers, it can be argued, play an essential part in achieving the potential of twice-exceptional people. Foley-Nicpon's (2015) study, which is meant to give information about twice-exceptional students from a psychologist's point of view, stresses that parents, psychologists, and teachers should be able to understand the differences between twice-exceptional people.

Some recommendations can be made based on the research findings. This study can be carried out in a variety of teaching departments. Lessons about twice-exceptionality can be offered, especially in pre-school and classroom teacher education degree programs, because teacher candidates have a low level of awareness of the idea of twice-exceptionality. The issue of twice-exceptionality can be incorporated into the in-service training programs designed and developed by the Ministry of National Education for existing teachers, and teachers can be informed about the characteristics of these individuals.

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Angel of Rare Disease – Life Story on the Talent Development of a Twice Exceptional Student

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ABSTRACT

Due to physical or psychological defects, lowness, or obstacles, people with disabilities have long been concerned and assisted, while ignoring the display of gifted or special talents, especially for twice exceptional students who are more likely to fail to discover their superior talents as soon as possible. This study adopts qualitative research method to explore the learning and growth process of a student with severe multiple disabilities who suffer from mitochondrial deficiency and cerebellar atrophy. To learn about students' life stories of how to face difficulties and never give up her special artistic talents under the physical and mental obstacles caused by rare diseases. Participants are twice exceptional student, her mother and 3 teachers. Data collection includes interviews, documents, works, videos, etc. Findings are as follows:

1. The development of special talents requires early observation by teachers and parents to cultivate their superior abilities. Interest and talent acquisition are definitely the driving force for sustainable development.
2. Key factors in the development of special talents including:

(1) In personal aspect, courage to face and accept personal obstacles, emotional stability and strong will, a stage that provides a sense of achievement are the main reasons for student success.

(2) In family aspect, parents continue to grow themselves and help their children develop, parents are highly supportive of their children's special talents are important for their child to blooming.

(3) In school aspect, teachers need to understand the needs of twice exceptional students and offer to assist, provide appropriate courses and teaching for students with special talents are key factors in the realization of students' potential.

Based on the findings, the researchers put forward suggestions for twice exceptional students and their parents, schools and related practical staff for reference.

KEYWORDS

Twice Exceptional Student, Artistic Talent, Qualitative Research Method

INTRODUCTION

1. Research motivation and research background

Due to physical or psychological defects, lowness, or obstacles, people with disabilities often pay attention to and assist the disabled part for a long time, but tend to ignore the display of their gifts or special talents. Twice exceptional students are more likely to provide an appropriate education in a timely manner because they fail to discover their strengths early.

The current educational concept of multiple intelligences and the trend of developing individual strengths and abilities illustrate the possibility that both physical and mental disabilities and outstanding talents can appear in the same individual at the same time. In recent years, there has been a lot of literature on international research on students with disabilities. Taiwan's early attention to twice exceptional students began around 1986 (Wu-Tien Wu, 1986), and they were mostly named "gifted and handicapped" and "handicap gifted". Later, researchers named such students "disabled gifted students", and "dual special students" (Wen-Hui Huang, 2007). Other scholars called it "double special differences" (Xiaolan Zou, 2007) and "twice exceptional student" (Ching-Chih Kuo, 2010). Start to call it from the perspective of paying attention to the educational needs of students, and reducing the adverse impact of marking on students.

In the field of special education school services for many years, students had diverse types of obstacles and severe obstacles, but they can still encounter surprising children. For example, a typical autistic student, whose mind is like a perpetual calendar, can correctly tell what day of the week it is in a certain month, a certain day. A student with severe attention deficit hyperactivity disorder can play a series of shocking jazz drums; students with disabilities can create delicate woodwork; students with intellectual and physical disabilities with rare diseases can create moving paintings. These cases show that students with disabilities have the advantage of being gifted or artistic. Through observation, discovery, professional resources, and special needs support, the potential of the twice exceptional students can be realized.

2. Research purpose

Based on the above research background and motivation, the main objectives of this research are as follows:

(1) Understand the analysis of strengths and weaknesses of the twice exceptional students.

(2) Discuss the educational needs of the twice exceptional students and assist in the development of their superior talents.

LITERATURE DISCUSSION

1. Physical and mental characteristics and educational needs of the twice exceptional students

The positive traits of giftedness displayed by the twice exceptional students are roughly similar to those of general gifted students, and they also show negative traits that may be similar to those of ordinary students with disabilities (Kun-Shou Wu, 1999).

The Ministry of Education (2009) lists the characteristics of the general gifted students and the twice exceptional students in the implementation promotion handbook of the “Principles of Evaluation, and Placement of Gifted Students”. Students have: (1) unusual imagination, often showing original and amazing ideas. (2) may be a leader in off-campus activities or in the community; exhibit “life-wise” behavior.

2. Development of the strengths of the twice exceptional students

Baum (2009) proposed a dual-special needs student talent-centered model, which centers on student talent development and cultivates students’ abilities through authentic and purposeful design. Five factors are considered: (1) in response to the advanced cognitive ability of gifted students, consider a differentiated and adaptive curriculum; (2) develop a challenging curriculum for learning strengths; (3) provide appropriate remedial support and compensation strategies for direct instruction; (4) create an appropriate physical environment and assistive aids; (5) social and emotional support. Therefore, according to the different characteristics of each student, we provide special education needs the different characteristics, and assist the development of the advantages and talents of the twice exceptional students.

The Ministry of Education (2009) put forward the principles of curriculum and teaching guidance in the implementation and promotion handbook of the “Principles of Evaluation, and Placement of Gifted Students”. The connotations of curriculum design include: (1) Curriculum design must start from the strengths and weaknesses of students; (2) Teachers must have both physical and mental disabilities and excellent professional knowledge to conduct teaching and guidance for students; (3) Adjust courses, gifted strategies, and remedial teaching according to students’ learning potential and special needs. The studies point out that school education must provide curriculum and teaching adjustments for the characteristics of twice exceptional students, and guide the development of students’ advantageous abilities to develop their potential.

RESEARCH METHODS

This research adopts the case study of the qualitative research method— and conducts semi-structured interviews with the research objects, primary caregivers and teachers, and 5 research participants to collect relevant information such as archival documents, works, and videos. Conduct triangulation and inductive comprehensive analysis through interviews (students, parents, teachers) and documents.

RESEARCH RESULT

1. Analysis of the strengths and weaknesses of the twice exceptional students

The case is now 20 years old and suffered from “Mitochondrial deficiency” when she was 8 months old. At the age of 17, she was diagnosed with a rare disease “Spinocerebellar Movement Coordination Disorder Type 29”, which caused multiple obstacles such as intelligence, language, and limbs. For a long time, the education process for people with multiple disabilities has mostly focused on the weaknesses of students, ignoring the talents of inspiring students with disabilities.

At the age of 12, the art teacher discovered that the case has a special drawing concept, color matching ability, and lively composition creativity. Parents began to learn to paint in order to plan their children's self-reliance life training— and let the case express their inner world through art to express their emotions. Due to the influence of the disease, the individual’s vision and body movements are not coordinated, and the learning path is even more difficult.

> *Although the limited eye and limb muscle motor nerve coordination is poor, Xiao Qiao (pseudonym) still works hard to complete the painting bit by bit, and each painting takes at least 2 to 3 months to complete. (ip20220106)*

> *When she was studying in high school, she gradually revealed her talent for painting. Her creations show rich emotions in composition and color, and the warmth presented by the full color is touching. He often participates in various competitions and wins awards. In 2019, she participated in the Taipei New Art Fair's “Art of Compassion, Top 100 Celebrities” paintings and participated in charity sales, etc., which shows that Xiao Qiao has a unique talent and creativity for art. (it120220110)*

In 2017, she participated in the joint exhibition of “16 Flying Gestures” at Taichung City Dadun Cultural Center. It was the first time to show herself on the stage, which increased her confidence in her paintings. The development of the special talents of twice exceptional students requires early observation by parents and teachers to

cultivate their interests and strengths. The affirmation of special talents will be the driving force for sustainable development.

2. Provide the educational needs of twice exceptional students and assist the development of their superior talents

The key factors in the development of special talents are described below:

(1) Personal aspects

> *Through several public welfare booth opportunities, Xiao Qiao can bring her paintings and cultural and creative works to face the public, and even receive appreciation and praise from everyone on the spot, with a bright smile on her face, which makes her an appreciated sense of achievement. (ip20220106*)

Therefore, they can bravely face and accept personal obstacles, develop stable emotions and strong willpower in the process of growth, and create a stage for a successful experience and a sense of accomplishment to help them exert their strengths.

(2) Family aspects

> *In 2019, she began to accept invitations from various units for the "Rare Angel–Shimmering Light" art exhibition– and took this opportunity to hold the "Extraordinary! Takeoff– Special Aesthetics Group Exhibition", leading other special students to join the group exhibition. I have been doing life education since 2017. I have been invited to give speeches in kindergartens, elementary schools, middle schools, high schools, universities, and enterprises, introducing Xiao Qiao's life course. It is hoped that through the sharing of paintings and life history, more people will know the life stories of people with disabilities who have rare diseases and multiple disabilities. (ip20220106)*

Therefore, parents' continuous self-growth and help children's development, as well as parents' high support for children's special talents, have become the most important pillars for twice exceptional students.

(3) Schools

> *During her study at the Taichung Municipal Taichung Special Education School for The Hearing impaired in Taiwan, her teacher applied for Xiao Qiao's "Twice*

Exceptional Student Art Resource Program", and "Twice Exceptional Student Energizing Resource Program Effectiveness Research Program", as well as corporate sponsorship to assist with weekly fixed art-related courses training students, develop superior ability. (it220220112)

The school has set up community activities to support students, and regularly holds exhibitions of students' works to enhance self-identity and provide an additional opportunity and stage. (it320220115)

Teachers can understand the learning situation of the twice exceptional students and actively provide resources and support, provide appropriate courses and teaching for students' special talents, and create a stage for students to show their artistic creative energy.

CONCLUSION AND SUGGESTION

1. Conclusion

"The face of the case is always full of smiles, and the colors of the paintings are colorful and full of warm and positive style, like a gleam in the dark, trying to shine, bringing strength and hope to myself and the people around me."

Although the case is trapped by illness, she still retains positive energy. In her body and her works, you can see that she is not afraid of setbacks, brave, persistent, and hopeful for the future in facing life. With the love of the parents, the training and assistance of school education, and the support provided by the society, the individual can still be full of sunshine, never give up, and move towards her goal despite multiple obstacles. The integration of family, school, and social resources enable the twice exceptional students to exert their artistic talents and achieve life value.

2. Recommendations

From the point of view of social justice and human rights, how to ensure the appropriate learning of disadvantaged groups is an important issue in education. It is the goal of special education to provide appropriate counseling for twice exceptional students. In this regard, the following recommendations are made:

(1) Provide multiple and flexible identifications and placement for twice exceptional students.
(2) Provide gifted education programs for twice exceptional students to achieve adaptive curriculum and teaching.
(3) Cultivate excellent teachers with a holistic view of education, and continue to develop students' outstanding talents from a broader perspective.

(4) Construct a good support and transition system to improve the future study and life quality of twice exceptional students.

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A Case Study on The Learning Experience of Inclusive Education for Twice Exceptional Students

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ABSTRACT

This research mainly explores the learning experience of twice exceptional student in inclusive education. Participant is a six-year-old boy, identified as Asperger's syndrome with emotional disorder, and also has the problem of refusal to school. The participant has high concentration and logical thinking ability in the field of information scratch courses, maker clubs, and mathematical problem solving and won the micro bit racing problem-solving competition. Case study method was applied through semi-structured interviews and related data analyzing. Findings are as follows:

1. The participant would stop all studies due to high frequency of refusal and emotional problems. He was unable to control his own emotional problems, and he did not know when the next conflict will occur, and he often hided in annoyance afterwards. However, he was good at reading and learning independently, and would be highly attentive to explore things of interest.
2. Parents tried their best to cooperate with the school’s arrangements, actively participated in various educational meetings, and provided more assistance to the participant. However, because the elders who live with them dote on them, there was no consensus on the method of discipline, and it was difficult to correct emotional behavior problems.
3. In integrated environment, the teacher used positive class management model and job analysis teaching methods to achieve teaching goals. Interviews was made to introduce firmly details to the participant. When the participant was in good shape his was bored with all the classes. For example, in mathematics class, he was used to not listening to the teacher's lectures, and doing mathematics problem solving alone. The participant had strong learning ability, but due to lack of patience, emotional problems and refusal to study, the potential characteristics of excellent talent were buried in the bottom.

Based on the findings, the researcher offers some suggestions for future teaching and research.

KEYWORDS

Twice Exceptional Student, Asperger's Syndrome, Inclusive Education

INTRODUCTION

According to researchers' statement, most challenging students are those who have diagnosed with Asperger syndrome and Gifted. As the students entered the upper grades, the classroom problem behaviors became the most troublesome in the whole school. Students, peers, teachers, and teachers in various disciplines are overwhelmed by cooperating with counseling experts, psychologists, doctors, parents, teaching team leaders, principals, expert teams, parents, school staff, and a student to discuss how to help students. However, Yass Abnormal behaviors with syndrome may interfere with their talent or learning (Hsiang-Yu Lo & Chen-Fan Chang, 2014). This study aims to explore the learning experience of Shuangshu students in inclusive education.

LITERATURE DISCUSSION

The characteristics of gifted students with Asperger's syndrome are the same as those of general gifted students, but there are differences in characteristics. First of all, we should understand the differences to avoid misclassifying these problem behavior makers as learning Obstacles or other obstacles, and even lead to the subsequent intervention of inappropriate teaching resources, not only failed to help students, but also made teachers and parents more frustrated (Maureen Niehart, 2000).

Interested in a specific field, able to concentrate, excellent memory ability, rich in association and fond of a lot of knowledge information (Hsiao-Lan Tsou & Tai-Hwa Lu, 2011). They develop early in speaking and reading, have strong memory ability, and are keen to express topics of interest; they are obviously weak in emotional and social skills, their maturity is lower than that of children of the same age with the lack of emotional awareness; most of them are not good at motor and fine motor skills (Friedrichs TP & Shaughnessy MF, 2015), in addition, when the environment or schedule is adjusted unexpectedly, the sudden plan change is unacceptable, and it is easy to get angry; the tolerance for changing things, excitement, and aggression in life is very low to identify such students, two things need to be done: grasp the students' learning development process and gain insight into the motivation behind certain behaviors (Endang Widyorini, 2007).

Asperger's gifted students learn in an integrated education environment, and different teachers and different courses have different strategies. Shih-Chun Li (2017) said that they can find out the advantages of Asperger's gifted students and intervene in teaching strategies, such as they are easy attention to details, difficult tending to see the parts of the whole and present both the parts and the whole through visual materials, images or diagrams. In addition, Hsiao-Lan Tsou & Tai-Hwa Lu (2007) conducted a storytelling course in a visual image way, and used the advantages of ability: like reading, excellent memory and other characteristics to plan the course to improve the weak ability and improve the communication efficiency.

METHODS

This research mainly explores the learning experience of twice exceptional student in inclusive education. Participant is a six-year-old boy, identified as Asperger's syndrome with emotional disorder, and also has the problem of refusal to school. The participant has high concentration and logical thinking ability in the field of information scratch courses, maker clubs, and mathematical problem solving and won the micro bit racing problem-solving competition. Case study method was applied through interviews and related data analyzing.

RESULTS AND DISCUSSION

In an integrated education environment, if tutors and subject teachers do not deal with students' problem behaviors with special care, and use coercion or demand to cooperate with temporary changes immediately, it will lead to counterproductive behaviors and even aggressive behaviors, which will reduce the potential obstacles to the original. Disadvantages are highlighted, causing uncontrollable obstacles to teaching and class management, and falling into the dilemma of three losers among parents, teachers, and students. The results of this study are consistent with the research of Endang Widyorini (2007) and Maureen Niehart (2000) scholars. Be able to grasp students' learning development process and gain insight into the motivation behind certain behaviors.

The way the tutor communicates with the students is very important. He communicates with the students with a calm and hold the line. Even if the students do not like it, they can respond in a soft way, which can avoid many frontal conflicts and crises. The teacher understands the students’ strengths and uses them effectively. The teaching strategies are helpful for students' course learning, building trusting relationships and communication channels.

CONCLUSIONS AND RECOMMENDATIONS

Findings are as follows:

4. The participant would stop all studies due to high frequency of refusal and emotional problems. He is unable to control his own emotional problems, and he does not know when the next conflict will occur, and he often hides in annoyance afterwards. However, he is good at reading and learning independently, and will be highly attentive to explore things of interest.
5. Parents try their best to cooperate with the school's arrangements, actively participate in various educational meetings, and provide more assistance to the participant. However, because the elders who live with them dote on them, there is no consensus on the method of discipline, and it is difficult to correct emotional behavior problems.
6. In integrated environment, the teacher uses positive class management model and job analysis teaching methods to achieve teaching goals. Interviews is made to introduce firmly details to the participant. When the participant is in good shape his is bored with all the classes. For example, in mathematics class, he is used to not listening to the teacher's lectures, and doing mathematics problem solving alone. The participant has strong learning ability, but due to lack of patience, emotional problems and refusal to study, the potential characteristics of excellent talent are buried in the bottom.

Based on the findings, the researcher offers some suggestions as follows:

1. Guide parents to think positively, encourage early application for identification, and provide education programs suitable for individuals.
2. School teachers and families must maintain open communication to discuss ways of coping with emotional and behavioral problems and the consistency of parenting attitudes.
3. Taking care of twice exceptional children requires high ability. The participant in this studied is suitable for homeschooling, but the parents have no other support or tutoring resources, they hope that the caregiver will have time to respite, recharge, and acquire caregiving strategies and skills.

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Part C

Program Implementation

Online STEAM Education Programme for Gifted Young Girls during the COVID-19 Pandemic

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ABSTRACT

A special education programme, Kids Academy, for gifted young children has been running in Japan since 2010. During the coronavirus disease pandemic, the activities have developed, with its main activities changing from face-to-face to online. This study focuses on the Winter School of Kids Academy, conducted from December 2021 to January 2022. Six gifted young girls—one in kindergarten, four in grade 1, and one in grade 2—participated in the programme. The winter school comprised four one-hour lessons. In the first lesson, the children learned about food nutrition and calories and then made dried apples. In the second lesson, they took part in creative activities related to sound. The third lesson taught about the human body and medicine. In the fourth and final lesson, the participating children presented their original research. The results of the post-school questionnaire showed that the school's level of difficulty was appropriate for the participants. Many parents also stated that both their children and themselves became more familiar with everyday phenomena and events, and that the experience expanded their thinking. This implies that this special STEAM programme for young children had a positive impact on the young gifted girls as well as the parents.

KEYWORDS

Online Programme, STEAM Education, Gifted Young Girls, the COVID-19 Pandemic

INTRODUCTION

The novel coronavirus pandemic (COVID-19) posed several education-related challenges globally. Many schools were forced to shift to an online mode of teaching. Early childhood education—which is primarily a child's free play activity—was particularly affected. A significant difference was found in 4 to 6-year-old children between 2018 and 2020 regarding losses in motor and cognitive development attitudes towards learning and internalizing behaviour (Gonzales, et al., 2022). Palmer and Small (2021) reviewed governmental policy responses in OECD countries during the COVID-19 pandemic and insisted that globally, governments must invest in social safety net programmes, and investments in early childhood care and education is one of a concentrated focus necessary not only to offset the pandemic's effects but also to support the future for youth.

Chowkase (2022) showed that there was no significant difference between online and in-person courses in gifted children's motivation by programme format, level, or gender, and discussed a possibility of out-of-school online programmes for gifted children. Kaya and Akgul (2022) interviewed parents of gifted children about online education during the COVID-19 pandemic and found its greatest advantage to be the individualized learning opportunity suitable for their children's interests and abilities. By contrast, one of the most commonly expressed disadvantages of online education seemed to be the lowered socialization opportunities. Differences in play preferences at an early age between boys and girls is an important gender perspective.

Based on the collective experience and thinking during the COVID-19 pandemic, we know that medical education is an important part of healthcare, with more emphasis required on both medicine and science (Chen, 2020). Therefore, the purpose of this study was to develop and implement a unique online education programme on medicine ("M" in Science, Technology, Engineering, Arts, and Medicine/Mathematics education) for gifted young girls with designing to enhance collaborations online.

METHODS

Ehime University Kids Academy was founded in 2010 with the aim of developing and implementing special learning programmes to identify and enrich the potential of gifted young children who demonstrate a high level of intellectual/creative ability and motivation or are skilled in a specific academic field (Sumida, 2015). Currently, there are 87 Kids Academy members within and outside of Japan.

This study analysed the curriculum developed and implemented for one of the winter school educational programmes. The 2021 winter school programme was developed based on the assumption that it would be held virtually, online, and it was ultimately implemented using Zoom. The programme consisted of four sessions

between December 12, 2021, and January 10, 2022. Each session lasted about an hour from 13:00 to 14:00.

A total of six girls participated in the winter school: one kindergartener, four first graders, and one second grader. As the programme was presented online, the participants lived far apart and did not know each other from school or kindergarten. However, a pair of sisters (first and second graders) were included among the participants.

RESULTS

Developing an “M” as “Medicine” STEAM education curriculum during the COVID-19 pandemic

The 2021 winter school comprised four one-hour lessons. This article focuses on the third lesson on the human body and medicine in the context of STEAM education, with uniquely “M” referring to “Medicine.”

During the COVID-19 pandemic, people experienced restrictions at home and in society, including in kindergartens and primary schools. To prevent infection and its spread, there was a focus on avoiding the three Cs: closed spaces, crowded spaces, and close-contact settings. Children were inevitably more concerned about hygiene and health, and at the same time, they were more anxious. Therefore, in the third lesson of the 2021 Kids Academy Winter School, I developed a programme based on education about human body and medicines.

First, under the theme of “the body fighting diseases,” the children took a quiz on body organs, with a silhouette confirming the name and location of each organ. They learned that a healthy life requires sufficient sleep, good exercise, a well-balanced diet, and a regular routine. Then, using a large plastic bag, they learned by drawing which organs are located in which part of their bodies (Figure. 1).

Figure. 1 Drawing their bodies' organs on a plastic bag

Next, under the theme of "how medicines work," they learned that there are different types of medicine. They conducted an experiment using capsules (baking soda inside), water, and grapefruit juice to find out why medicines need to be taken with a sufficient amount of water. Afterwards, they were quizzed on questions such as "I forgot to take my medicine, so I will take two doses at once" to determine the correct answer. After learning how medicine circulates in the body, the children enjoyed designing a medicine that dissolves slowly. Creative ideas were presented, such as the use of a hard-to-dissolve substance as a coating. Finally, they played a card game about the body.

Enhancing the potential of gifted young girls and their parents

After the four lectures, a questionnaire was mailed to the parents, asking for their responses regarding their children's reactions to the winter school and how they were doing at home. The response rate was 100%.

First, they were asked to rate the difficulty of the course on a 5-point scale from 1 (very easy) to 5 (very difficult), and the average value given by the respondents was 3.0. This indicated that the programme developed in this study was appropriate for gifted young children. In response to the questionnaire item about whether the children were satisfied with what they had learned in the winter school on a 5-point scale from 1 (not satisfied at all) to 5 (very satisfied), the mean value was 4.8, a very high value.

In response to a questionnaire item about family involvement with their children at home, the parents were asked to indicate whether they (1) talked with their children about their interests and discoveries; (2) had more opportunities to look things up with

their children using dictionaries, books, the Internet, etc.; (3) became more familiar with everyday phenomena and events with their children and deepened their thinking; (4) engaged in learning activities and research with their children; or (5) gave more opportunities to their children to learn on their own initiative. The mean scores on a 5-point scale from 1 (not at all true) to 5 (very true) for each of the five items were 3.8, 4.0, 4.0, 4.8, and 3.3, respectively. Although it was an educational programme for children, many parents became involved in the learning activities and research, and it was clear that the programme had a positive impact not only on the children, but also on their parents. For example, the following episode describes what happened at home after learning about medicines.

She seemed to enjoy experimenting with the medicines. Even after the class was over, when I tried to take some medicine with juice, she warned me, "No, Mom, you can't." (First grade)

Regarding the questionnaire item on the advantages of conducting the programme in a virtual, online setting, all the parents mentioned the ease of participation, which included not having to travel to the venue and the ability to study together with children who lived far away. Some parents responded that it was easier for them to be involved, as they were working from home, and they felt more secure knowing that their children would be with them during the online programme. Some parents also mentioned that they were able to participate without worrying about coronavirus infection. On the other hand, some parents commented that they found it difficult to visualize the size of the organs on the computer screen and that it was unfortunate that the sound of tapping on the glass cups could not be conveyed online.

The 2021 winter school was only for girls. The parents were asked to write freely about what they thought was good about this, or what concerned them in this regard, and the following responses were obtained:

I was glad that there were only a small number of people and that the atmosphere was one in which it was easy to speak up, which I thought was probably due to the fact that it was limited to girls. (Kindergarten)

I think that many of them like the same things and are interested in the same things. In my daughter's case, I think she was able to focus more on her participation than when it was with boys. I don't think she felt too competitive ... (First grade)

DISCUSSION

In this study, an educational programme on “medicine” was developed and implemented for gifted young girls online during the COVID-19 pandemic.

Pharmacy is directly related to chemistry and biology, as well as to public health and information analysis. Medicines have a profound influence on culture and history. In Japan, the ratio of male to female registered pharmacists is approximately 4:6, and the profession has a large number of female registered pharmacists. Learning about medicine, therefore, is of interest to many girls from early childhood.

In an emergency situation such as the COVID-19 pandemic, it is of great significance to provide interdisciplinary and transdisciplinary learning about the human body and medicine for all so that young children are not devoid of information and can maintain their own health properly.

In this study, after the human body-themed activity of drawing organs on plastic bags and wearing them, one of the girls commented that she felt a little embarrassed. Considering these feelings, it is quite possible that activities with only girls would provide more opportunities for them to express their ideas and opinions freely and be more active. Future studies should conduct similar activities with gifted young boys to compare the reactions and findings with this study.

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Early Childhood Math Education Program Based on Sternberg's Theory of Successful Intelligence: Development and Effects

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ABSTRACT

The purpose of this study was to develop an early childhood math education program based on Sternberg's theory of Successful Intelligence and explore its effects on children's mathematical ability, creativity, and creative problem-solving ability. Main research questions and subsidiary questions were given to investigate the effects regarding the purpose of the study.

The sample was composed of 76 five-year-old children at two kindergartens in Seoul. For data analysis, the SPSS 24.0 program was used with a paired-sample t-test and multivariate analysis (MANOVA) to compare pre-and post-test results.
The results of this study are summarized as follows.

There was a statistically significant improvement in mathematical ability in the experimental group compared to the control group. Moreover, the sub-domains of mathematical ability, such as Algebra, Number properties and operations, Geometry, and Measurement showed statistically significant improvements in the experimental group. The sub-domains of creativity, also showed statistically significant improvements in the experimental group. Lastly, the experimental group showed statistically significant improvements in the creative problem-solving ability score, including the sub-domains, Exploring the challenge, generating ideas, and Preparing for action.

In conclusion, the results revealed that the early childhood mathematics education program based on Sternberg's successful intelligence theory has a positive effect on mathematical ability to general 5-year-old children, and may be provided to younger aged gifted preschoolers, thus contributing to the field of early childhood math education.

KEYWORDS
Young Children, Infans's Math, Successful Intelligence, Math Learning, Math Teaching

INTRODUCTION

Research Necessity

We live in an era of industry 4.0, also known as superintelligence and hyperconnectivity. Young children need to solve daily problems logically and rationally and make the best decision every time. The OECD addressed critical thinking, problem-solving abilities, creativity, communication, and cooperation abilities as the capabilities required for talented people of the future. Meanwhile, the World Economic Forum presented complex problem-solving, critical thinking, creativity, interpersonal management, cooperation, emotional intelligence, decision-making, service-orientation, negotiation, and cognitive flexibility as the core capabilities for future society.

Sternberg's theory of successful intelligence is one of the base education theories on preparing for the rapidly changing future society. Sternberg (2006) stated that successful intelligence is the ability to recognize and compensate for our weakness and to recognize and make full use of our strength. There are three types of successful intelligence: analytical intelligence, creative intelligence, and practical intelligence. He stated that successful intelligence can be shown when we pursue the balance of the three. Young children can act appropriately in diverse situations and anticipate others' behavior since young children with successful intelligence can make appropriate decisions by adapting to their environment and adjusting the balance of the three. Additionally, successful intelligence lets people recognize that they are valuable human being and engage in social opportunities. It shows that there is a need for education programs which result in successful intelligence development by emphasizing skills needed for young children who move to a new area (Moghaddam, Nasireh, Nasrollahi, & Bagheri, 2020).

Future society will require creative talented people who reason three-dimensionally from various points of view and solve complex problems. In particular, in the future, large amounts of information and technology will dominate, requiring the ability to select, systematize, and apply information and mathematical ability to solve various problems in science, art, and other fields (Seefeldt, 2005).

Cultivating mathematical sense should be a focus in early childhood when children understand mathematical principles and build abstract concepts through experience. Therefore, early childhood math education should be centered on complete activities suitable to young children's developmental stage with direct and specific experience. Thus, it is important to let young children have competence and confidence by handling materials during activities. Furthermore, it is desirable to encourage young children to interact and induce them to creative thinking through questioning.

Early childhood math education enables interests not only in offline classes but also online classes (Choi & Sunyoung, 2021). The role of video content that mediates communication has grown as the COVID-19 pandemic opened the untact era. The importance of early childhood math education has also grown with work from home and online classes (Noh, Changeui, 2020). Utilizing audiovisual stimulation can maximize the effect of education by helping young children to understand topics easily (Yoon & Joonhwa, 2017). In particular, educational videos let young children whose attention span is short access information easily and increase learning achievement through their senses (Park & Sungdeok, 2014).
A program was developed based on the theory of successful intelligence and tested at early childhood education sites based on the topics above. The purpose is to develop a program in which students learn mathematical concepts and analytical intelligence by exploring and playing with learning materials after watching a video and also develop their communication, creative intelligence, and practical intelligence to improve their problem-solving ability and practical intelligence.

Research Questions

This study was to develop an early childhood math education program based on Sternberg's theory of successful intelligence and verify the effects on young children's mathematical ability, creativity, and creative problem-solving ability with the program. The following questions were given.

1: What are the characteristics of the program based on Sternberg's theory of successful intelligence?
1-1. What are the goals and objectives of the program?
1-2. What is the content of the program?
1-3. What is the relationship with the teaching-learning method of the program?

2: What is the effect of the program based on Sternberg's theory of successful intelligence?
2-1. What is the effect of the program on mathematical ability in early childhood?
2-2. What is the effect of the program on creativity in early childhood?
2-3. What is the effect of the program on creative problem-solving ability in early childhood?

RESEARCH METHODS

Research Subjects

This study used two kindergartens located in densely populated area of Seoul. They share a similar sociocultural environment and follow the Revised 2019 Nuri Course. Study participants were a total of 76 five-year-old children, 33 in the experimental group (15 boys and 18 girls) and 43 in the control group (24 boys and 19 girls).

Research Tools

Mathematical Ability Test

This study used an infant drawing examination tool developed by Hwang, Haeik and Choi, Hyejin (2007) to measure analytical intelligence. The reliability coefficient of the test was .94 and the reliability coefficients of the sub-domains were .81 in Algebra, .85 in Arithmetic, .75 in Geometry, and .82 in Measurement.

Creativity Test (TTCT Test)

This study used Kim and Yeongchae's (1999) scoring criterion and standards based on Torrance's (1966, 1993) Tests of Creative Thinking (TTCT). Pre-test A and post-test B were used to test the same ability and both were the same test. The reliability coefficient (Cronbach α) of the test was .65 and the reliability coefficient (Cronbach α) of pre- and post-test were .50 and .70, respectively.

Creative Problem-Solving Test

This study used Lee and Seonyeong's (2006) test based on problem-solving process of Treffinger's (1989) three creative problem-solving actions (exploring the challenge, generating ideas, and preparing for action). The reliability coefficient (Cronbach α) of the test was .91 and the coefficient (Cronbach α) of pre- and post-test were .73 and .98, respectively.

RESEARCH PROCESS

1) A literature review of existing studies was developed and preschool teachers' recognition and demands of mathematical program were investigated and analyzed. Based on the finding, an educational intervention was developed, in which young children watch a video, recognize problems in the mathematical situation, do specific operational activity, perform creative play with peers via communication, and link these to real life.

A team was built with two experts in early childhood education, two doctoral program students with more than ten years of education experience, and one kindergarten teacher with master's degree in Early Childhood Education. They provided feedback on the program draft, program suitability, material selection, video suitability, teaching-learning methods, and final program draft as well as participating in the program development.

The draft was focused on the purpose of the study and its suitability, young children's interest and suitability for their development, and the effect of teaching-learning methods. Ten teaching materials and video content sections were reviewed for the suitability of this study. The teaching exercise of watching a video, exploring teaching materials, activity recreation, and connecting them to real life in sequence could cultivate Sternberg's analytical intelligence, practical intelligence, and creative intelligence. Preliminary research was done to verify the effectiveness of the program. Ten tests were conducted over ten weeks (from May 17, 2021 to July 23, 2021) with five-year-old children at K kindergarten in Seoul. Each test was split into three sessions each week. A total of 30 tests were conducted. In the first session, young children watched a video as a large group activity and interacted. In the second session, they explored and played with teaching materials which they saw in the video by recollecting the content of the video as a small group activity. They were encouraged to utilize the materials to new games by playing with the materials freely, and they communicated in creating new games. In the third session, they heard stories of the material so they could apply mathematical concepts in real life as a small group activity and experience problem-solving in real world.

The preliminary research shows that there was a significant difference between pre- and post-test in young children's mathematical ability, creativity, and creative problem-solving ability.

The results were analyzed and consulted with experts and applied to the final program development.

2) The effect of the early childhood math education program based on Sternberg's theory of successful intelligence on young children' mathematical ability, creativity, and creative problem-solving ability was verified. The program was applied to 76 five-year-old children (33 in the experimental group and 43 in the control group) at two kindergartens in Seoul for ten weeks, from August 30 to November, 5, 2021. A pre/post-test design was utilized to examine the effect on young children' mathematical ability, creativity, and creative problem-solving abilities. SPSS 24.0 program was used with a paired-sample t-test and multivariate analysis (MANOVA) to compare the pre- and post-test results and verify the effect.

RESEARCH RESULTS

First, the early childhood math education program based on Sternberg's theory aimed to improve the three types of successful intelligence. The learning content was composed of 'numbers and arithmetic,' 'space and shape,' 'regularity,' 'measurement,' and 'data collection and result.' There are two sessions for each content, resulting in a total of 10 sessions. In the introduction of each session, young children watched a video and recognized the mathematical situation. In the development stage, they explored learning resources and materials and played with them. In the final stage, they applied the content to real life. The program was developed through planning, implementation, and completion evaluation.

Second, there was a statistically significant improvement in mathematical ability of the experimental group compared to that of the control group and in the sub-domains of mathematical ability (algebra, number and operations, geometry, and measurement). Additionally, there was a statistically significant improvement in creativity and in the sub-domains of creativity (fluency, originality, abstractness of titles, and resistance to premature closure). Lastly, there was a statistically significant improvement in creative problem-solving ability and the sub-domains of creative problem-solving ability (exploring the challenge, generating ideas, and preparing for action).

CONCLUSION

First, this program was developed based on existing studies focusing on children older than elementary school age. However, it is now important to pay attention to young children, develop successful intelligence improvement program continuously, and apply them to the education field. Regarding to the sub-domains of successful intelligence, many researchers focused on analytical intelligence more than creative intelligence (Kim & Unju, 2003). This is because getting into a good school is considered a child's sole success. It is time to expand this narrow view and pay attention to the fact that young children should live with many problem-solving from real world (Ministry of Education & Ministry of Health and Welfare, 2019) and early childhood is the most important time for children to form an interest in mathematics (Moon & Yeonsim, 2010). It should be noted that a longitudinal study shows that a mathematical ability in early childhood affects the academic achievement of children in school ages (Rittle-Johnson et al., 2017).

Second, early childhood math programs should be developed by integrating various factors, not focusing on simple and specific media or methodology. Specifically, they should utilize videos, combining materials and play, connecting real-world problems to education smoothly, utilizing interactions between teachers and young children and between young children, creating and providing teaching materials to minimize differences in teachers' play support ability and individual young children.

Third, since programs that combine various factors mentioned above can improve successful intelligence, program development and application should be encouraged to connect with real life. This is because young children can develop an interest in mathematics and solve problems creatively throughout the program (Kim & Choi, 2011; Kim et al., 2008; Ryu & Ahn, 2006; Yang & Kim, 2019).

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The Impact of Talents-Unlimited-Theory Based Activities on the Development of Divergent Thinking Skills and the Development of Motivation for Creativity among Primary Stage Students

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ABSTRACT

This research aims to identify the impact of a training programme that adopts the talents unlimited model (TUM) on the development of divergent thinking skills of elementary school students in the UAE, and on enhancing their motivation for creativity by using the experimental method.

The research aims to answer two main questions: what is the impact of the activities of the multiple talent programme on developing the creative thinking skills of sixth grade students in the UAE and developing their motivation for creativity?

The research sample consisted of (42) female and male students from Al Nouf Elementary School for Girls in Sharjah, and from Al Bidaa Elementary Education School for Boys in Fujairah, divided into experimental and control groups. To achieve the research objectives, I designed a training programme that follows the talents unlimited model. In addition, a motivation scale was developed consisting of 29 Likert items.

The results indicated that the programme managed to moderately interpret the dependent variable. Based upon the results, the researcher concluded the following:

- The talents unlimited model has a significant impact on developing divergent thinking skills among the subjects in the experimental group.
- The talents unlimited model activities have a clear statistical significance as demonstrated by the average scores of the experimental group. Subjects in this group showed a high level of thinking skills and motivation for creativity.

KEYWORDS

Talent Unlimited Programme, Divergent Thinking Skills, Creative, Motivation

BACKGROUND

Abstract and Literature Review

Pedagogical theories are based on providing appropriate support at school to achieve a model that would enable the teacher to plan, develop, implement, and evaluate an educational programme. They seek to provide the best services and programmes that meet their needs that are the outcome of the disparity between the students and their environment, and the variations in the content and skills that they need. Meanwhile, most of our educational institution focus on the students' academic skills neglecting their other potential skills.

Current educational programmes, plans, and strategies face much criticism and challenges especially for their reliance on pre-packaged curricula that undermine the ultimate goal of educating the future generations; a task that should only be entrusted to those who are most concerned with the students' particular needs and their divergent skills and abilities. As such, these programmes may negatively impact the students' critical thinking skills, research skills, and intellect hence impeding their motivation for discovery and creativity.

Training young students to utilize and develop their critical thinking and problem-solving skills is considered one of the main tenants of the comprehensive development of any nation. Awareness of the crucial role science plays should be our top priority as it would help students to be better able to understand what they are being taught and, as a result, enable the nation to fill the skill gap it suffers. When students apply their higher thinking, they are less likely to give up. This means that we must admit that class discussions would ultimately direct the teachers to adopt teaching strategies that focus on developing the students' thinking skills and cater for the particular needs of generation.

Modern teaching theories aim to produce learners who think in unconventional, creative, and intuitive way and promote learning approaches that apply investigation skills, divergent thinking, and projects. It has been observed that students who are able to overcome challenges and adapt better to challenges are those who are more likely to display talented behaviour (Buerk, 2016). The focus on the teaching of these "survival skills" (Wagner, 2010) is a significant requirement of this new age of innovation and technology. Abu-Rayash (2007) claims that learning theories are concerned with the student's behaviour and the positive changes that it undergoes.

They aim to improve and develop the students' behaviour and strive to achieve educational goals in the shortest time and with the least effort. This supports calls to adopt a learning approach that focuses on the development of a variety of potential intuitive human resources which, in its turn, would positively impact the quality of educational programmes.

The real challenge that educational institutions face is the recruitment of qualified teachers whom they would train to practice the said thinking skills. However, only those teachers who have received the appropriate training are able to would help their students to use their thinking skills at higher levels (Aldahan, 2013) enhancing their students' self-confidence and reinforcing future skills. Meanwhile, modern educational approaches consider learners not as passive consumers and receivers of knowledge but rather as produced of knowledge in their own right through learning to learn programmes where the pedagogy is based on developing and enhancing students' thinking skills (Amazian, 2015). Guilford (1966) proposed a broader link between divergent thinking and the students' engagement in extracurricular activities and achievements. In contrast, what we are practicing here is a manifestation of the dominance of traditional thinking over creative problem solving.

While Gardner discussed multiple intelligences and teaching methods, many went further claiming that people employ different thinking methods and follow different steps in their thinking process. Taylor (1978, 1988) developed a talent model that presented a classification of the major human capabilities which aimed to bridge the gap between the school and the levels of achievement in the classrooms. However, the capabilities entailed in the thinking talents model are yet to receive enough attention after Gardiner. Unlike many of Gardiner's open educational activities, the talents unlimited model for teaching thinking skills seems to have met the needs of learners with a wide variety of skills. What makes this approach fairer is that it caters for the students' individual differences and trains all of them to develop such skills as planning, forecasting, communication, decision-making, and productive thinking and only those who are considered gifted (Renzulli, 1977).

Theoretical Background

Taylor (1978) succeeded in developing a solid model that pointed out the shortcomings of making a distinction between the gifted and other students. His was a practical framework that explained the individual differences in developing thinking skills and tools. His argument was that the more varied the cognitive skills, the more equal the students are, and the greater the chances of expanding their abilities in school performance, and the greater the growth of the whole individual. It is a dual and synchronous approach that includes the development of abilities and innate talents and the acquisition of knowledge.

Several studies reveal that the application of the talents unlimited programme had a significant impact on reducing teachers' bias towards high-achieving students. Another effect of the programme was the identification of a large number of gifted students in less privileged areas (Chissom & McLean, 1979). Aljughaiman and Albuyosif (2022) explained the low representation of schools in less privileged areas in such programme as a direct result of the lower opportunities for education, lack of awareness of the existence of such opportunities, and the poor educational level of the students' families.

Talents Unlimited Theory

Modern cognitive theories focus on thinking skills and cognitive processes. The talents unlimited theory made significant achievements in providing more details about the individual differences in the thinking process and methods of creativity including the following thinking talents:

Figure 1 Examples of talent areas that teachers may refer to when using the talents unlimited model

The Talents Unlimited Model

Talent Area: Productive Thinking
Definition: To generate many, varied, and unusual ideas or solutions and to add detail to make the ideas more interesting.
Sample Activity: Students learning how energy can change from one form to another draw/label many, varied, unusual examples of energy chains.

Talent Area: Decision Making
Definition: To outline, weigh, make final judgments, and defend a decision on the many alternatives to a problem.
Sample Activity: Students decide which famous African American included in a reading unit will be the subject of dioramas they make by weighing the choices with such criteria as information available, interest to audience, and so forth.

Talent Area: Planning
Definition: To design a means for implementing an idea by describing what is to be done, identifying the resources needed, outlining a sequence of steps to take, pinpointing possible problems, and showing improvements in the plan.
Sample Activity: Following a study of myths and misconceptions about bats, first graders develop a plan for conducting a survey about other children's attitudes about bats.

Talent Area: Forecasting
Definition: To make a variety of predictions about the possible causes and/or effects of various phenomena.
Sample Activity: As students first learn about the 14th Amendment during a study of their state's history, they are asked to predict many, varied possible effects of the ratification of the amendment.

Talent Area: Communication
Definition: To use and interpret verbal communication to express ideas, feelings, and needs to others.
Sample Activity: Following a field experience to measure the circumference of trees in their schoolyard, students compose math word problems that make comparisons between the sizes of those trees and the sequoia tree they just read about.

Talent Area: Academic
Definition: To develop a base of knowledge or skill about a topic or issue through acquisition of information and concepts.
Sample Activity: Students read from a variety of sources about political candidates in a local election, making notes of the main ideas.

Within the scope of this theory, Taylor presents a three-faceted model for talent development based on the hypothesis that 99% of students can be identified as above average on at least one of the six talent areas. Therefore, it is essential to give these students to develop their talents through a comprehensive educational programme. When this hypothesis was tested, it was found that 85% of grades 1-6 students fell into this description (Chissom & McLean, 1979).

Figure 2 Taylor's multiple talent totem poles

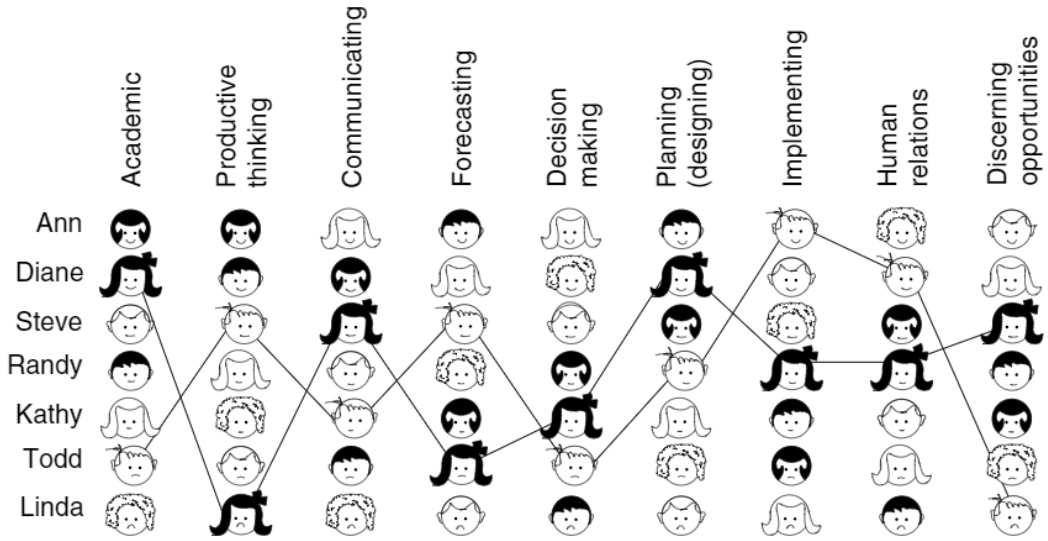

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Figure 2 illustrates the differences in the multiple talents that can be observed among children. It can be seen that such programmes as the talents unlimited can result in significant increase in the students' levels of motivation to excel and be creative. They may even encourage the students to overcome all the challenges that previously obstructed their progress, develop their individual talents, and seek originality and creativity. Or as Zhang et al (2018) stated that they would mediate the role of creativity because of the growth mind-set, creative achievement, and the absence of stereotypes.

Divergent Thinking Skills

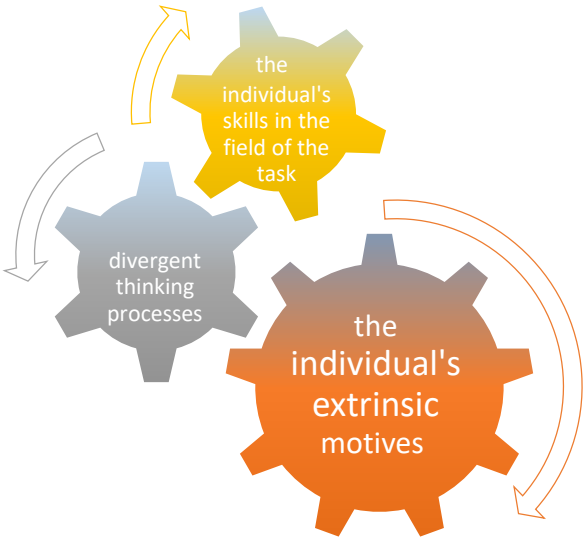
A divergent thinking skill is the ability to analyze, synthesis, evaluate, develop, assess, generalize, generate ideas, make decisions, set objectives, and think critically and coherently (Dillon & Scott, 2002, Miri, David, & Uri, 2007, Zohar & Dori, 2003). For the purposes of this research, divergent thinking skills refer to the students' performance in this area on the divergent thinking scale (Frank Williams, F.1993). Which supporting, the students to practice their skills and talents in the classroom through developmental research and exposing them to real-life problems would achieve these goals. Thinking skills programmes help build the students' personalities and increase their self-

confidence.It is this creative confidence that would improve their ability to make better choices (Alqatami, 2003). Engaging the students in investigation and searching for information enables them to connect different concepts through providing them with the appropriate resources, guided discovery, and supporting their understanding of difficult concepts which motivates them to be more creative in the future (Salari et. al, 2018).

Motivation for Creativity

This is the force that simulates individuals to engage in creativity-related behaviours and which are manifested in their performance, learning, and achieving new things (Zhang et al., 2018). In this research, it refers to the students' performance on the motivation scale that was specifically designed for this research by the author. The scale consists of 29 items divided into six areas: intrinsic goal orientation, extrinsic goal orientation, the value of learning tasks, control of learning beliefs, self-efficacy in learning, test anxiety.

Figure 3 Classification of the Motivation for Creativity Skills



The students' motivation for creativity is best represented by the talents unlimited model which provides them with important tools and strategies for developing their thinking skills and transcending their sensory barriers to adopt such practical skills such as planning, forecasting, decision-making, and communication and, hence productivity. Creativity requires the investment in the individual's thinking styles and skills, the

motivation to overcome challenges, and an environment that reduces challenges and accepts that new ideas and activities entail risks (Sternberg & Lubart, 1995).

With confidence and motivation, a creative mind-set can be transformed to a sustained motivation which would indirectly affect the individual's overt creative behaviour. Motivation is the force that compels the individual, in high purpose and value experience, to perform, learn, and achieve new things (Zhang et al., 2018). This is why contemporary frameworks focus on detect certain behaviours in the individual to assess her creativity and her levels of motivation to be creative. These views on the motivation for creativity and confidence are in line with the ideas presented in the talents unlimited model.

The researcher sought to link the motivation for creativity and the attitudes it entails (including a high-quality experience, an effective purpose, and the value that drives individuals to behaviours related to creativity that manifest in their performance, learning, and accomplishing new things). In addition, it engaged the students in different activities while working in an environment that fostered a passion for learning new things. It also fostered discovery and encouraged the students to develop new interests that would motivate them to use their skills beyond the school context and in their future lives.

SIGNIFICANCE OF THE STUDY

The significance of this study stems from that, to my knowledge, it is the only such study that focuses on employing the talents theory in enhancing the students' motivation for creativity. Most literature on creativity has focused on the patterns of learning in the two brain hemispheres and personality traits. Based on the findings of previous studies, this study attempts to answer one main question: what is the impact of talents-unlimited-theory based activities on the development of divergent thinking skills and the development of motivation for creativity among UAE primary stage students?

Aims of the study

The aim of this research is to develop a teaching programme based on the talents unlimited model. It also seeks to determine the impact of such programme on the development of divergent thinking skills and the development of motivation for creativity.

RESEARCH APPROACH

Research Method and Variables

To achieve the aims of the study, the researcher adopted the quasi-experimental approach to evaluate the effectiveness of the training programme to test the research hypotheses.

Research Tools

The Talents Unlimited Programme

The main objective of the programme is to develop the target students' divergent thinking skill and motivation for creativity. This is done through exposing the students to training sessions and experiences, and educational activities that are based on the strategies of each of the talents mentioned in the talents unlimited model.

The programme was presented to a group of reviewers, teaching supervisors, and curriculum design experts to evaluate every aspect of the programme.

About the program implementation mechanism, Table 1 shows the distribution of the lessons of the program parts over the days of the application period for the two experimental units.

Table 1 The schedule for each training session

Session number	Session title	Number of meetings
	Introduce students to the program and its importance	1
First session	(The first part of the program / Planning skill): Introduce: Definition of the primary goal of planning skill. -Planning for a school party and arrangement and invitation procedures. -Planning to organize a school trip to a tourist area. -Planning to set the basic behavioral rules in school and class. -Planning to hold an exhibition of formal arts at the school.	5
Second session	(The second part of the program / -making decision). Introduce: Definition of the primary goal of making decision skill. Making decision in the animal Zoo How to prevent visitors from feeding animals Making decision a factory suffers from various production problems, what will you do as a manager? Making decision Your friend of your friend will stand in front of the fire, you begin to burn it, decide what to do? Making decision: Your friend is bleeding in school from the nose: Decide what to do?	5
Third session	(The third part of the program / prediction). Introduce: Definition of the primary goal of prediction. Prediction about the various and varied events that could cause extinction Dinosaurs Prediction about What happens to life if the seasons of the year are similar to the winter. Prediction about: Second World War|| What could happen if Japan had won in the second world war? Prediction about: What could happen if fuel filling stations were closed?	5

Table 1(continue) The schedule for each training session

Session number	Session title	Number of meetings
	Introduce students to the program and its importance	1
Fourth session	(The fourth part of the program / communication). Introduce: Definition of the primary goal of Communication: -Students make comparisons numerous and varied. -comparisons in the form of similarity using a word. I am brave Such as I am witty just like… I am just human Such as… -Communication: Attributes and characteristics. Communication: wrote money that quotes four characteristics that you notice in both the coming things and thought about giving one reason each. Communication: Feelings and ideas During the concentration on Language is not verbal.	5
Fifth session	(Fifth Part of the Program / Product Think Introduce: Definition of the primary goal of Product thinking: Fluency: Think about adding a fourth word, which can be linked to the three words that precede it, as it becomes a well -known crossing. Words: paper, lie, flag Creativity by mobility: an idea that looks wrong to an acceptable idea, or in other words, is the use of an idea and to move from it to another new idea. Thinking patterns and seven intellectual languages, Visually, Numerically, Logically, Sequentially, Emotionally, Conceptually. Integration: The integration is between the two words, we note that we will find new ideas" glasses and pen" The glasses industry contains one of its arms on a pen….	5

Motivation Scale

The internal consistency coefficient was measured using the Cronbach's alpha equation, where the stability coefficient of the total degree was (0.79), the overall score is statistically significant at (α= 0.05).

Table 2 Stability Coefficients

	Test-Retest Reliability	Internal Consistency	Number of Items
Intrinsic goal orientation	0.83	0.77	4
test anxiety	0.81	0.80	5
value of learning tasks	0-.84	0.82	5
self-efficacy in learning	0.86	0.79	6
extrinsic goal orientation	0.80	0.86	4
control of learning beliefs	0.79	0.86	5
Total	0.86	0.79	29

The Divergent Thinking Skills Scale

For the purposes of this study, and after consulting the literature, the researcher concluded that the divergent thinking test developed by Williams (1993).

RESULTS OF THE STUDY AND INTERPRETATION

To answer the first research question (what is the impact of talents-unlimited-theory based activities on the development of divergent thinking skills and the development of motivation for creativity among UAE primary stage students?),

First, verified with this was to ensure that both research groups were compatible before the application of the training programme.

The results of the T-test (Table 3) show that the differences between the scores of the two groups the pre-measurements of the divergent thinking and motivation scales were not statistically significant at (α= 0.05). This indicates that members of the two groups were compatible in their divergent thinking skills and the different parts of the motivation scale before the implementation of the programme.

Table 3 Results of the T-test of the scores of the control and experimental groups on the pre-test

	Scale	Group	Mean	Standard Deviation	T Value	Significance
Overall	Divergent Thinking Skills	Control	56.71	17.687	- 1.17	0.24
		Experimental	62.00	10.445		
Overall	Motivation	Control	2.31	0.68	- 0.121	0.454

The data show that there are apparent significantly significant differences between the average scores of the two groups that can be attributed to the programme.

Table 4 Performance of the control and experimental groups on the divergent thinking skill test

Divergent Thinking Skills	Control Group		Experimental Group	
	Average	Standard Deviation	Average	Standard Deviation
Pre-test total score	**56.71**	**17.687**	62.00	10.445
Post-test total score	**57.00**	**13.17**	**85.38**	**10.042**

Table 5 Statistical analysis of the subjects' scores on the divergent thinking post-test

Contrast source	Dependent Variable	Control Group		Experimental Group		F Value	Significance at (α = 0.05)		Eta	η^2	effect size
		Mean		Standard Deviation			significance level				
The programme	The title	14.05	3.827	19.29	3.663	18.781	.000	Significant	.582	.339	Medium
	Details	10.38	5.869	16.05	4.260	11.030	.002	Significant	.493	.243	Medium
	Originality	15.95	5.670	22.71	4.808	15.178	.000	Significant	.550	.303	Medium
	Flexibility	4.62	1.284	10.95	0.805	344.605	.000	Significant	.950	.902	large
	Fluency	12.00	0.000	18.10	1.609	288.608	.000	Significant	.940	.883	large

This statistical analysis reveals that:

There is a statistically significant difference between the mean scores of the control and experimental groups on the divergent thinking pre-test and post-test in favour of the experimental group.

The activities of the talents unlimited model had a big effect on the development of the students' flexibility and fluency as ETA-squared value reached 0.950.

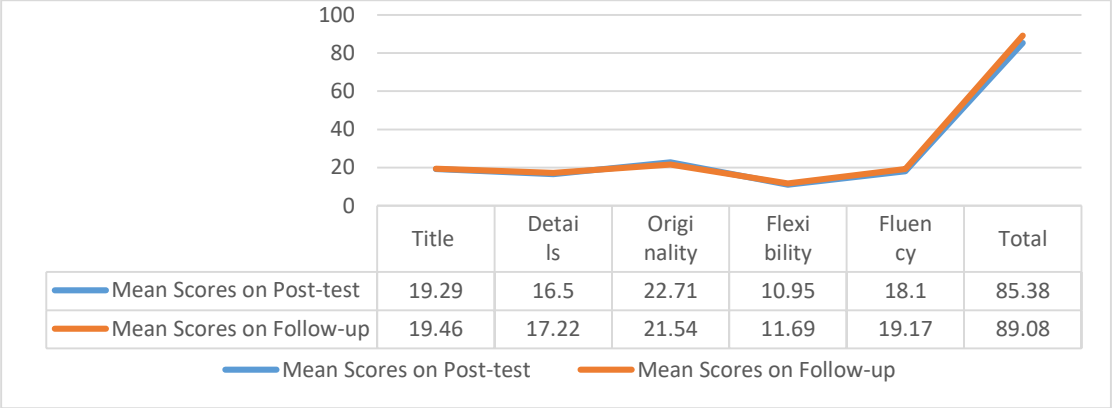
Table 6 eta-squared values and the effect size of the motivation test

Contrast Source	η^2	Effect Size
The programme	0.1444	Medium
	0.2401	Medium
	0.0625	Medium
	0.1089	Medium
	0.1936	Medium
	0.1444	Medium
	0.2401	Medium
	0.0625	Medium
Total	2.63 0.4	3.47 0.43

Table 6 shows that there was a positive effect of the programme and the students' scores on the post-test reveal that there are statistically significant differences between

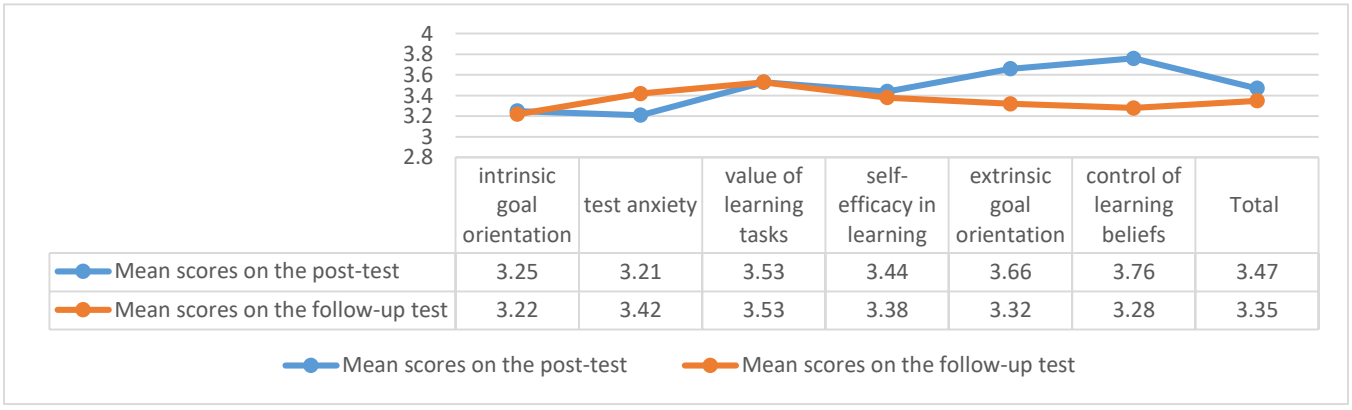
the control and experimental groups on all aspects of the motivation test (intrinsic goal orientation, extrinsic goal orientation, the value of learning tasks, control of learning beliefs, self-efficacy in learning, and anxiety).

Figure 4 A comparison between the mean scores on the post-test and follow-up test of the creativity scale of the students in the experimental group



	Title	Details	Originality	Flexibility	Fluency	Total
Mean Scores on Post-test	19.29	16.5	22.71	10.95	18.1	85.38
Mean Scores on Follow-up	19.46	17.22	21.54	11.69	19.17	89.08

Figure 5 Comparison between the mean scores on the motivation post-test and follow-up test of students in the experimental group



	intrinsic goal orientation	test anxiety	value of learning tasks	self-efficacy in learning	extrinsic goal orientation	control of learning beliefs	Total
Mean scores on the post-test	3.25	3.21	3.53	3.44	3.66	3.76	3.47
Mean scores on the follow-up test	3.22	3.42	3.53	3.38	3.32	3.28	3.35

The sustained impact of the programme can be attributed to the comprehensive nature of the programme and its activities that gradually increase in difficulty some of which also challenge the students enough to stimulate them. In addition, the activities were designed for implementation in the regular classes in line with the findings of many studies that have demonstrated the effectiveness of such strategy.

The programme specifically included activities that matched the students' interests through linking these activities and projects to the students' personal and social lives. The activities were designed as real life tasks that provide the students with varied opportunities for discovery in the form of challenges, stories, issues, and puzzles that would intrigue the students enough to seek information about the topic (Aljughaiman, 2018).

DISCUSSION

The data collected for this study shows that the activities of the talents unlimited programme had a positive effect on the divergent thinking skills and motivation for creativity of 6th year students in the experimental group.

In addition, the programme had a significant positive impact on the thinking skill of the subjects of the study indicating that the programme is suitable for the Emirati context. This supports claims that is the model has proven its effectiveness worldwide (see for example, (Aldahan, 2013; Aldilimi, 2005). As a result, I propose that the programme is implemented in the regular classes and with all students not all only those identified as gifted.

This is because the programme provided the subjects of the study with the opportunity to engage in effective, real-life tasks that stimulated their interest and motivation. The findings of a study conducted by Zhang et al. (2018) suggest strongly that intrinsic motivation is closely linked to creativity.

Another factor that contributed to the positive impact of the programme is that the students were challenged. Students competed to present their ideas orally or in writing including writing reports and messages. Some students showed great skill in delivering speeches, conducting interviews, and writing. Moreover, the diversity of the activities enabled the students to express their interests and motivated them to be creative. This is in line with the findings of a study that found that intrinsically motivated students produced more creative poems (Amabile & Gryskiewicz, 1989), and another that demonstrated that students who were intrinsically motivated to engage in certain learning activities showed long-term excellence (Conti et al., 1995). This is because students who achieve the pleasure of freedom and are self-motivated to learn are characterized by intense focus and enjoyment (Csikszentmihalyi, 1993 and 1996).

RECOMMENDATIONS

Based on the results of the study, I recommend that further studies should focus on the implementation of the talents unlimited model as part of the school's regular curriculum.

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The Implementation of Gifted Education in Indonesia

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ABSTRACT

Indonesia is one of the countries in the world that emphasizes the importance of educating gifted children, as shown by the implementation of numerous gifted programs over the past few decades. However, each country is unique in developing these programs, especially Indonesia, known for its diversity. This narrative review aims to identify and summarize: (a) the approaches Indonesia uses to develop and implement gifted education programs and (b) how gifted education is executed.

Articles were identified through Garba Rujukan Digital (Garuda), a publicly available repository explicitly created to identify registered Indonesian published journals. Screening and eligibility check was carried out on the abstracts followed by the full-text papers to choose which articles are included in this study.

A total of 25 articles were included in this study out of 122 records identified, while the other 97 records were duplicate, irrelevant, or incomplete in terms of full-text availability and explanations. Four keywords are consistently mentioned when discussing the approaches to gifted education in Indonesia: acceleration, differentiation, inclusion, and enrichment. Various gifted education programs are implemented at the kindergarten to the high school level, targeting academic (e.g., extracurricular programs, specialized module development, interactive learning models, etc.) and non-academic talents (e.g., establishing sports talent schools, character education teaching, etc.). An important point that is repeatedly discussed in the literature is that each school has its method of educating gifted students.

Based on this review, it can be concluded that the implementation of gifted education in Indonesia is well on its way to achieving its ideal state. To accelerate this process, each party involved needs an equal understanding of the essence of gifted education in Indonesia so that the issue of the diversity of approaches and methods can be thoroughly discussed.

KEYWORDS

Indonesia, learning methods, gifted education, narrative review

INTRODUCTION

Indonesia is one of the countries that recognize the importance of gifted education. Indonesia views gifted children as national assets that need special attention because of their potential to encourage the improvement of Indonesia's future in various aspects (Nashori, 1994). In line with the prior statement, Indonesia understands that if gifted children are not provided with specific assistance, a variety of challenges can occur, including negative self-concepts (Firosad, 2019), underachievement (Amin, 2009; Hastini & Rustam, 2014), absenteeism, or even dropouts (Amin, 2009).

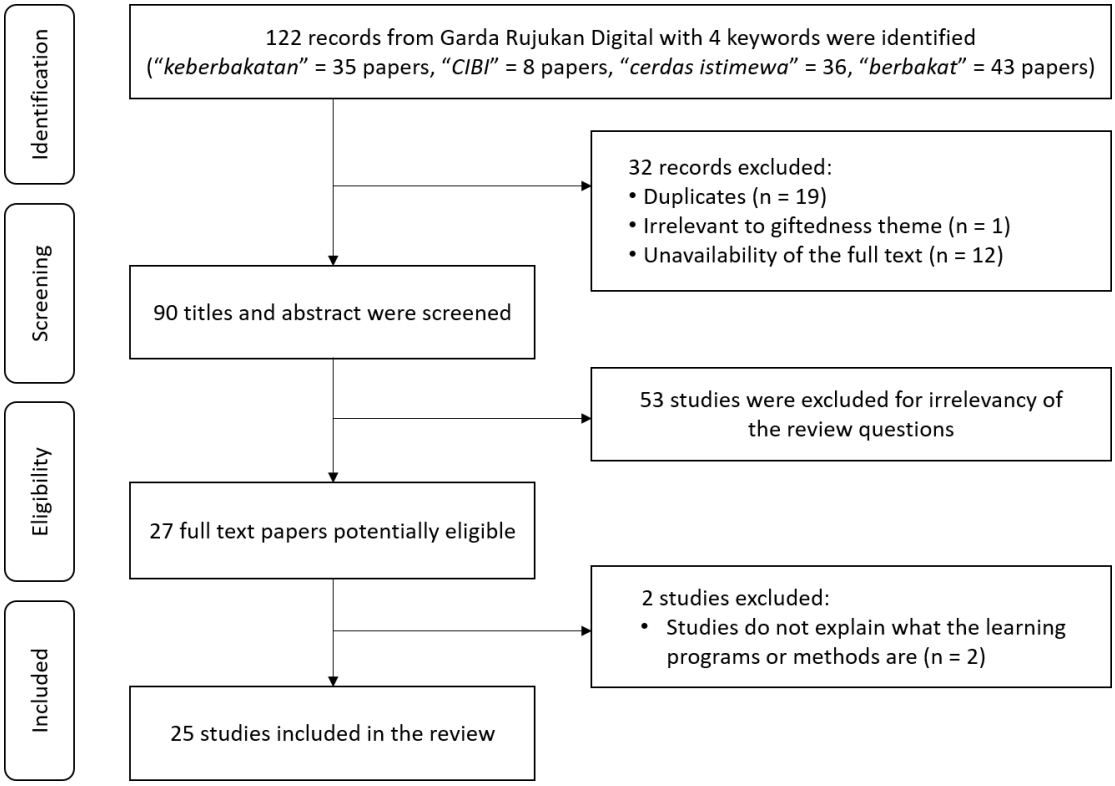
Indonesia has its uniqueness compared to other countries, especially in viewing and providing education for gifted children (Suherman, 2014). There are many factors to be discussed in understanding gifted education in Indonesia. First of all, Indonesia is the fourth most populous country globally, with 273 million people (Worldometer, 2022) and more than 45 million of them being students (Central Bureau of Statistics, 2020). These students also come from various ethnic groups spread over more than 300 islands (Akbar-Hawadi, 2010). In addition, socio-economic issues also affect gifted education in Indonesia (Nashori, 1994; Suherman, 2014). As discussed in this paper, Indonesia's diversity will significantly affect the implementation of gifted education.

This narrative review aims to explain the uniqueness of Indonesia in implementing gifted education by linking the existing literature with the diversity of Indonesian culture through identifying and summarizing (a) the approaches Indonesia uses to develop and implement gifted education programs and (b) how Indonesia executes gifted education.

METHODS

This narrative review used a search strategy to explain how we identified relevant journal articles according to the research aim presented in Figure 1. To specifically address publications unique to Indonesia, we identified published journal articles through Garba Rujukan Digital (Garuda), a publicly available repository explicitly created to identify registered Indonesian published journals. This literature search was carried out from July to October 2021 using four keywords about giftedness in the Indonesian language, i.e. '*keberbakatan*' (giftedness), 'CIBI' ('*Cerdas Istimewa Berbakat Istimewa*'; giftedness and talentedness), *'cerdas istimewa*' (gifted students), and '*berbakat*' (gifted). At first, we identified a total number of 122 records. After excluding 32 records because of duplicates, irrelevant themes, and unavailability of the full text, we screened 90 titles and abstracts; only 27 articles were considered eligible to be checked thoroughly. After reviewing the full texts, we decided to exclude another two studies because they were irrelevant to our research aim.

Figure1. Flow diagram of this study.



RESULTS AND DISCUSSION

This section presents the 25 articles included in this narrative review according to the two research objectives.

Approaches to developing and implementing gifted education programs in Indonesia

Four keywords were consistently mentioned or discussed implicitly when referring to the approaches used to develop and implement gifted education in Indonesia, i.e., differentiation, inclusion, acceleration, and enrichment. Differentiated instruction is learning that considers students' differences and acknowledges their needs to choose an education option that suits their level of readiness, interests, and learning profile (Amin, 2009). Thus, 'differentiation' is a term that is frequently used to discuss the importance of special education for gifted students that differs from general education (Nashori, 1994).

Unfortunately, differentiation is often misunderstood as exclusivity; hence, it is essential to include inclusivity when discussing differentiation (Suherman, 2014). Differentiation does not equal one teacher teaching only one student despite paying attention to students' individual characteristics (Amin, 2009). In fact, this approach can

be executed by integrating gifted education into regular classes by offering gifted students several learning options or special treatment (Amin, 2009; Arini, 2012). Other models, i.e., the provision of special schools or classes, have drawn criticism because they seem exclusive and elite, leading to social jealousy (Arini, 2012). Although there are various opinions against the exclusivity that can arise from special programs for gifted children, ideas state that the provision of special programs is necessary (Firosad, 2019). Nonetheless, as a democratic country, Indonesia needs to provide ideal educational services for all children so that gifted education must also reach gifted and disadvantaged children (Suherman, 2014).

Educational differentiation can be achieved by modifying the curriculum, for example, by accelerating the delivery of learning materials (Firosad, 2019). This modification is commonly referred to as acceleration. Gifted students may have mastered the subject matter before being taught because they have more advanced learning abilities than others (Firosad, 2019). If gifted students are forced to study material they already have mastered, they can experience boredom, leading to more significant problems (Amin, 2009). Accelerating the students' study duration is one of the recognized efforts to help provide adequate and appropriate gifted educational services (Suherman, 2014).

Another way to modify the curriculum is through enrichment. Students may get enrichments in two ways: vertical enrichment is done by deepening and mastering certain subjects, while horizontal enrichment is done by expanding their knowledge with additional lessons (Arini, 2012).

Execution of gifted education in Indonesia

Indonesia has made various efforts to organize gifted education since 1974 (Zakakalana et al., 2017), starting from incidental programs (Busono, 1995) until more and more programs are officially explicitly held for gifted children. The diversity of Indonesia, especially in organizing gifted education, can be seen through the selected articles presented in this paper. Empirical studies were conducted at various levels, namely at the preschool level (e.g., Makmun, 2017), primary school (e.g., Suherman, 2014; Mardiah & Rofiah, 2018; Suryawan et al., 2017), junior high school (e.g., Munawaroh et al., 2015; Wabula et al., 2018), and high school level (e.g., Arini, 2012; Hastiani & Rustam, 2014; Sariningsih et al., 2017; Wulandini, 2016). Based on the place of study, studies were conducted in Java province (e.g., Arini, 2012; Mardiah & Rofiah, 2018; Munawaroh et al., Usodo, 2015; Sariningsih et al., 2017; Wabula et al., 2018) or outside of Java (e.g., Hastiani & Rustam, 2014; Makmun, 2017; Nur'aini & Sasongko, 2020; Suryawan et al., 2017; Wati & Martiani, 2020, Zakakalana et al., 2017).

Special education for gifted Indonesian students is held in various forms, ranging from segregative to integrative models (Suherman, 2014). There are three ways in which gifted education in Indonesia can be held, i.e., through special schools, special classes, or integrated with regular classes but with unique treatments (Firosad, 2019). A recent example of organizing a particular gifted school is the establishment of '*Sekolah Keberbakatan Olahraga'* (SKO) or a gifted sports school that serves as a great alternative educational path for students with exceptional talents in sports. At SKO, students still receive compulsory subjects such as mathematics or civic education and get elective subjects in particular subjects where they can deepen their talents in certain sports (Huda et al., 2016). The implementation of special sports education units was inaugurated by the Ministry of Youth and Sports and the Ministry of Education and Culture through a memorandum of understanding on 27 October 2013 (Zakakalana et al., 2017). There are many particular sports subjects that talented students can participate in at SKO, e.g., taekwondo (Nur'aini & Sasongko, 2020) and kick volleyball (Wati & Martiani, 2020).

Special classes in the form of acceleration classes were the most common form of gifted education until 2014. One of the challenges of holding special classes with an accelerated approach is to condense the duration of the study and condense the material by selecting essential materials (Sujinah, 2012). Unfortunately, the implementation of acceleration classes at that time was still limited to to condensing the duration of study only, without any differentiation strategies to make it more engaging for the students, leading to stress and boredom of the students (Sujinah, 2012; Wulandini, 2016). In response, experts have begun to propose various models of differentiated learning and enrichment programs to be applied to accelerated classes, e.g., unique learning models in specific class subjects (e.g., Hastini & Rustam, 2014; Makmun, 2017; Murtianto et al., 2013; Sariningsih et al., 2017; Sujinah, 2012), specialized module development (e.g., Jauhari et al., 2013; Pribadi et al., 2015), enrichment programs (e.g., Arni, 2012; Mardiah & Rofiah, 2014; Rizky, 2015; Suryawan et al., 2017). Mixed with the debate about the exclusivity of this type of special treatments, Indonesia officially stopped the acceleration classes in 2014 (Jaya, 2020).

Indonesia now generally applies a gifted education model integrated with general education. One way to realize this integration model is through a semester credit system where students can do grade skipping by taking classes above it for specific subjects (Jaya, 2020). This credit system is similar to the accelerated class model, but there are differences in the recruitment system (Wabula et al., 2018). Through an integrative system like this, gifted students can get educational services that meet their needs to learn effectively and differentially and experience education in an inclusive

setting (Suherman, 2014; Wabula et al., 2018). An example of this model can be seen in schools that apply a gifted learning model in which all students learn together, whether considered gifted or not, but are given a choice to study for a shorter duration or participate in various activities to enhance their talents (e.g., Suherman, 2014).

In addition to the academic and sports programs already discussed, Indonesia also attaches great importance to the personal-emotional aspects of gifted children. Busono (1995), as an education expert, proposes some training to develop a positive identity as the base for the development of student creativity, for example, training students' openness to ideas and independence. Some schools implement character education in the learning process of gifted students, for example, teaching the character of hard work through group assignments or teaching self-confidence by providing opportunities to answer teacher questions in class (Munawaroh et al., 2015).

Last but not least, it is essential to underscore that each school has its method of educating gifted students. The emergence of various models of educational services at the operational level occurred due to the regional autonomy policy, which handed over authority to each school to design education for its students (Ishartiwi, 2009). For example, although special classes were the hallmark of the implementation of special education before 2014, several schools provide an integrated service between gifted and regular education (e.g., Mardiah & Rofiah, 2014).

CONCLUSIONS

Our review suggests that the implementation of gifted education in Indonesia is well to achieve its ideal state. To accelerate this process, each party involved needs an equal understanding of the essence of gifted education in Indonesia; so that the issue of the diversity of approaches and methods can be thoroughly discussed. We suggest conducting further research to investigate specific opinions regarding giftedness in different parts of Indonesia to determine whether the education of gifted children in Indonesia can be seen generically or whether it is necessary to accommodate the existing cultural diversity. This knowledge can help stakeholders evaluate which education service programs are appropriate for various areas. It is also required to provide education about gifted education programs equally in all regions in Indonesia.

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A Study on the Effectiveness of High School Gifted Students Participating in Leadership Associations

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ABSTRACT

Facing the fast-changing modern society, schools and society have the responsibility to develop the leadership potential of gifted students and provide them with opportunities to learn leadership skills. Gifted education should cultivate gifted students with the ability to lead themselves and then others. The purpose of this study is to explore the impact of high school gifted students' experience in participating in service-learning community activities on leadership development and to analyze the relationship between students' participation in community activities and leadership development from the process of service-learning activity design, participation and development. This research adopts a case study, using multiple sources of evidence and multiple data collection methods, to study the current situation of high school math and science gifted students participating in service-oriented associations. Data analysis includes case interview records, reflections, service logs, and activity plans and results reports, which are checked through the four indicators of "observation", "execution", "solidarity" and "influence." Findings are as follows:

1. High school gifted students' participation in service-learning activities is positively correlated with leadership development. Participating in service-learning activities can improve various leadership qualities of high school students.
2. In terms of observation, students can specifically observe the needs of others, maintain social care and sensitivity, as well as observe the life around them, and find problems in life.
3. In terms of unity, they can focus on teamwork and interpersonal interaction. Learn to effectively apply social resources, use their strength to work together with like-minded partners, learn to see each other's characteristics through teamwork, and understand others and themselves at the same time.
4. In terms of execution, students can act in practice. They can propose solutions and solve problems through self-practice. They can solve problems.
5. In terms of influence, students can exert a transformative power to affect the lives of others around them.

Based on the findings, the researchers put forward relevant suggestions on the leadership development of high school gifted students' participation in service-oriented student associations for reference in subsequent teaching and research.

KEYWORDS

Math and Science Gifted Student, Leadership

PREFACE

In the face of rapid changes in modern society, schools and society have the responsibility to develop the leadership potential of gifted students and provide them with opportunities to learn leadership skills. Gifted education should cultivate gifted students with the ability to lead themselves, and then lead others, as well as to be led Ability. Paragraph 1 of Article 19 of my country's Current Appraisal Measures for Physical and Physical Disabilities and Talents explains that the term "superior leadership skills" referred to in Article 4, paragraph 5 of the Special Education Law refers to those with excellent planning, organization, communication, coordination, decision-making, those who have outstanding performance in handling group affairs. Item 2 states that the leadership competencies specified in the preceding paragraph are excellent, and the criteria for identification shall be by the following subparagraphs:
1. The score on the leadership competency test or the leadership quality scale should be within two standard deviations of the mean or above the 97 percentiles.
2. Observed and recommended by experts, scholars, instructors, parents, or peers, and attached with specific information on leadership qualities and outstanding performance.

Therefore, in addition to the evaluation criteria of the leadership ability test and the leadership quality scale, it is also necessary to attach the specific data of each outstanding performance of the file evaluation, supplemented by other relevant data such as tests and interviews, and comprehensive research and judgment are fair.

In the process of learning at various stages, gifted students often inadvertently show some leadership characteristics, and they are often easy to become leaders of a group and become group leaders. However, the current orientation of high school gifted students in academic disciplines is not It is easy to have the opportunity to receive suitable leadership gifted education programs, resulting in academically gifted students with leadership skills, whose leadership skills are easily buried and unknown, and their potentials cannot be used by society. Therefore, most high school students currently choose to participate in student self-government organizations or student associations to obtain other diverse learning opportunities based on their sexual orientation.

This research uses multiple case studies, using multiple sources of evidence and multiple data collection methods, to explore the current status of high school gifted students participating in service-oriented clubs. Based on case interview records, reflection experiences, service logs, activity plans, achievement reports, etc., the data is analyzed through the four indicators of "observation", "execution", "solidarity" and "influence". nuclear. This paper further explores the impact of gifted students' participation in service-learning club activities on leadership development and analyzes the relationship between gifted students' participation in club activities and leadership development from the design and development process of high school gifted students' participation in service-learning curriculum activities.

DEVELOPMENT OF LEADERSHIP THEORY AND SERVICE-LEARNING THEORY

Research on leadership skills

Sorting out the perspectives of scholars at home and abroad, it is generally believed that leadership is in a social group, influencing other individuals to engage in certain activities in a non-coercive way, and the interaction between groups, through various methods, effectively exerts influence and achieve group. The goal, the process of mutual interaction, can be a single action or a process. The development and trend of leadership theory and research in recent years have developed different definitions due to the different backgrounds of each era. This research integrates the perspectives of Bryman (1992) and Robbins (1994) on the classification of leadership theories, and is briefly described as follows:

1. Trait Theories: Trait Theories emphasize internal traits and take personal traits as the main factor for successful leadership.
2. Behavioral Theories: Behavioral Theories emphasize the mode of leadership behavior of leaders, and the more representative ones are authoritative, democratic, and laissez-faire. The interaction behavior and process between leaders and members are regarded as the main factors of task success.
3. Situational Theories: the most famous of which is the "contingency theory" advocates including F.E.Fiedler, R.J. House, V.H. Vroom, and P.W. Yetton, W.J. Reddin, P. Hersey, and K.H. Blanchard; their distinction There are "path-goal theory", "normative contingency theory", "three-dimension theory" and "situational theory of leadership" (cited in Luoyu Village, 1995)
4. New leadership approach: Combining the first three leadership theories, developing the way of leadership, not only emphasizing the importance of leaders but also the effectiveness of the leader and the organization, to achieve successful leadership with mutual trust and cooperation with members.

Theories related to service learning

Service-learning is a kind of experiential education. Through planned arrangements, structured design, and reflection after experience as the center, on the one hand, the service needs of the service recipients can be achieved, and on the other hand, service participants can be promoted. of learning and development. Six core characteristics of an ideal service-learning program or curriculum: collaboration, reciprocity, diversity, difference, experiential learning-based, social justice-focused Drawing, leading a group of students to complete the implementation of the project together, experiencing the symbiotic relationship between service and learning, based on "learning", echoing Dewey's view of experiential education learning - learning by doing, and practicing Kolb's experiential learning style theory, By participating in the interaction between students and the real environment, by participating in the design of service experience courses, and reflecting and giving feedback after the real experience of the service project, the gifted students' critical thinking ability and leadership ability in group cooperative learning has been improved as a whole.

PARTICIPATION, STUDY DESIGN, AND IMPLEMENTATION

Research structure

The purpose of this study is to explore the impact of high school gifted students' experience in participating in service-learning community activities on leadership development. The course of painting and analysis of the relationship between students' participation in club activities and leadership development. This research studies the curriculum design and implementation of service-oriented associations in which gifted students participate. The teacher guides participating students to reflect and give feedback by leading group interactions and topic discussions, integrating group dynamics into curriculum design, guiding students to actively perceive problems, and increasing the number of groups. Interaction opportunities empower cadres to empower, review and give feedback through implementation and mutual frustration experiences, and finally, through review and sharing of students' service experience learning process, empower and promote the internalization of service value and personal growth.

Research objects and research tools

This research adopts multiple case studies, uses multiple sources of evidence and multiple data collection methods, and analyzes data including case interview records, students' reflections, service logs, and curriculum activity design content and achievement reports. Execution, solidarity, and influence were examined in four

dimensions to explore the correlation between the inner experience of high school gifted students participating in service-oriented organizations as cadres and leaders and the connotation of leadership development. It also uses various data and researchers to conduct triangulation verification, supplemented by the observation of the community instructor, and integrates different information to organize and summarize, to reduce and avoid the subjective influence of researchers.

The first part of the interview questionnaire is the collection of personal background information, family social and economic background information, including gender (male and female by biological sex), whether there is club cadre experience (distinguished by whether you have served as a club cadre experience in high school) and service methods (By the way of participating in the service, it is divided into public issue service or community elderly service).

The second part includes "Service Knowledge" and "Service-Learning Development Process Experience". "Service Knowledge" includes concepts such as equality, reciprocity, cooperation, service action and commitment, and service value. "Service-Learning Development Process Experience" includes "preparation period", "service period" and "reflection and feedback period".

The third part refers to Tyree's (1998) "Social Responsibility Leadership Scale" to design the eight core values of leadership development (self-awareness, sincerity, commitment, cooperation, shared goals, respect, tolerance, citizenship, influence, and change) design Interview questions.

The gifted students who participated in this course plan as leaders, and reflect through interviews:

1. What did they do during the service-learning course plan this semester?
2. Reflect on the feelings and problems found in the process of participation.
3. Reflect on the influence and change of these experiences on yourself and others?
4. Reflect on the differences and changes of the leadership team before, during, and after the three stages of their participation?

In this research, the records of interviewing students are coded, the first code is the service method, the second code is the student number, and the third code is the initial reflection (1) midterm reflection (2) final reflection (3).

Data analysis

1. Leadership is to demonstrate individual social skills through group interaction. Student leadership is the voluntary work of students with peer groups through active participation in service- or learning-based groups. Research shows that grade, gender, family socioeconomic status, and cadre experience may all affect student leadership-related performance.

2. Through discussions with various cadre groups and consultation with professionals in the professional field, student leaders will design courses after determining the direction of activities and the conditions and availability of service objects. Co-design the semester service-learning course plan, and fully implement the service-learning plan and review and reflection.

3. During the implementation of the service-learning course, the leader and the leader team cooperate and cultivate tacit understanding, planning and communication, thinking and leadership, actual performance, correction, review, sorting, and feedback. The leadership development of students with club cadre experience is higher than that of students without club cadre experience, and timely guidance and assistance from consulting instructors can improve the development of students' leadership skills.

4. Service-learning course experience and substantial community service contributions deepen students' cohesion and commitment to team organization, deepen their inner understanding through the collaboration of cadres and groups, and confirm their value. Through experiential learning and dialogue, they can learn from changes and Get learning results.

5. Guide reflection and review promptly, so that students can fully connect with their learning experience and feelings, write service logs and reflect on their experiences, and exchange and share their learning process in the classroom. "Reflection" will affect their inner sense of the value of service. "Reflection" and "commitment", "collaboration" and leadership of gifted students all showed positive effects.

6. Through service implementation and reflection guidance, students can better feel the temperature of life, cultivate empathy and a sense of responsibility, enhance students understanding of social responsibility, and feel the power of hard work and transformation.

RESEARCH FINDINGS AND RECOMMENDATIONS

1. The results of this study found that high school gifted students' participation in service-learning activities is positively correlated with leadership development. Participating in service-learning activities can improve various leadership traits of high school students.

(1) Observation: Observe the needs of others, actively maintain social care and sensitivity, "observation" life around them, and discover problems in life.

(2) Unity: Focus on teamwork and interpersonal interaction. Learn to effectively apply social resources, use your strength to work together with like-minded partners around you, learn to see each other's characteristics from the interaction of the team, understand others and yourself at the same time, and enhance the display of personal value.

(3) Execution: Possess practical actionability, can put forward solutions and practical problems through self-practice, have the problem-solving ability, and improve self-evaluation.

(4) Influence: exert the power to change the lives of others around them, and enhance their active care for the people around them. Through continuous attempts, we will jointly solve problems and give back to society, become altruistic actors, and show the "influence" of individual life.

2. The results of this study suggest that

(1) Provide multiple service-learning opportunities, plan advanced, continuous, and serial curriculum design with creative thinking and leadership skills, and provide opportunities for mutual observation of teamwork and tacit understanding, which will help to cultivate "happy learning", a new century leader who is good at communication, courageous in taking responsibility, and brave in innovation.

(2) Provide students with a space for independent creative thinking and creative leadership. Through interpersonal interaction and care, group cooperation learning can effectively enhance students' creativity, problem-solving ability, and leadership.

(3) Create a stage for students to learn and express themselves. Through living with different individuals and cooperative learning, providing opportunities for cooperation, effective communication and learning, and displaying and demonstrating the leadership of peers or being led.

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Part D

Curriculum and Instruction

Developing Inquiry Abilities: Independent Study Curriculum-Concept and Cases Analysis

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ABSTRACT

This paper aims to explore the importance of independent study for gifted students and the actual practice in gifted resource rooms in elementary schools in Taiwan. For the special needs of gifted students, doing independent study allows them to discover the problems they are curious about in real situations, and to make further exploration and come up with resolutions. This is not only a response to the current talent development paradigm of gifted education but also a key competency for cultivating future talents. Therefore, this paper attempts to clarify the definition and scope of independent study and then discusses the role and positioning of independent study in the gifted education curriculum in elementary schools. Finally, taking the independent study cases of two elementary school gifted resource rooms, to explore the actual practice of independent study and the performance of students as a reference for the application of the integration of independent study theory and practice.

KEYWORDS

Independent Study, Inquiry Abilities

ORIGIN OF THE ISSUE

The basis of gifted education is to lead the talented students to have higher order thinking and learning performance. Their ability to solve problems, critical thinking and creative thinking (Sternberg & Spear-Swerling, 1996) should correspond the connotation and characteristics of valuing problems and thinking deeply to “inquiry ability”. Therefore, putting stress on the independent study of inquiry ability becomes common courses for the gifted education on the spot.

Many related discusses about the future talent cultivation also show the importance of independent study teaching. Its purpose is to expect students can find out problems in the real situation. As to the inquiry methods of problem design, collecting and analyzing the information and putting forward the conclusion and discovery, these are the critical abilities that the students will possess when facing to the unknown and complicated future situation (Crawford, 2000; Marx et al., 2004). Not only that, at present the promotion of Curriculum Guidelines of 12-year Basic Education stresses the cultivation and achievement of inquiry ability on the learning performance of core competency and every curriculum field. Since the curriculum guidelines linked are the current trend, it’s the teachers’ responsibilities to satisfy the demand of gifted students and the future talent cultivation. Thus, the present study tries to clarify the definition and category of independent study and then to discuss the role and position of the gifted education courses in elementary schools. Eventually through the cases of independent study among the gifted classes of two elementary schools, the researcher explores the practical approaches and the students’ performance to be the applied reference of integration of theory and practice.

DEFINITION AND CATEGORY OF INDEPENDENT STUDY

Independent study means the students autonomously proceed to inquiry learning. However, “independent” does not mean “on one’s own”. The teachers cannot completely let go (Kuo, 1993). Stephens (2017) believes that independent study include both the students’ self-choice and the teachers’ consultation. Teachers should adjust their roles to be counselors, collaborators or guides (Kuo, 1993).

The process of independent study is similar to practical experts and domain experts. The research topic sets off from interests and advantageous ability and focuses on solving the problems in real life (Johnsen & Goree, 2021; Reis & Renzulli, 2009). Results of the study are diverse and hopefully the students can be cultivated to become lifelong learners (Johnsen & Goree, 2021). According to the curriculum

guidelines of Ministry of Education (2019), the “goal” of independent study in the Curriculum Guidelines of Special Need field is to inspire the students to explore the motivations and interests, cultivate advanced thinking and the ability to solve problems. Then they can possess research competency and be willing to share experience and results of the research. They also have study reflecting ability and cultivate social responsibility to become lifelong learners who can adjust and manage to have present and future living ability. The “learning performance” of independent study includes research attitude, research concepts, thinking ability and independent research to become the indicators of independent study ability.

ANALYSIS OF COURSE CASES ON INDEPENDENT STUDY

Course cases of independent study in the present essay mainly base on the two researchers’ teaching courses and their students’ performance. Taking independent study and the students’ performance in Chinese courses, the researchers explain and explore the learning performance of inquiry ability.

Taking Interdisciplinary Independent Study Courses as an Example

This course is the sixth-grade students’ independent study taught by the first researcher, using independent method to proceed to independent study teaching. Every student in the sixth grade should complete a work of independent study. The topic of the study is the routes of light rail transit and the designed plan of the station locations. The main purpose is to combine their own interests in MRT and care about the local to carry on autonomous exploration.

Through taking the MRT in person, surfing on the official website of Mass Rapid Transit Bureau to focus on the MRT planning, searching for the related news, they explore autonomously. At that time they explore more randomly and lack rigorous process. After attending independent study course, they begin to explore more systematically. At first they keep continually inquiring, from the official planning to the residents’ pros and cons. Then they keep inquiring and excavating the consideration dimensions such as the routes of the MRT. They continue understanding this issue deeply and cohering attention. As for the research, the dimensions of the information they search are from the influence of the light rail transit on local communities, the road network of light rail transit to the survey of environmental ecology and the analysis of traffic effectiveness. They present their own opinions and suggestions through information sorted out and analyzed and they use the information to support or adjust. Not only can they show their views thickly and solidly, but they can also focus on the questions and make responses.

The clearer methods to solve problems, the stronger the motivations are due to this back and forth inquiry and research. Eventually not only do completed research reports make the students satisfy their research achievements, but they also present their results to the government agencies proactively. The students hope to devote their own effort to the society. These studies include the literacy performance, such as autonomous actions, interactive communications and social participation, satisfying the guidelines of independent study. In the meanwhile, constant inquiry and research also display the image of research literacy.

Taking Chinese Courses in Curriculum Field as an Example

The above examples are the students' literacy display cultivated in the independent study courses. Then we will use incorporation teaching course as an example to explore another image of research literacy.

This course is the fourth-grade language exploration course taught by the second researcher. It mainly explores fantasy stories as its topic, fitting the gifted students' keen and imaginary interest and characteristics toward learning language. The major goal is to make the students learn to enjoy and analyze the meaning and creative factors from the story content, to understand the worldview and authors' views then to try to further their own creative works.

The course includes story exploration and analysis, factors of inducing fantasy stories and fantasy stories creating with binary and diverse worldview. In the process of the course, the teacher and students set up the regulations of creativity and the students must learn according to them. Thus, it can meet the demand of differentiate instruction and the goal for the students' self-inquiry to advance the language learning.

Before the students' creating work, they set up the creating regulations (as given in Table 1) together according to the factors of stories (the preface of the story, the structure of the story, character design and worldview design).

Table 1 The Creative Regulations of Fantasy Stories

	No good	It's O.K. So so.	Fine. Nice.	Very good. It's too good to be desired.
Foreword of the story	The structure is unclear.	The structure is clear but it's not fit for the factors of fantasy stories.	The structure is precise and fits for the factor of fantasy story.	Structure is clear, fitting factors and creative.
Structure of the story	Not logical.	Structure is logical but it's not complete.	Structure is fit for logic.	Structure fits logically, clear and complete.
Character design	Character design is not precise.	Character design is precise but nothing new.	Character design is precise and full of novelty.	Character design is precise and breakthrough creativity.
Worldview design	Worldview design is not precise.	Worldview design is precise but it doesn't fit for the factor of fantasy.	Worldview is fit for the factor of fantasy.	The design fits for the factor and still has creativity.

This time the cases of students aim at the above regulations of the first dimension: Foreword of the story. The students proceed to the process at class is the creativity foreword. They use the regulations to self-evaluate and revise the foreword. In this case the title of students' fantasy story is: Fantasy gloves.

> *8 magic gloves appear in the earth. Any creature gets the glove will possess some special power. It can destroy the world or it can recover the world back in control again.*

Students in this case self-evaluate with the regulations. They discover that the result of the self-evaluation falls on the second level “It’s O.K..” because it is “not fit for the factor of fantasy story: It has no connection with the real world and there is no inverse worldview”. Therefore the students begin to self-revise according to the above deficiencies: (The words in “ ” are revised afterwards.)

> *“After 3000 years, because the sixth World War occur between the United States and Mainland Chins”, the earth “is going to extinct”. Eight magic gloves appear. Any creature gets the glove will have special power. It can destroy the world or it can recover the world back in control again. “However those who don’t have the glove begin to envy those who have the glove”.*

We can learn from the above deficiencies that the students can clearly find out the creativity problems and have the precise principles and directions to revise. However, the teacher and students set up the regulations together, the students still need to self-evaluate their creativity and then learn how to make creativity more precise.

CONCLUSION

The present essay tries to adopt the gifted students’ learning performance at class in elementary school to describe inquiry ability and cultivating process and images in independent and integrated independent study course. With cases of two courses, we can find that through the characteristics of interest and ability, students can initiate the inquiry motivation of learning issues, constantly inquiry and research and keep improving to make their inquiry ability display.

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Effectiveness of Note-taking on Students' Science Performance in Inquiry-Based Science Learning

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ABSTRACT

It has long been the main development goal of science education that teachers should facilitate students to learn science effectively. The 12-Year Basic Education Curriculum Guidelines also expect the students to learn spontaneously and apply their knowledge in everyday lives. However, it is just in the beginning, and most of the junior high school teachers are not familiar with them. This paper aims to examine the effectiveness of performance by taking notes under the implementation of Inquiry-based science learning model. A student was asked to explore the knowledge like scientists and to take notes when doing the experiments. This study collected one gifted student's scientific notes for a month, analyzed the content of the student's notes and found that if the student can take notes well to illustrate the purpose of the experiment, the process, the results and the acquired scientific concepts, he will learn science more effectively.

KEYWORDS

Inquiry-Based Science Learning, Note-taking, Science Performance, Gifted Students

INTRODUCTION

Conforming to the increasingly advanced technological innovations, science becomes an integral part of our life. The Ministry of Education has taken measures to implement the 12-Year Basic Education Curriculum Guidelines for Natural Science. Based on the principle of the guidelines, teachers are asked to take on a facilitator role to motivate students to become autonomous and self-directed learners (Ministry of Education, 2014). If students can be actively involved in building their knowledge, then the knowledge gained will last long in themselves. Over the past years, inquiry-based science learning (IBSL) has been widely recommended in science education. It provides an authentic student-centered environment in that students can set their own learning goals by identifying investigation questions; formulating predictions; planning and conducting investigations; analyzing and evaluating data. Despite these learning offering opportunities for science learning, there are still some challenges.

Research has indicated students are incapable of conducting scientific investigations since the processes impose a high cognitive load on them (Kraijcik et al., 1998). Scientific investigation requires a high level of cognitive knowledge, if students are not able to offload their cognitive load during learning, they cannot yield meaningful results (Piolat et al., 2005).

Note-taking is a highly cognitively demanding process and requires lots of effort on dealing with process information. Students have to decide which information to record and then organize, paraphrase, and explain it (Piolat et al., 2005). In addition, they can promote their learning outcomes by reviewing the notes (Armbruster, 2009). There has been extensive research documented that note-taking can facilitate students' academic success (Armbruster, 2009; Peverly et al., 2007). As more and more learning is happening through inquiry-based learning environments, researchers have begun to enhance the beneficial effects of taking notes in science learning. Therefore, in this study we aim to examine the effectiveness by exploring the relationship between note-taking actions and student's science performance in an inquiry-based science learning environment.

LITERATURE REVIEW

IBSL

Inquiry-based learning has been a strongly encouraging approach to teaching and learning (Anderson, 2002). In particular, multiple studies stated that this approach significantly positively predicts students' tendency interest in science schemes, motivation to learn science, and science literacy (Constantinou et al., 2018). As a result, IBSL has been broadly used in the science learning. According to the National Research Council (NRC), the process of IBSL involves several steps: identifying questions; formulating hypotheses and making predictions; planning experiments; analyzing and evaluating data; developing explanations; and communicating with others (NRC, 2012). Guided by those steps, students can achieve a better understanding of science principles that allow to connect with the experiences in their everyday life (Anderson, 2002). Moreover, it enables students to develop inquiry skills and critical thinking (Haury, 1993). When students engage in science authentic explorations, they need to comprehend the inquiry, and apply science knowledge to social issues. Empirical studies have stressed the crucial benefits of IBSL in bringing into students' scientific practices and cognitive skills (Engeln et al., 2014).

Although IBSL offers many advantages of science learning, it still imposes some challenges on students (Edelson et al., 1999). Some studies stated that students

may encounter difficulties when engaging in scientific investigations (Krajcik et al., 1998). Students will have high cognitive load during the IBSL, since the process requires lots of science content knowledge (Piolat et al., 2005). It is crucial that students have robust background knowledge in learning that they are asked to inquiry. Accordingly, this study tries to enhance the knowledge and offload the extraneous cognitive load for students simultaneously.

Note-taking

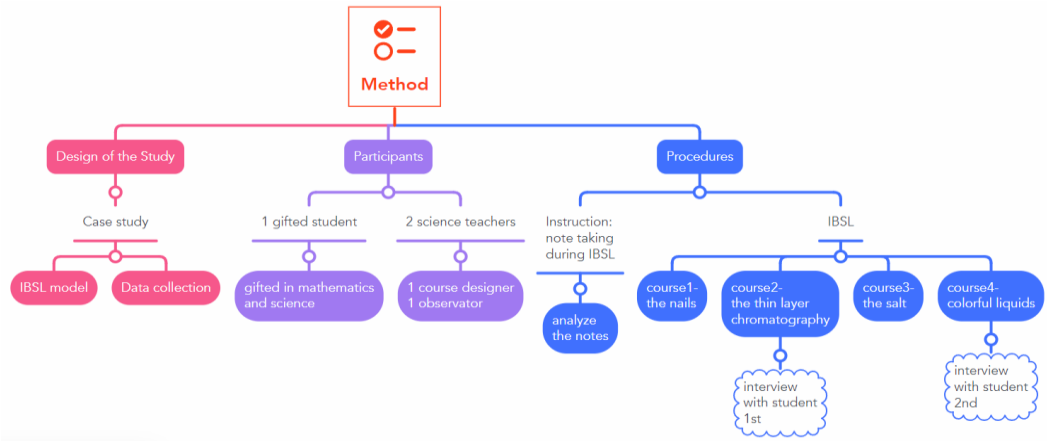
Note-taking is a significant part of classroom practice and learning strategy in the 21st century (Stacy & Cain, 2015). Research has shown that students took notes of lectures at least once a week in 54% of middle school science classes (Weiss et al., 2001). It seems that taking notes is a nearly ubiquitous academic strategy and is commonly used in class. Many studies showing the importance role of note-taking in advancing students' academic success (Armbruster, 2009). Taking notes facilitates paraphrase of instructional content into text in one's understanding (Piolat et al., 2005). As reported by Rahayu (2018), student notes can serve as a facilitator in developing science process skills. It shows that student notes can raise their deeper understanding and reflect different levels of cognitive processing, so that they can do better in class (Craik & Lockhart, 1972). Hence, the study investigates note-taking in IBSL for middle school science, and examined both the content of student notes and science outcome more comprehensively.

RESEARCH DESIGN

Design

Case study with single subject design was used, and the study implementation process is as follow in Figure 1.

Figure 1 The framework of the design



Participants

Research participants: one student gifted in math and science studying at the middle school. There are 2 researchers in the research. One of the researchers is the student's science teacher, and the other one served as the observer. The student, Ade, is a less words but more realistic student and takes relatively. high integrity of scientific notes.

Procedures

The research was conducted one month in the science class, 3 times per week, and each class lasts 45 minutes. There are 4 topics including the nails, the paper chromatography, the salt and the colorful liquids used IBSL in the science learning. The student was asked to be explored like scientists, followed the inquiry steps: orientation, conceptualization, investigation and conclusion. Discuss with other students, either at the end of the whole inquiry process or in parallel with all other phases.

Before the first course, the teacher showed some samples which the other students took during scientific inquiry. Students could evaluate the content of the notes. And then they should finish the records of their experiments or the science concepts they used to explain scientific phenomena. The students' notes show each step they took during the inquiry in science class.

The teacher checked those notes of the students, urged students to publish their scientific findings. Ade made a speech with his notes. Demonstrating a well notes that the other students could mimic, as Figure 2 and Figure 3.

Figure 2 Presentation by student

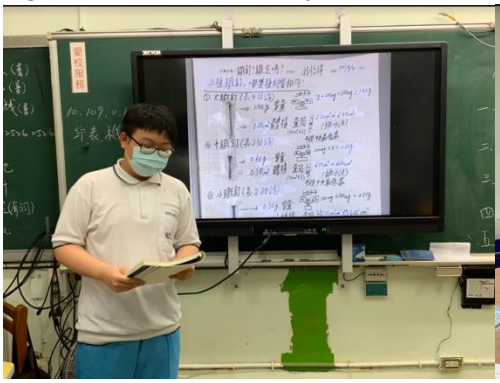


Figure 3 Discussion time between peers

The researcher interviewed with Ade to get more messages from him, not only can analyze the notes from Ade, but also can understand Ade's concepts about note-taking during the process of inquiry.

Data collection

Examine the inquiry phase from the content of notes

The instrument of the study selected the framework of Margus (2021) as the Table1.

Table 1 List of the content of notes related to the inquiry phase and inquiry ability

探究能力 探究階段	analytical skills 分析能力	planning skills 計劃與執行能力	interpretation skills 詮釋資料能力	science knowledge 科學認知
Orientation 定錨	·	·		·
Conceptualization 概念化				·
Investigation 多元探究				·
Conclusion 結論				·
Discussion 討論				·

Interviewing the student's opinion about taking notes to facilitating science learning

Questions:

i. Why taking notes?

ii. What should be the content of the notes?

iii. When do you take notes?

iv. Which subjects to take notes?

v. What characteristics should a good note have?

Questions:

i. Why taking notes in science class?

ii. Where will your science notes go?

iii. What time do you use to complete your science notes?

iv. How would you use your science notes?

v. What items do you think a good science notebook should have?

RESULTS

Reasons of taking notes

The student started using the notes in class because he wanted to write down the important points in the test which the teacher mentioned in class. After a month of the course, the student felt that taking the notes not only can record the key points of process (see Figure 4), but also can write down his reflection of the science experiments (see Figure 5). By doing so, it can be easier to control his own learning process, as he stated:

> *I think taking notes in science class can record the experiment process, so that the experiments are not just done, but can let it be more meaningful.*

Choice of taking notes

At the beginning of the course, the student took notes to record the content of knowledge only after being reminded by the teacher. However, after the implementation of the course for a month, he wrote the notes spontaneously in the class. After going home, he also supplemented new information so that he could review what he had learned during the class (see Figure 6). He noted:

> *I gradually accustomed to taking notes during class. And after class, I wrote down the unfamiliar information on it which I searched from the textbooks. This is because the notes were the significant material that I look at when I study for a test. They were my primary source, so I wanted them to be as complete as possible. And after returning back to the textbooks to find the information could help me to build up the conceptual clarification.*

Contents of notes

In the first course, the student only chose the information that he thought was meaningful to him. Observing from his notes, we can find that the contents of notes often included no complete sentences and phrases. However, after a month of the course, we can find that the student could write in sentences, add tables, charts, and even pictures. Besides, the proportion of the notes is quite appropriate (see Figure 7). He declared:

> *I could not identify what I wrote in the first class! The words were too fragmented...like jigsaw. I thought a good set of notes should not*

be taken as isolated words but completeness. Besides, I also wanted to add the chart and adjust the proportions of the notes just because by doing so could help make the notes more organized. I thought a good set of notes should not be taken as isolated words but completeness.

Figure 4 Experiment process in the note

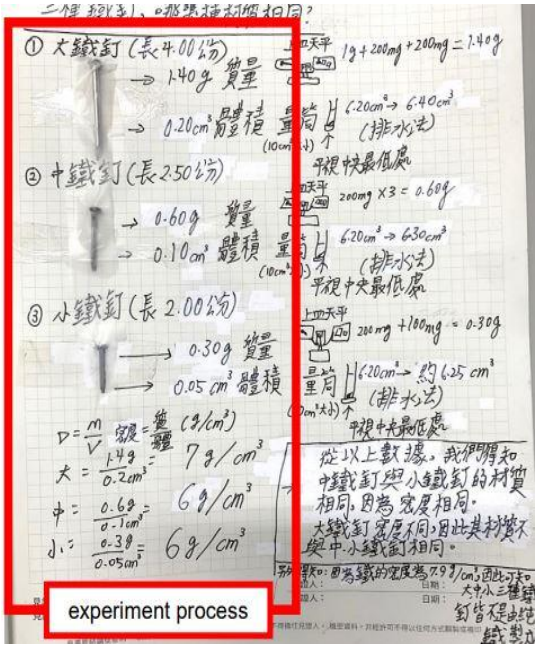


Figure 5 Reflection of students in the note

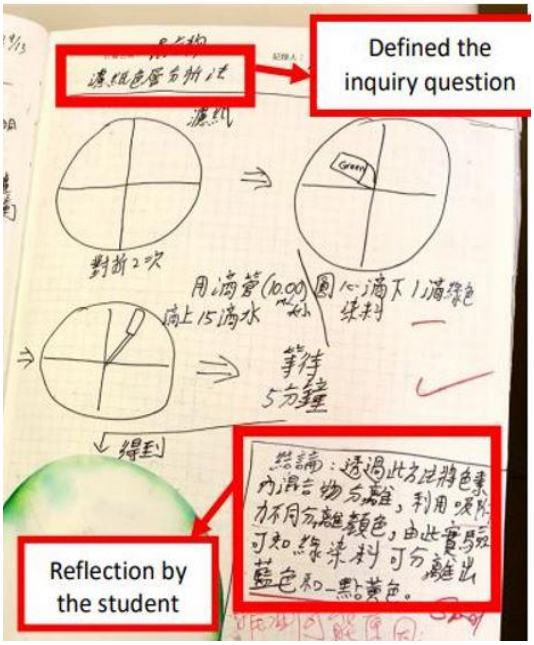


Figure 6 Table and picture in the note

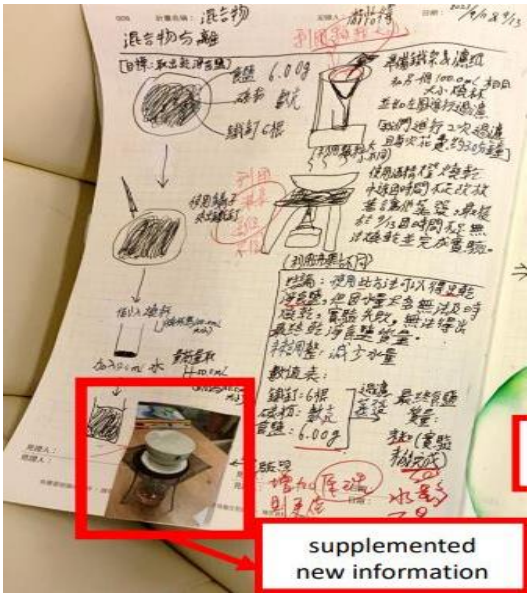
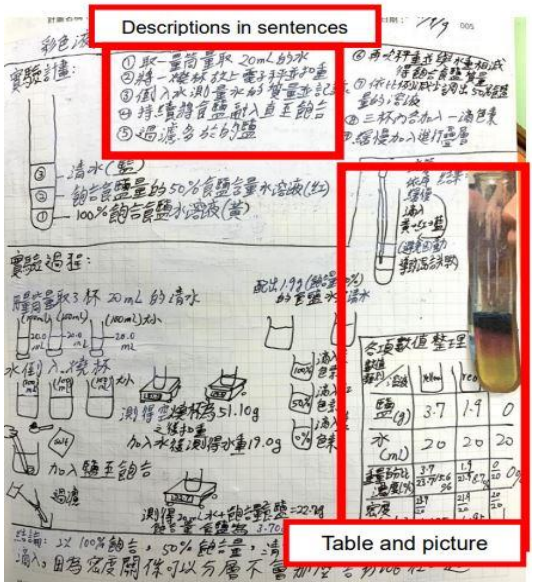


Figure 7 Supplement of information



CONCLUSION

In this study, we aim to examine the effectiveness by exploring the relationship between note-taking actions and student science performance in an inquiry-based science learning environment. In the student's notes, the content of note-taking was significantly positively associated with science performance, suggesting the benefits of taking notes on facilitating science inquiry knowledge within IBSL. That is, the function of note-taking seemed to boost performance on complex science inquiry tasks in the learning environment. These results corresponded to Rahayu's claim that taking notes can help students develop a deeper understanding of knowledge. Taking notes can also reduce the cognitive load in line with the results of Craik & Lockhart (1972).

In the future, the study objects can be further expanded, such as collecting the notes of different levels of students. Besides, teachers can understand students' misconceptions in learning by reviewing their notes, moreover to adjust their teaching in class. Furthermore, teachers can use the findings as references to design the literacy-based assessment tools.

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A Meta-Synthesis Analysis on EFL: Gifted Students

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ABSTRACT

The aim of this study is to analyze the articles written on the argumentation to find out the diversity of education techniques, the needs, the learning tools, the learning difficulties, the motivation, the teaching methods, the perceptions and the attitudes of gifted or talented (GT) students in English language learning by using meta-synthesis method. Within the scope of the study, the articles conducted since 2010, were selected in this field. In the selection of the 35 articles, but not dissertations, Google Academic search engine, TÜBİTAK ULAKBİM DergiPark, EBSCOhost-ERIC and SPRINGER databases were used. Each study was examined according to the keywords such as; gifted students, English language learning, talented students, English language teaching, English as a second language. The studies were identified in accordance with the content analysis consisting of the aim, the sample, the data collection tools, methods and the results. As a result, it was found out that most of the studies mainly used qualitative research methods by some data collection tools such as interviews and observation, furthermore the attitudes, perceptions and biases of the GT students towards language learning were positive. As samples, mostly, the participants were teenagers, aged between 11-18, and the difficulties, the technology and some language learning strategies were consisted of the subjects of the studies.

KEYWORDS

Meta-Synthesis, English Language Learning, Gifted Student.

INTRODUCTION

In Turkey, Ministry of National Education (MEB) generally aims to develop students at all levels and in all aspects in order to gain effective characteristics as well as cognitive and psychomotor skills while preparing English language teaching curriculum. However, to prepare an appropriate curriculum for GT student can be forceful because of the barriers and uncertainity of who they are, to what aspect do they learn, with which techniques the teachers could use and to what extent the language learning and teaching can be expanded.

In this study, the articles published from 2010 to 2021 were analyzed from the perspective of learning and teaching English for GT sudents. The examined articles were chosen from different databases such as Google Academic search engine, TÜBİTAK ULAKBİM DergiPark, EBSCOhost-ERIC and SPRINGER.

Being GT in Language Learning

Giftedness organizes the control and use of distinctive natural abilities, called aptitudes, in at least one ability overpowering, to a degree that rises an individual at least among the top 10% of age peers (Gagné, 2008). Some of these major abilities of being GT are being intellectual, creative, social, perceptual, muscular and motor control ay a higher level than the others.

GT education opens a road for GT students to support their potential intelligence to the highest level and inspires them to study independently. Adequate and efficient education, appropriate mentoring and tutoring, and motivation improve the potential of GT students (Demirok & Ozcan, 2016; Turalbayeva et al., 2017). Thus, it can be said that language teaching environment, tools, teachers and the curriculum are important constituents for GT students as.Moreover, they frequently intend to have a higher linguistic ability from birth, and this talent gives way them to organize the first or second language in an impressive way in comprehending, interpreting and expressing information (Yunus et al., 2013). As stated in the study of Al-Khasawneh and Al-Omari (2015) that GT students are mostly motivated to learn English. It is found out that GT students know the necessity of learning English as a second language to achieve in all of the areas since the importance of being efficient in English language (Harris et al., 2007).

In language learning for GT students, as mentioned before, utilizing a high level of different kinds of skills such as questioning, critical thinking, problem-based teaching & learning, and creativity as well as motivating gifted students to perform non-finalised activities is of great importance (Kronborg & Plunkett, 2015; Zeidner & Matthews, 2017).

Research Questions

This study aims to examine some of the basic questions as follow:

1. What are the aims of the studies?
2. Who are the paricipant groups of the studies?
3. What are the data collection tools of the studies?
4. What kind of methods are used in the studies?
5. What are the results of the studies?

METHOD

This meta-synthesis includes thematic content analysis which consists of finding out the similarities or differences among the previous studies in a specific area such as language learning and teaching for GT students.

The Criteria of Data Collection and Including Process

Content analysis consists of analysis of the different units of materials about the aimed phenomenon. In the same line of the aim of this study, Google Academic search engine, TÜBİTAK ULAKBİM DergiPark, EBSCOhost-ERIC and SPRINGER databases were used in order to examine the trends in the current studies on English language learning and teaching for GT students. The necessary data were collected through scanning the publications in the relevant databases which revealed 30 articles but not dissertations or thesis. Some of the certain keywords were used during scaning such as; English language learning, English language teaching, Gifted students, Talented students and Giftedness. The metadata of these articles were analyzed based on the criteria involving the aim, the participants, the data collection tool, the methods and the results.

Coding Process

Firstly, every detail of the studies were read and the data were tranferred to the computer. The articles were investigated according to the aim of this study and coding was formed. Additionally, in order not to lead confusing numbers, each study was coded and used like 1,2,3….30.

THE RESULTS

Table 1 The data according to the aim of the studies

Themas	Sub-themas	f
Techniques / Models / Methods	Teaching	1,6,7,9,15,22,29,30
	Learning	3,8,13,18,26
Skills	Metacognitive & Critical thinking skills	12,20
	Metacognitive & cognitive skills	10
	Language skills (reading, writing, speaking and listening)	14,21,28
Motivation	Difficulties	2,12
	Experiences	4
	Motivation	5,23,24,27
	Attitudes	9,11
	Anxiety	19
Identification		16,17,25

*Some of the studies have multiple aims.

As can be seen in Table 1, the aims of the articles examined, were categorized according to the themas such as different techniques, models an methods, skills, motivation ans identification. Most of the articles included in this study, aimed to find out the different techniques, models and method of teaching and learning English language.

Table 2 The data according to the methods of the articles

The Methods of the Articles		f
	Case study	3,5,24,26,27,30
	Contrastive	14,21
Quantitative	Experimental	20,29
	Case study	2,4,7,8,13,16,17,18,25
Qualitative	Phenomenology	11
Mixed Method		1,9,10,15,19,22,23
Literature Review		1,12,28
Analysis of Documentation		6

*Some of the articles used multiple methods.

In Table 2, the methods of the articles are categorized as; quantitative, qualitative, mixed method, literature review and analysis of the documentation. Mostly, the articles used qualitative methods.

Table 3 The data according to the participant groups

The categorization of the participants	f
Pre-school	21
Primary school	6,16,20,21,22,25
Secondary school	4,10,11,13,14,24,29
High school	5,9,12,18,19,23,27,30
University	15
Teachers / professors / experts	1,7,17
Others (non-defined)	2,3,8,26,27,28

*Some of the articles used more than one participant group.

In Table 3, the participant groups were formed according to the age of school such as pre-school, primary school, secondary school, high school, university, teachers, professors and experts, and finally the non-defined participant groups. Mostly, the researchers preferred to study with the secondary and high school students.

Table 4 The data according to the results

The Results of the articles		f
Positive	Anxiety, motivation, attitude, experiences	4,5,11,12,17,19,23,24,27
	Development of skills	3,10,14,20,21,26
	Success of the techniques, methods, models	1,7,8,13,18,15,22,28,29,30
Neutral	Difficulties in learning and teaching	2,9
	Identification & representation of the GT students	16,26
Negative	Disproportional representation	6
	Lack of resource and time	17
	Barriers for identification of GT students	25

*Some of the articles share more than one result category.

As can be seen in Table 4, the results of the articles were seperated into three categories such as positive, negatice and neutral results. Most of them found out positive results in techniques, models and methods.

Table 5 The data collection tools of the articles

The Categorization	f
Questionnaire (included the open-ended questionnaire)	1, 3,5,15, 18,19,20, 23,24, 30,4, 7, 9,29
Interviews	2,4,7,8,16,13,17,19,23,25
Tests	6,9,11,21
Observation	9,13
Others (repertory grids, written accounts, teaching strategies, maps and games)	11,12,14,22,29,15,28

*Some of the studies shared more than one data collection tool.

According to Table 5, most of the articles used questionnaires and open-ended questionnaires as a data collection tool.

DISCUSSION AND CONCLUSION

This study is a meta-synthesis which includes content analysis of the articles published from 2010 to 2021 about English language learning and teaching for GT students. The results indicated that most of the studies included the GT students from the secondary and high school which means that between 11-18 aged GT students were mostly favored as a participant groups. Furthermore, the studies on English language learning and teaching for GT students used questionnaires and interviews mostly as a data collection tool. According to the result of the study, the majority of the articles aimed to find out some of the learning and teaching techniques, models and methods. It is also seen that as a method of the studies, most of the studies were carried out by consisting methods such as mostly qualitative and mixed methods. Moreover, the results of the studies showed positive effects about the anxiety, motivation, attitude and experiences, besides, on the success of the techniques, methods and models used in learning and teaching of English language.

In conclusion, this study provided a framework for some categories in the field of GT students' learning and teaching of English language for researchers and practitioners in the related field. There is a limited quantity of such studies in the literature, this study possibily guides the further investigations.

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Enhancing the use of augmented and virtual reality in the teaching of gifted students: Suggestions for the current practice

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ABSTRACT

This research aims to determine the current technological products that teachers working in science and art centers (SAC) prefer in their teaching processes and then provide augmented reality (AR) and virtual reality (VR) recommendations for their observed lessons based on those findings. This research was conducted using a case study. In this study, five SAC teachers and one instructor from a variety of fields including elementary education, mathematics, Turkish, English, and art were observed using semi-structured forms. The average observation time for each teacher was 20 lesson hours. While observing the teachers, the effectiveness of using technology in their classrooms was also evaluated in terms of teaching, learning, and functionality, which forms the basis for AR/VR proposals. A content analysis was used to analyze the data in the research. Among the study's most striking findings was that while mathematics teachers do not often use technology, elementary education teachers often use games (Minecraft, Kahoot) and design applications (Canva). Additionally, only the elementary education teacher gives place to the AR application (quiver). According to the research, recommendations for AR/VR are made for each area of expertise.

KEYWORDS

Augmented Reality, Virtual Reality, Needs Assessment, Gifted and Talented Students, Technology in Education

INTRODUCTION

Students can explore concepts and objects in VR/AR by interacting with headsets, gloves, and motion sensors while experiencing first-person experiences while interacting with objects and concepts (Martín-Gutiérrez et al., 2017). Today, students and their teachers are using augmented reality (AR) and virtual reality (VR) applications for creating active educational environments and for assisting with the transfer of visual models into content study and application. As AR has been used in education primarily to introduce abstract, hard-to-assimilate, dangerous, and/or inaccessible information and experiences, it is proving to be a useful tool in the development of creative skills(Bower et al., 2014).

Creativity plays an important role in gifted education, as it contributes to understanding the characteristics of a gifted child (Renzulli, 1978). Besides simulating physical settings, virtual and augmented reality simulations facilitate realistic experiences, provide remote access, reduce moral or ethical constraints, and enhance creativity through imaginary, immersive, and interactive environments (Wei et al., 2015).

The objective of this research is to identify the current technological products that teachers working at intuitions for gifted students prefer in their classrooms, and to recommend AR and VR solutions based on those findings.

METHOD

Model of the Research

An exhaustive analysis of the data obtained from the data collection tools used in this study has been conducted in terms of a specific group of participants by analyzing without regard to generalization. This was accomplished through the application of the case study method.

Participants in the research

Maximum variation sampling, one of the purposive sampling methods, was used to determine the participants. An essential characteristic of purposive sampling is the selection of information-rich situations and the thorough examination of those situations (Patton, 2005). In the context of this study, five SAC teachers, one each from each of the five subject areas (elementary education, mathematics, Turkish, English, and Art) working at a SAC institution located in the Western Black Sea Region of Turkey, were included in the research. The age range of the teachers varies from 30 to 45 years old. The requirement for working at SAC institutions in

Turkey is that the applicant must have worked in the public school system for three years. As part of the application process, teachers are required to complete a form that outlines the evaluation criteria. According to this form, teachers are assigned points based on factors such as their educational status, their experience with national or international projects, art-related activities, and publications (articles, papers, etc.). Typically, applicants are ranked based on the results of this evaluation, and then they are invited to take part in the oral interview as the second stage, beginning with those who have obtained the highest score. Those who are successful at the application process are appointed to SAC institutions (MoNE, 2019). To ensure that teachers working at SAC institutions are properly trained, in-service training, seminars, and courses are organized annually for teachers based on their specialties, and at least once a year for administrators (MoNE, 2015).

Collection of data

Semi-structured observations were used to collect data. The items in the observation chart were discussed with experts in the field and used as a data collection tool after necessary revisions were made.

Implementation of the research

Implementation of the research occurred in the first semester of the academic year 2021-2022. In the beginning, the teachers were given information that their lessons would be observed. Following this, in order not to interrupt the flow of the lessons, time was spent with the students by attending the lessons of each teacher. A subsequent observation process was initiated, and the observations lasted for an average of 20 lesson hours per teacher. A number of the technological products that the teachers used were also evaluated in terms of their effectiveness in promoting teaching/learning and the functionality of their products, and this evaluation served as a basis for the development of AR/VR solutions.

Analysis of Data

The data in the research were analyzed using content analysis, one of the qualitative data analysis techniques. While presenting the current usage scenarios of teachers in regards to the use of technology, applications in terms of learning/teaching and functionality are evaluated. AR/VR recommendations are discussed separately within each subject of the observed activities. While presenting the findings, codes were given to the teachers.

Table 1 Codes for SAC teachers

Codes	Subjects
A1	Elementary Education
A2	Math
A3	Turkish Language Art
A4	English Language Art
A5	Art

RESULTS

The current state of teachers' subjects

One of the most interesting findings was that, whereas the mathematics teacher does not include any technological products in the classroom, the elementary education teacher incorporates games (Minecraft, Kahoot) and design applications (Canva) into lessons. Furthermore, it was determined that only the teacher who teaches elementary education allowed the AR application (Quiver) to be considered. The English language art teacher, however, was seen to use technology to meet foreign teachers and students in only two lesson hours with the Zoom application, and the Turkish language art and art teachers only used technology as part of smart boards during classes.

Table 2 Teachers' use of technology in learning and teaching processes and the functionality of the technologies they employ

Teachers	Examples of Observation Notes for Learning and Teaching Processes	Findings Regarding Its Functionality
A1	*The opening of the lesson is reserved for the Minecraft game* *As a class activity, the teacher asked the students to develop a poster about her local products using Canva.* *Quiver was introduced to students for the first time. Their drawings were transformed into 3D representations when they used the application to create Christmas-themed drawings.*	*Consequently, the products that are designed by the students are permanent as they will be able to reflect upon them later on.*

Table 2 (Continue) Teachers' use of technology in learning and teaching processes and the functionality of the technologies they employ

A2	-	-
A3	*No matter what subject was discussed in the lesson, the main focus was on developing students' creative writing abilities.*	*The creative writing activities were conducted on paper and pencil.*
A4	*During the two lesson hours, the Zoom application was opened on the computer and the Thai teacher was able to be contacted.*	*However, due to the nature of the meeting, it could not be adjusted for individual differences.*
A5	*With the help of the smartboard, the teacher presented photos of the natural events resulting from global warming (fires, melting glaciers, floods, etc.)*	*Even though a photographic record may not be able to convey the full impact of global warming.*

AR/VR implementation recommendations for teachers based on their area of expertise

AR/VR implementation recommendations for teachers based on their area of expertise.

Table 3 Recommendation for AR/VR implementation in response to observations' findings

Teachers	**Recommendations**
A1	*It is possible to place the scientists whom students are curious about and inspired by in the same class with the students through the use of avatars. Using glasses, students can create a product in a virtual environment while working collaboratively on the same design.*
A2	*When teaching solid objects, for example, the object that comes to the coordinate system as a cylinder can be projected onto the glass (overlapping) and matched.*

Table 3 **(Continue)** Recommendation for AR/VR implementation in response to observations' findings

A3	*There is an activity that is currently commonly used in creative writing workshops. It is in the process of forming the ending of a story or novel. Through an AR application, a character or a place can be presented to the student.*
A4	*Teacher questions designed to determine the students' prior knowledge can be enriched with AR applications at the beginning of the activity.* *With the assistance of Zoom, a meeting was held with a foreign teacher. As a result of the AR application, the foreign teacher can be seen as a model in the middle of the U-shaped table.*
A5	*Animated paintings can be created utilizing drawings on the paintings, and even theaters based on the paintings may be viewed using virtual reality glasses.*

CONCLUSIONS AND DISCUSSION

Based on the observations and findings of the study, functional implementation ideas have been developed. One of the recommendations was that students can create a product in a virtual environment while working collaboratively on the same project with glasses. Similar to the literature, it has been examined whether the use of VR and 3D prototyping in the context of project-based learning (PBL) enables effective communication, increases problem-solving skills, and impacts student outcomes (Halabi, 2020). A virtual reality headset permits a user to see and interact with different 3D worlds in real-time and on-demand, similarly to real-life scenarios (Chuah et al., 2010). Students will be able to view solid objects in a virtual environment and also be able to compare them with real-world objects, as described above. Also, the evidence suggests that learners will engage with lectures more effectively if virtual avatars are visualized in realistic settings (Gao et al., 2021). Furthermore, another recommendation was made regarding an art class which supports the finding from a study that using digital media technologies has made art creation more convenient and convenient, and new forms of expression and innovative methods of creation have emerged as a result of virtual reality (Gong, 2021).

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English Curriculum Design Combined with the Special Needs of Gifted Education

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ABSTRACT

The promotion of Taiwan's 12-Year Basic Education Curriculum Guidelines emphasizes the needs of gifted students in terms of creativity, independent research, affective development and leadership, in addition to the adjustment of subject areas. For teachers in subject areas, how to take into account the special needs of gifted students under the curriculum requirements of education is a big challenge. Through the deepening and widening design of the English curriculum, this research integrates the concept and spirit of the special needs curriculum for gifted students, and develops teaching contents and activities that are different from traditional teaching, combining environmental education issues, creative thinking strategies, independent research methods, and the process of teamwork. This curriculum also stimulates students' learning motivation and creative potential. Through the teacher's observation, interviews with students and analysis of their works, we can understand students' feelings, strategies and difficulties in learning English, their feedback on and suggestions for this course, as well as their own help and growth in the field of special needs. All of these can be used as a reference for teachers to design and adjust the course in the future teaching to English gifted students.

KEYWORDS

Gifted English Course, 12-Year Basic Education Curriculum Guidelines, Syllabus Design for Special Needs

RESEARCH BACKGROUND

The dilemma of implementing gifted education in high school English classrooms

Even in the 21st century, in the Chinese society, there is still a conventional thought that prevails: Nothing is more important than studying hard, which paves your way to the top of society. That is, most people still believe the best way to attain a higher social status is to work hard, pass tests and enter prestigious schools or universities. In traditional prestigious high schools, where exam-oriented teaching methods are

emphasized, teachers are usually faced with the pressure of exam-guided teaching and course progress, as well as the high expectations of parents and principals. It is indeed a big challenge for teachers to design courses for gifted students based on the content of the textbooks and at the same time fulfill their special needs while increasing their motivation to learn and achieving teaching effectiveness.

New challenges derived from 108 Curriculum Guidelines, or the 12-year Basic Education Curriculum Guidelines, and new education policy

After the launch of the 12-year Basic Education Curriculum Guidelines, gifted education has focused not only on the adjustment of subject areas, but also on the cultivation and development of creativity, independent research, affective development and leadership. However, because the supplementary class (the 8th hour: 16:00-17:00) can be provided only for reviewing lessons, and the morning session (7:30-8:00) is often canceled, the number of teaching hours per week is limited and it is difficult to take into account the various needs of gifted students.

The myth that gifted education and the pursuit of a diploma can never go hand in hand

Gifted students show outstanding characteristics in their language competence, including better reading comprehension skills, rich vocabulary, and greater expression skills. Their language and reading development also occur earlier than in others, and they demonstrate a high interest in learning language; they can use more advanced and complex vocabulary; they read extensively and they can do better in learning a foreign languages (Clark 2013; Gallagher & Gallagher, 1994; Nikolova & Taylor, 2003; Van Tassel-Baska, 1996). Based on these characteristics and the concepts and requirements of Taiwan's 12-year Basic Education Curriculum Guidelines, researchers have developed content and teaching activities that are different from those in standard textbooks. Through the themes in the textbooks, combined with environmental education issues, creative thinking strategies, independent research methods and the teamwork process, students are not just motivated, their learning performance and creative potential are enhanced.

Whether the curriculum design based on the integration of these concepts can be implemented in traditional gifted education classrooms, whether the gifted students' learning effectiveness can be promoted and whether the gifted students benefit from the designed course are the foci of this research.

RESEARCH FOCI

1. How to design English enrichment courses suitable for gifted students?
2. How to design an English course based on the Instruction of Gifted Students' Special Needs in Taiwan's 12-year Basic Education Curriculum Guidelines?
3. The benefits of English enrichment courses for gifted students.

METHOD

This research collects and organizes information through questionnaires and interviews to understand the effectiveness of the designed course.

Course Design

If the language courses provided by schools cannot meet the learning needs of gifted students and their thinking ability, not only will their potential be locked, but their learning motivation may also be weakened (Zeng Qifen, 2014). In addition, VanTassel-Baska (1994) believes that in order to strengthen students' thinking ability, improve their thinking level, and maximize the potential of gifted students, gifted courses must be different from ordinary ones—more open-ended activities, more opportunities to present performances, and more interdisciplinary work should be provided. The course of this research is thereby planned according to what's mentioned above and the Instructions of Gifted Students' Special Needs in the 12-year Basic Education Curriculum Guidelines, with following points mainly taken into account:

(1) Use a variety of activities to enhance students' learning effectiveness.
(2) Combine the requirements of the instructions of the special needs field of gifted students in the 12-year Basic Education Curriculum Guidelines.
(3) Design differentiated curricula based on students' characteristics.
(4) Take into account the requirements of course progress and subject content.

Table 1 Course Design Instructions

Content / Hours	Teaching Activities	The Corresponding Aspects in the Instructions of Gifted Students' Special Needs in the 12-year Basic Education Curriculum Guidelines
1st hour	**Warm Up Exercise** Watch videos related to plastic pollution, and understand the content of the videos through English Q&A. **Brainstorming** (using **Slido**) **When it comes to plastic, what comes to your mind?** Ask students about plastic-related associations and let them give their answers freely.	**Affective Development** Watching videos related to the harm caused to nature and animal life by plastic pollution will lead students to think critically. Discuss the advantages and disadvantages of plastics.
2nd hour	**How to Do Research** Explain how to conduct the research, what research spirit should be displayed, and the presentation format of the research report. **Find a partner and decide which topic to work on.** Select research topics related to plastics based on personal interests and find cooperative partners.	**Independent Research/Leadership** Guide students to develop the skills required in independent research and leadership. Distribute tasks and plan in groups.
3rd hour	**Reading Comprehension** Learn the new words, phrases and sentence patterns mentioned in the text. Appreciate the creative writing mode in the text. Think of your own research topic with a partner, and how to produce creative writing in a similar way.	**Creativity/Affective Development** Through creative writing, learn how to tell a story from multiple perspectives and standpoints. In this way, students are taught to stand in others' shoes and understand the different feelings of people and things around them.

Table 1 (Continue) Course Design Instructions

	Grammar Drills Learn how to use 12 verb tenses in English through group competition and use the 12 verb tenses in their creative stories.	**Leadership/Creativity** Sentence-making competitions based on 12 verb tenses are conducted to strengthen the understanding of different tenses through cooperation.
4th hour	**Mock Press Conference** Each group briefly introduces its research results and roughly describes its creative writing story, accepts questions from the other groups, and prepares for the presentation.	Conduct interviews to understand the research motivation, process, and creative writing stories of different groups.
5th hour	**Presentation** Groups take turns to present their reports related to the theme of plastic, along with their creative stories and the relevant posters.	**Creativity/Leadership /Independent Research/Affective Development** Groups report to and evaluate each other, reflecting on what they have learned from each presentation.

Questionnaire and interview

(1) Subjects

A total of 30 mathematically gifted students were given questionnaires and interviews after the designed course to understand their feelings and learning effectiveness.

(2) Questionnaire

The researcher designed a questionnaire according to the research purpose and course content. The dimensions of the questionnaire include students' English learning attitudes and experiences, the students' feelings regarding the course, and the effectiveness of this course.

(3) Interview

Interviews were conducted by researchers to understand the benefits of gifted students' learning experiences in areas of their special needs, including creativity, independent research, affective development, and leadership.

RESULTS

1. Students' English learning experience (overall)

(1) The importance of learning English

80% of the surveyed students think English is important because it is one of the subjects tested in the college entrance exam. 77% think it is important in communicating with people. 57% of students think English is important in cultivating a global mindset while another 57% think English is helpful in entertainment.

(2) Their preferred way of learning English

70% of the students prefer rich and diverse content, 63% favor a course that is systematically constructed, and 53% prefer lively and innovative teaching methods. From this, we can see most students care most about the content and the structure of the lesson as well as teacher's way of teaching.

(3) Their difficulty in learning English

70% of the students think they have a hard time increasing the volume of the words they learn. 47% think they have problems in English writing, and 40% in oral expression.

2. Students' learning experience of this unit

(1) Regarding whether this unit can improve their English ability, the statistical result of the Likert's five-level scale, the average is 3.7.

The benefits of this unit for English learning are increasing the number of words and phrases learned (70%), writing skills (47%), and oral expression (40%). It is suggested that students maintain a positive view of this course, and the benefits of these lessons correspond to students' difficulties in learning English. It is suggested that this unit can effectively help students improve their English.

(2) The multiple learning plans in this unit provide students with the following benefits: 80% of the students learn to cooperate with classmates. 70% realize English learning can be acquired in a variety of different ways, another 70% appreciate the chance to learn from their peers, and still another 70% learn how to effectively collect needed information. 67% of the students learn how to write a creative English story.

(3) When asked about their favorite teaching activities, 44% of the students like writing a creative English story, 33% like learning from other groups' presentations, 20% enjoy collecting information, 11% enjoy cooperating with colleagues and another 11% like designing posters.

3. The benefits of this course in improving the special needs of gifted students

(1) Creativity: Writing creative stories and designing posters can stimulate creative thinking, help students to see problems from multiple perspective, and encourage the use of images or words to express ideas. Some students mentioned that the activities of the course are helpful in speculating on their future and in increasing creativity through collaboration.

(2) Independent research: Most of the students mentioned that the course has improved their ability to collect and organize information, as well as to testify to its authenticity. In addition, some people mentioned the cultivation of their interest in doing research, enhancing their thinking ability, and sharpening their presentation skills.

(3) Affective development: Most students mentioned that this unit can improve their attitude toward and methods of cooperation. In addition, they pay more attention to social and environmental issues, and they can look at problems from diverse perspectives. They believe their empathy, confidence, courage, and communication skills as well as problem-solving skills are also polished.

(4) Leadership: This unit contains many cooperative and interactive tasks. Through the tasks, students are offered the opportunity to cooperate, with special emphasis on finding the strengths of each person, which can promote the efficiency of cooperation. In addition, by learning from one another, helping one another, and supervising one another through the experience of being a leader, students can improve their communication skills. Their observation, memory, courage, and positive attitude are also developed.

CONCLUSION

This research helps us understand the effectiveness of English enrichment courses that break away from conventional teaching and incorporate gifted students' special needs as outlined in the 12-year Basic Education Curriculum Guidelines. The researchers used the ideas and practices of gifted education to carry out innovative design of English courses. From the actual teaching experience and student performance, we can see that the students appreciate the course and their progress in English. From the students' responses, we can see clearly that students have a positive attitude towards this course and believe that this course is not only helpful for their English learning, but also for fulfilling their special needs in gifted education. As

such, the successful experience of the course demonstrated in this research has provided a model for English teaching.

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Curriculum Development of the Original English Book Reading Instruction for the Intellectually Gifted Children

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ABSTRACT

The current research attempts to develop a systematic curriculum of original English book reading instruction for the gifted children at Beijing No. 8 High School, China, which aims to cultivate students' reading literacy.

In view of the long-standing problems of insufficient English reading volume, low interest in reading and fragmented and unsystematic extracurricular supplementary reading materials of the gifted children, the foreign language teacher group of Quality Class of Beijing No. 8 High School has begun to try and explore the original English book reading instruction since 2016. After five years of practice and exploration, the study has defined the original graded reading list in grade 1-4 of the Quality Class, edited the reading log for grade 1-4 students, designed the students' learning plan of reading bibliography in class, and compiled the teaching strategies for reading the whole book of the original English reading materials. This study establishes a teaching model combining intensive reading in class and extensive reading after class, which greatly stimulates students' interest in reading, cultivates students' good reading habits, significantly improves students' reading literacy, and improves foreign language teachers' ability of text analysis and teaching of original English book readings.

KEYWORDS

Gifted Children, Original English Books, English Reading Literacy

1. Research Background and Raising Questions

Good reading literacy is an important part of the core literacy in the 21st century, an important factor related to personal development, and an important foundation for improving national quality and enhancing national competitiveness (Wang Qiang et al., 2017).

In order to improve students' reading literacy in an all-round way, the English teaching and research group of the quality class of Beijing No. 8 High school has made a variety of useful attempts and explorations. The quality class of No. 8 middle school recruits intelligent children in grade 4 and grade 5 of primary school. It takes seven years to complete the eight year course from the senior grade of primary school to the graduation of high school. It exempts the primary school graduation examination and the high school entrance examination. It breaks the strict restrictions of the original school period and saves more time and space for teaching to cultivate students' core qualities. The gifted children in the quality class have a stronger thirst for knowledge and curiosity than the normal children. However, the vocabulary of the text in the current English textbooks is small and there are many deletions from the original text, so it is difficult to arouse the students' interest in reading and thirst for knowledge. Therefore, it is necessary to introduce a large number of original reading materials into English reading class to meet students' needs for knowledge of language and information, and to provide cultural resources for improving students' reading literacy as a whole.

The revised English curriculum standard for compulsory education in 2011 stipulates that "the amount of extracurricular reading of junior middle school students should reach more than 60000-80000 words in total". However, a large number of survey data and teaching practice show that although teachers will supplement some extracurricular reading materials in teaching, the current performance of junior middle school students in English reading is far from meeting the requirements of the national curriculum standards, and the promotion of extracurricular reading is still difficult, which is specifically reflected in the following three aspects:

1) Extracurricular reading materials still mainly come from the supplementary materials of textbook topics, the total amount is not enough, and fragmented reading cannot stimulate students' interest in reading;

2) Although English reading materials are very rich, students do not know how to choose suitable materials to read;

3) Teachers lack specific extracurricular reading teaching strategies, and lack experience in the implementation of extracurricular material reading teaching.

In view of the above problems, we expect to solve two major problems in the teaching of extracurricular material reading:

First, what to teach: different from the fragmented supplementary materials, the original English reading materials bring good reading experience and stimulate students' interest in reading with their vivid topics, real language and complete language input; On the other hand, not all the original materials are suitable for students to read. Only after comprehensively considering the students' reading interest and reading level, the graded original reading list with gradual difficulty can truly solve the problem of students' extracurricular reading difficulties;

Second, how to teach: This study has developed a teaching method of combining intensive reading of original readings in class with extensive reading guided by after-school reading record manual, and explored a set of effective original reading teaching strategies in the

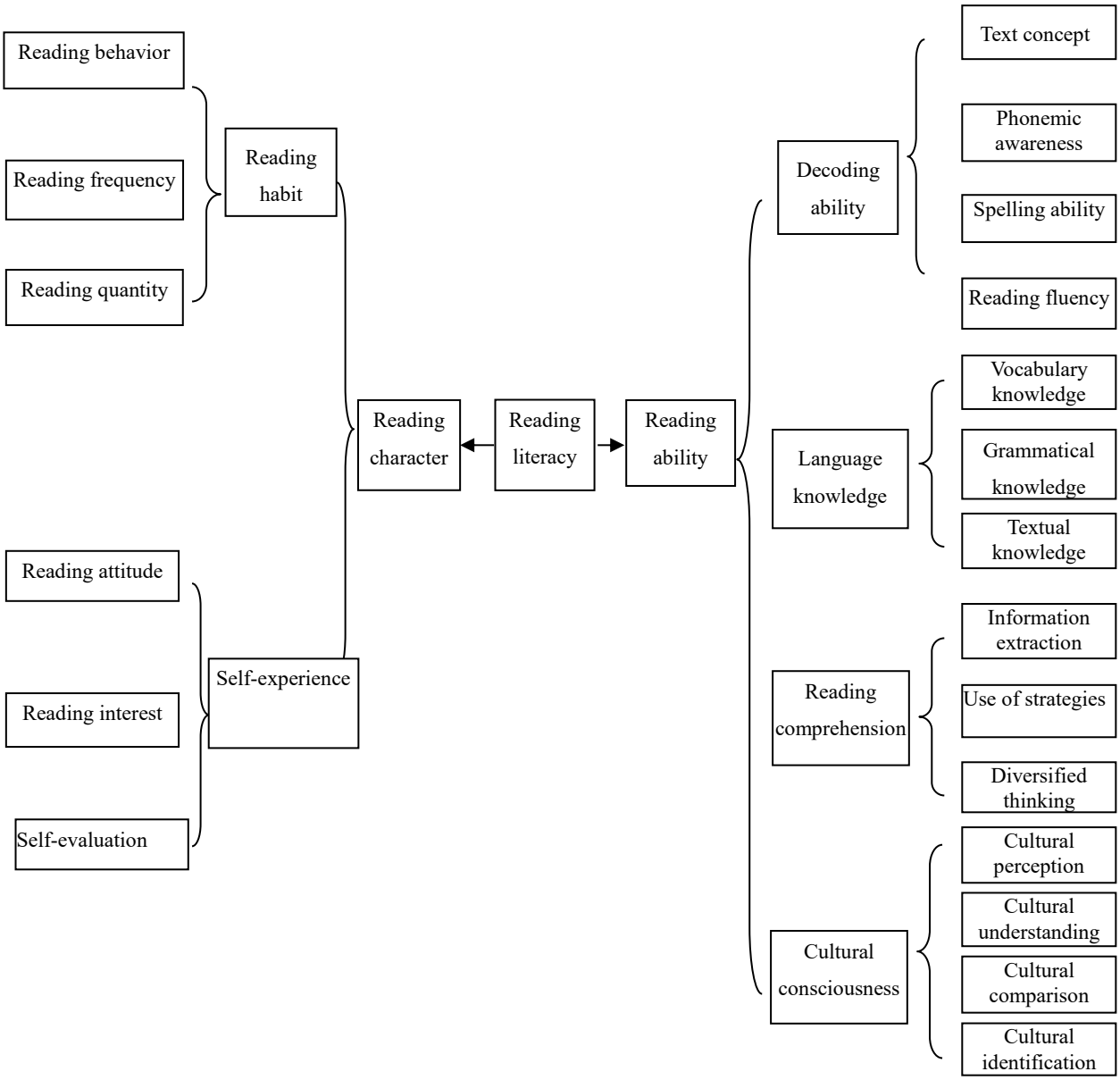
process of practice, which has promoted the professional development of teachers.

2. Research method and research process

Theoretical framework and measurement method:

Based on the framework of English Reading Literacy of Chinese primary and middle school students improved by professors Wang Qiang and Chen Zehang in 2016 (see Figure 1 below), this study can clearly measure whether the implementation of the original reading curriculum has significantly improved students' reading literacy through questionnaires, interviews and reading tests while building the original reading curriculum system. This study focuses on reading habits and reading comprehension in reading literacy.

Figure 1



The problem-solving process of this study is divided into the following stages

1) Brewing construction (2016.9-2017.7): Since 2016, the teaching of original English

reading materials has been introduced into the classroom. The four grades of the quality class have 1-2 class hours a week dedicated to the original reading. At the same time, the original reading has been included in the final examination and semester performance evaluation.

2) System development and Implementation (2017.7-2021.7):

Develop course content: determine the four-year in class original graded reading list and after-class original reading list as the carrier of course development;

Start course Co-Construction: teachers of all grades cooperate to develop the original reading bibliography, student handouts, the original collection of classic teaching practice lessons, students' after-school Reading Log, course evaluation scheme and student incentive methods.

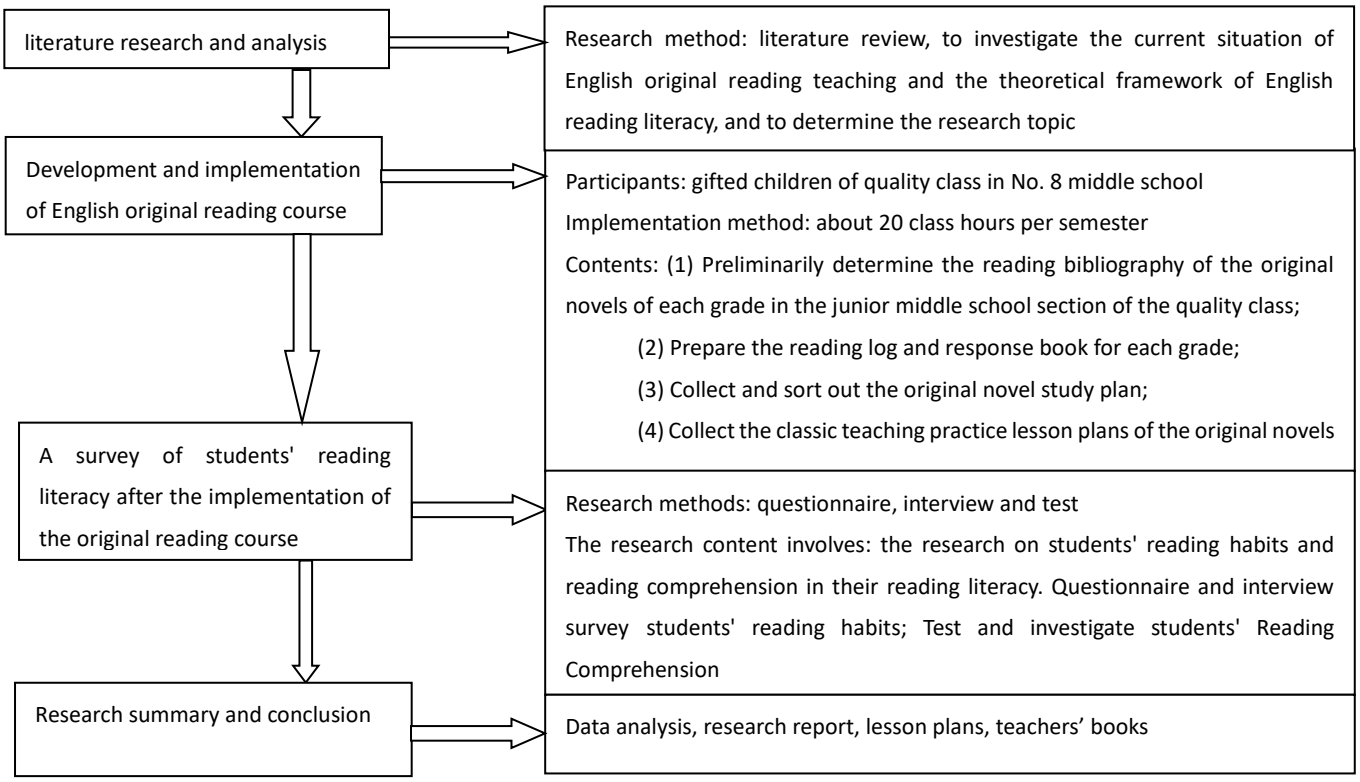
Sharing leads the teaching practice: demo lessons of how to teach the original English books will be held 1-2 times per semester, and teachers will grow together in the atmosphere of sharing and discussion.

3) Summary and promotion (from July 2021 to now):

Teachers cooperate to discuss and systematically summarize the original reading teaching strategies, students' learning strategies and diversified course evaluation methods. At the same time, share and promote in the group school.

According to the research objectives and contents of the subject, this subject will adopt the research methods of literature research, questionnaire survey, student interview, data analysis and students' writing products analysis. For the theoretical groundwork of the subject, it mainly adopts the literature research method; The change of students' reading habits is mainly investigated through questionnaires and interviews. The improvement of students' reading comprehension by original reading is mainly investigated through data analysis and students' writing products analysis. Refer the following figure 2 for specific methods and processes.

Figure 2



3. Main research foundings

First, the system has expanded the English extracurricular reading teaching curriculum. Compared with the previous sporadic original reading studies, it has creatively developed more complete, systematic and effective teaching strategies for reading original English books. The first step reading list was created. More than 10 picture books, several sets of elementary chapter books and 7 juvenile novels were arranged according to the reading difficulty to gradually improve students' reading level. The system has developed student learning plans corresponding to all the bibliographies to provide help and guidance for students' reading. It has created a teaching mode combining intensive reading in class and extensive reading after class. In addition to the original reading teaching in class, students are required to adhere to the original reading after class every day and record it in the reading record manual.

Second, it enriches the way of teaching and learning. Make full use of the rich content of the original reading materials to design various "situational" activities, so that teachers can become the organizers and guides of the classroom and promote students' in-depth learning. In a variety of reading activities, students comprehensively improve their language expression, cooperation and communication, critical thinking and other abilities.

Thirdly, it has expanded a variety of incentive strategies, such as reading bookmarks, reading star lists, book sharing workshops, etc., to stimulate students' interest in reading.

Fourth, it enriches the evaluation strategies of students' learning. In addition to incorporating the reading list of this semester into the formal final test, the evaluation of the original reading adopts the formative evaluation method. At ordinary times, students will be assigned different tasks for each book they read, such as study plan, debate, drama performance, etc. In this way, reading a book is not for examination, but to extract the essence of the book with various forms of activities, which greatly enhances students' interest in reading.

4. Effect and reflection

After four years of exploration and research, the English group of the quality class of Beijing No. 8 middle school has formed a systematic English original reading course, and more than 500 students of the quality class have benefited from the course. The implementation and promotion of this achievement has also brought some unexpected results.

First of all, the research has opened up the systematic development of school-based curriculum for school English extracurricular reading. From the initial random selection of books to the systematic consideration of the difficulty of bibliography and the level of interest in the gradual formation of the book list; From the initial random arrangement to the guarantee of two class hours per week for the original reading; From not knowing how to teach at first, to the formation of effective teaching strategies.

Then, the promotion and application of the results promote the professional development of teachers. The teacher has read a large number of original materials of youth literature, and has significantly improved the text analysis ability of the original novel. The research courses carried out by the group for the original reading teaching practice have promoted the growth of young teachers, trained a number of district backbone teachers, helped teachers from "not good at teaching" to gradually change into scholar teachers in this field, and the relevant papers written by teachers have won many awards.

Most importantly, the original reading teaching practice research has greatly improved students' reading literacy. The students' interest in reading has been greatly stimulated, and they have formed the habit of insisting on English reading. Their reading ability and level have been greatly improved. English reading is not a burden for students, but a way for students to obtain knowledge and fun. From the analysis of students' questionnaire and interview results, students' reading habits, i.e. reading behavior, reading frequency and reading quantity, have been significantly improved, and students' reading comprehension ability is also significantly higher than that of students in parallel classes in the entrance test of senior one.

However, the establishment of the original reading course system is a relatively large project after all, and there are still many insufficiently detailed places. However, we have found the right direction and will continue to improve the original reading teaching course in the next practice.

Project Based Learning Applied in Mathematics and Science Learning

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ABSTRACT

In the curriculum of mathematics and science education, there is a growing need to design activities in real-world settings that follow a specific plan and focus on the creative process rather than just the outcome. It requires students to choose strategies and make decisions for solutions in every situation they face, which is in line with the spirit of Project Based Learning (PjBL). While research regarding PjBL is bountiful, little has been done to connect this body of research with student perceptions regarding its classroom application, especially concerning authenticity and student engagement. This article is about analyzing and sharing two high school students conducting a research project on meaningful issues related to bird's window collisions in Taiwan. The purpose of this paper is precisely to allow students to naturally connect the creative activities of mathematics and science education with the problem-solving process by implementing PjBL in a real-life setting. And hope more teachers are willing to share, criticize, and give feedback to each other, to promote the development of mathematics and science education through authentic activity sharing.

This paper mainly refers to the content of PjBL activities proposed by Bell (2010), including (1) *defining problems*; (2) *discussing ideas*; (3) *designing inquiries*; (4) *collecting and analyzing data*; (5) *sharing findings* (Bell, 2010; Chen & Yang, 2019). The author also analyzes and presents how the two students (6) *seek help* when they encounter difficulties, ask new questions through (7) *creative thinking*, and then solve problems through the mathematical method. All these processes may be more precious than the results. This article also presents two students' (8) *emotions* about life, environment, or beauty. This highlights the inner meaning of this PjBL for the two high school students.

KEYWORDS

Project-Based Learning, Mathematics and Science education, Window-Collision

INTRODUCTION

Project-Based Learning (PjBL) is an active, student-centered form of instruction characterized by student autonomy, constructive investigation, goal setting, collaboration, communication, and reflection in real-world practice. It is a kind of renewed enthusiasm for approaches to instruction that emphasize the connection of knowledge to the contexts of its application. And it encourages individuals to explore and examine a variety of problems and resources to construct personal strategies for handling these problems and negotiate and share solutions. During their learning at PjBL, students are required to solve problems by defining issues, discussing ideas, designing queries, collecting and analyzing data, and sharing findings with their peers. (Barron et al., 1998; Bell, 2010; Grant & Branch, 2005; Kokotsaki et al., 2016)

In the curriculum of mathematics and science education, there is a growing need to design activities in real-world settings that follow a specific plan and focus on the creative process rather than just the outcome, it requires students to choose strategies and make decisions for solutions in every situation they face, which is in line with the spirit of PjBL (Fisher et al., 2020; Kokotsaki et al., 2016; Lavicza et al., 2018). Many teachers considered the development of students' knowledge and understanding of mathematics and science, and 21st-century skills as important objectives of PjBL in mathematics and science education (Viro et al., 2020). While research regarding PjBL is bountiful (Guo et al., 2020), little has been done to connect this body of research with student perceptions regarding its classroom application, especially concerning authenticity and student engagement (Bowen & Peterson, 2019).

Authentic activities relate the problem-solver to the problem and only apply to situations in which the student can place the problem within a meaningful context (Bowen & Peterson, 2019; Kramarski et al., 2002). The purpose of this paper is precisely to allow students to naturally connect the creative activities of mathematics and science education with the problem-solving process by implementing PjBL in a real-life setting. And hope more teachers are willing to share, criticize, and give feedback to each other, to promote the development of mathematics and science education through this authentic activity sharing.

“Don't let life fall from the window lattice” PROJECT

The author guides two high school students to conduct research on interesting and meaningful issues in their lives. One of the students recalled there was a window collision between the French windows at the front door of their house five years ago, and he was very sad to find that a cute little life died on the spot. When his family installed sunshades on French windows to keep the room cool from direct sunlight, there hasn't been any window collisions in five years. Therefore, the two students decided to explore the bird-window collisions in Taiwan, hoping that through this research project, one of the most beautiful creations (birds) made by God could continue to fly in the sky.

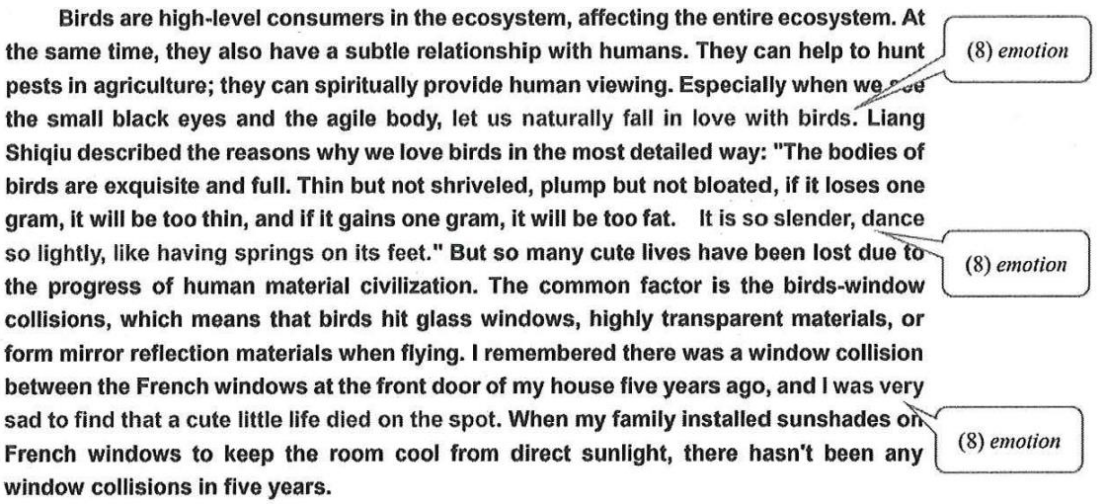
This paper mainly refers to the content of PjBL activities proposed by Bell (2010), including (1) *defining problems*; (2) *discussing ideas*; (3) *designing inquiries*; (4) *collecting and analyzing data*; (5) *sharing findings* (Bell, 2010; Chen & Yang, 2019). The author also analyzes and presents how the two students (6) *seek help* when they encounter difficulties, ask new questions through (7) *creative thinking*, and then solve problems through the mathematical method. All these processes may be more precious than the results. This article also presents two students’ (8) *emotions* about life, environment, or beauty. This highlights the inner meaning of this PjBL for the two high school students. The eight aspects above do not occur linearly during the research process but are intertwined with each other to form a "plane" of the development process. Elements such as beauty and art, for researchers, produce a living "field" connected with the ecological environment, which is in line with the educational connotation behind STEAM (Lavicza et al., 2018; Liao, 2016; Mann et al., 2011; Perignat & Katz-Buonincontro, 2019; Platz, 2007).

The two high school students first searched the literature to gain a preliminary understanding of the current domestic and foreign research on window collision. The research on bird-window collision in Taiwan has just started, while the aspects of foreign research on window collision include "bird's vision", "bird habits", "window material", "building height", "environmental field", "seasons", "light damage", "habitat"...etc. They selected bird vision, building height, and the number of households as the main research variables, and deeply explored the relationship between the three variables and the number of bird-window collisions. The contents of the work descriptions of two high school students are quoted below, and a small part of the research process is shared. The above eight aspects are used to analyze students' growth process implementing PjBL, correspond to the mathematics application and learning through PjBL under STEAM education.

Emotions about the ecological environment and the beauty of life

Two high school students have strong feelings for birds. From the contents of the quotation from the two students' work, you can feel the motivation of the two high school students to carry out PjBL because of their emotion for the bird's life. They found that it is possible that small action could save such a lovely life. The author observes that through this project, the two high school students are more caring and loving their life.

Figure 1 Emotions about the ecological environment and the beauty of life

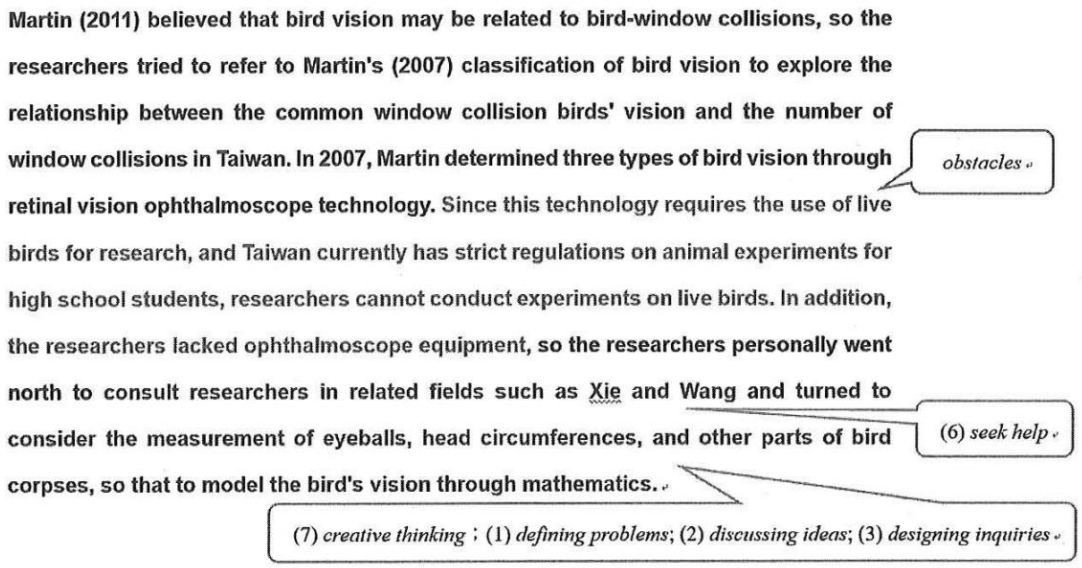


If at first, you don't succeed, try, try again

Small changes in creativity after seeking professional help

Two high school students encountered great difficulties in the research process of "bird vision". First, the window collision birds studied abroad are different from the local window collision birds in Taiwan, so foreign data cannot be directly quoted. Second, high school students cannot use living birds for research. The two high school students did not give up and they persevered and sought assistance from domestic experts in the field. They considered switching from studying "live birds" to studying "dead birds"; and using mathematical knowledge of ellipses to simulate bird vision, to analyze the relationship between different bird vision and the quantities of bird-window collisions. The author observed that the love of the two high school students for the beauty of life has transformed into a spirit of not being afraid of difficulties, and stimulated various creative ideas to solve problems.

Figure 2 Overcoming obstacles through seeking help and creative thinking



Prior experience in mathematics plays an important role. When students find that in the absence of equipment, mathematical simulation becomes the most reasonable way. The ellipse knowledge that students have learned in high school mathematics courses naturally overcome the shackles at this time. The creative idea of two students simulating a bird head with an ellipse naturally experiences the practicality and power of mathematics.

Figure 3 Ellipse sphere simulates bird head and equatorial plane

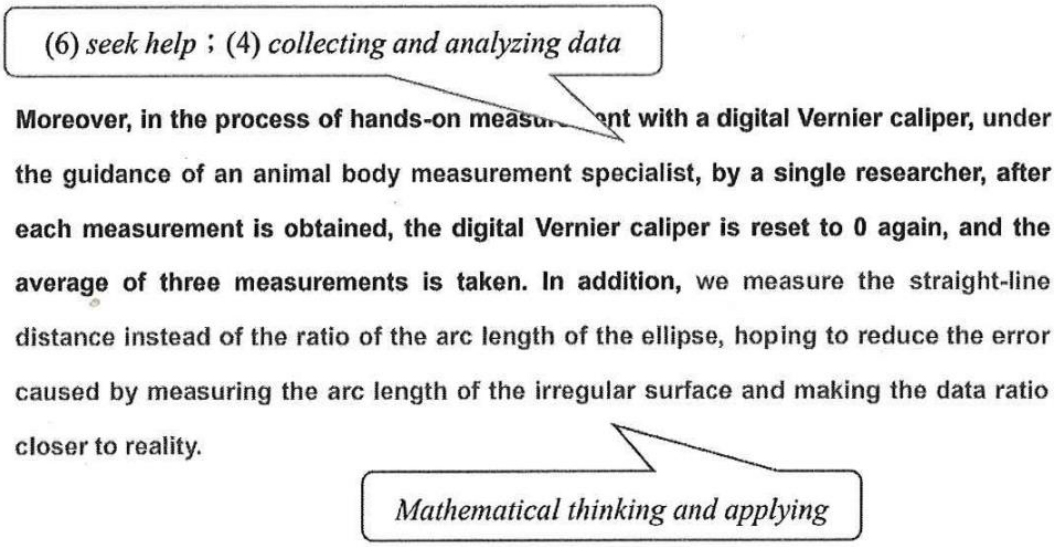
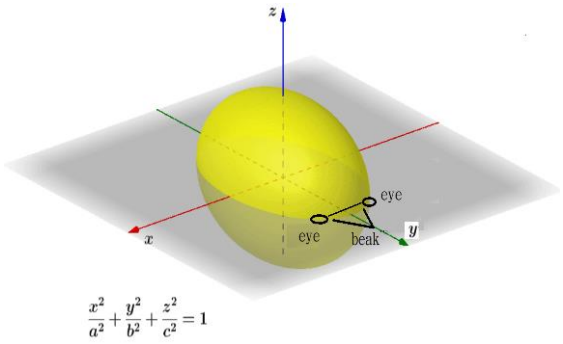
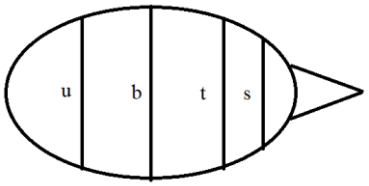


Figure 3 (Continue) Ellipse sphere simulates bird head and equatorial plane



$$\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$$



(1) b : ellipse minor axis

(2) s/b < t/b Represents a wider range of binocular vision

(3) if u = t, ratio u/b = 1 + t/b

Summary of the strategies used by two high school students in the implementation of PjBL, including:

(1) defining problems;

(2) discussing ideas;

(3) designing inquiries;

(4) collecting and analyzing data;

And there are more than two creative ideas:

The first part is switching the study from "live birds" to "dead birds"; The second part is using ellipsoids to construct 3D coordinates to simulate bird vision, overcoming the limitations of research ethics and the lack of professional equipment.

Figure 4 The process of hands-on measurement with a digital Vernier caliper, under the guidance of an animal body measurement specialist

Lead to more interesting questions and interests, which will become the basis for future research directions and the selection of university departments.
During the research process, the two high school students got more interesting questions and expressed to the author that in their future university, they hope to develop in relevant departments and continue their research, which brings the author great feedback, more than any award.

Figure 5 Lead to more interesting questions and interests

(1) When we simulated bird vision, we divided the birds' vision into three intervals and conducted a variance analysis. The results were not significant. Although there are differences between the simulated bird vision and the real bird vision, the analysis results should be interpreted carefully, but these results show that in addition to the visual field, other reasons for bird-window collisions may need to be considered in detail, such as the habits of birds when chasing prey and flying, the ability of birds to perceive artificial objects, the role of other senses in birds, and so on. On the other hand, the data showed that the proportion of accipiter trivirgatus was 0.503, the proportion of sparrows was 0.497, and the proportion of swallows was .4601. What makes it special is why the ratio of the inner eye distance to the head width of the sparrows and swallows, two common birds in urban areas, is so close to that of the raptor, the accipiter trivirgatus? Is there any evolutionary implication? Or just a tectonic coincidence? It is worth exploring further.

(5) *sharing findings*；and leading to more interesting questions

CONCLUSION

This article summarizes and shares a small part of the process of two high school students in the implementation of PjBL, and presents examples of mathematics and science education applications in real life. The author deliberately highlights that it is natural to evoke students' experience of beauty, and their love, and care for the ecological environment in solving real situational problems. Mathematics is a powerful helper currently, helping students build models outside the real world, and analyze logically. In the process of guiding the students, the author really felt that to

conduct this small research related to bird's life, although they encountered many difficulties in the process, they still persevered in finding ways to solve the problems, and then stimulated creative adjustments or changes. The whole wonderful journey is filled with all kinds of love, beauty, friendship, resilience, and perseverance.

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Part E

Social-Emotional Adaptation

A Study on the Data Analysis of Research Literature on Family Parenting Styles of Gifted Students in Taiwan

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ABSTRACT

This study analyzed the research literature on the family parenting style of gifted students in Taiwan in recent years, summarizing the influence and trend of family parenting style on the learning of gifted students. The data analyzed were from 2000 to 2021 and the database included domestic doctoral dissertation, master thesis and academic journal articles. Sources included NCL Taiwan Periodical Literature, National Digital Library of Theses and Dissertations in Taiwan and Airiti Library. Key words were gifted, gifted and talented, parenting and family upbringing.

After precluding non-empirical research, 13 papers were eligible, consisting of 7 professional journals and 6 dissertations. After deducting duplication of dissertations and journal publications, a total of 11 empirical research papers were formally used for analysis. This article then summarized the domestic research literature on the parenting styles of gifted students in recent years in terms of "educational stage", "research method", "research tool" and "research results." Findings were as follows:

1. Regarding the achievement motivation of gifted children, two literatures showed that when parents treat their gifted children in a democratic, open and caring way of parenting, their children will feel more love, encouragement and reasonable requirements, so they have a strong pursuit of achievement and perfect performance.
2. In terms of emotional intelligence, two studies have showed that parenting styles not only shape their children's personalities, but also establish their children's behavioral patterns, and indeed affect their children's emotional intelligence development.
3. In terms of leadership skills, a study indicated that there is indeed a correlation between the parenting style of gifted students and leadership skills.

The results of the study showed that different parenting styles were associated with the achievement motivation of gifted students, that advising teachers to strengthen the promotion of parenting education.

KEYWORDS

Gifted Student, Parenting Styles

INTRODUCTION

The domestic research on family parenting styles is very diverse, and for the nurturing and development of gifted students, the relative impact of family environment factors is also a topic worthy of attention. Terman's long-term follow-up research on gifted students found that the achievement of gifted students is closely related to their parenting style. Good parenting is a good foundation for the future development of gifted students（Li Ming Sheng,1972）. This article will analyze the research literature on domestic parenting styles of gifted students recently, and explore and summarize the impact and trends of family parenting styles on gifted students' learning. The purpose of this study was as follows:1. Learn about the current status of parenting styles for gifted students and the parenting styles of talented students with different background variables.2. Understand the impact of parenting styles of gifted students on the academic performance and potential development of gifted students. Finally, summarize the findings and results of the research, put forward conclusions, and make recommendations for future teaching and research in gifted education.

LITERATURE REVIEW

Early long-term studies on gifted students tended to understand the physical and mental characteristics and development of gifted students. The research on gifted students' families was limited to statistics and surveys. There were few studies on family upbringing and gifted students（Terman,1925）. Berbe's investigation of the family background of gifted students in 1956 is a relatively early representative of family research. He found that most of the gifted parents belonged to families of middle and upper social economy, and the parents themselves were mostly well-educated. Only after that have researchers paid attention to the influence of gifted families on them（Cornell,1984）. Among them, the socioeconomic status of gifted families, parenting attitudes and methods, etc., have a profound impact on the personality, academic achievement, social adaptation, and future development of gifted children（Noller & Callan,1991）.

Foreign scholars research family upbringing and the development of gifted students. In the study section, Rudasil et al. (2013) found that fashionable parenting promotes positive outcomes for gifted children. Say, Içen, Kaplan; Içen, Mustafa (2019) found that gifted families generally hold democratic and overprotective attitudes, there is a relationship between democratic attitudes and learning quality, and that democratic attitudes improve children's learning quality. And in the social adaptation, Vassiliki Pilarinos1 and C. R. Solomon (2017) did not find an association between the use of specific parenting styles and social problems in gifted children.

WAY OF DATA ANALYSIS

The data analyzed are from 2000 to 2021 and the database includes a domestic doctoral dissertation, master thesis, and academic journal articles.

Sources include NCL Taiwan Periodical Literature, National Digital Library of Theses and Dissertations in Taiwan, and Airiti Library. Keywords are gifted, gifted and talented, parenting, and family upbringing. After precluding non-empirical research, 13 papers are eligible, including 7 professional journals and 6 dissertations. After deducting duplication of dissertations and journal publications, a total of 11 empirical research papers were formally used for analysis. All literature sources and publication years are listed in Table 1.

Table1. List of researchers who analyzed the literature, literature types, and topics

Author	Literature type	Title
Wan-Ni Chung (2005)	Thesis	A Study on the Relationships among Parenting Style and Achievement Motivation of gifted Students in Junior high school
Yuh-She Tsay Yu-Ting Chang Meng-Chen Shieh (2006)	Periodicals	The Relationship between Parenting Styles and Emotional Intelligence of the Gifted Students at Elementary Schools
Ke Liqing (2007)	Periodicals	Research on family upbringing of gifted children

Table1 (Continue) List of researchers who analyzed the literature, literature types, and topics

Chia-Ching Lai Hui-Chin Yang Ing-Cheau Sheu (2007)	Periodicals	The Case Study of Parental Experiences from a Father of a Gifted Junior High School Student in Grade Acceleration
Chi-chu Liao (2008)	Thesis	The Research on Gender-role Stereotypes and Gender-role Rearing Attitudes of the Parents of Gifted Female Students
Ling-hui Lin (2008)	Periodicals	The Study of the Family Influences on Creative and Productive Achievements of the Math and Science Talent
Yung-Yi Wu (2009)	Periodicals	The Study of the Effect of Home Nurture of the Superior Musical Talented Students to Their Musical Achievement-An Example in Eastern Taiwan
Min-ying Tsai (2010)	Thesis Periodicals	A Comparative Study on Parenting Styles and Self-efficacy of the Gifted in Junior High School with Different Types of Perfectionism
Yuan-Yuan Hu (2012)	Periodicals	The Relationship Among Implicit Theory of Creativity, Perceived Creativity, and Parents' Rearing Attitudes of Gifted-Students and General Students.
Te-Han Chung (2017)	Periodicals	A Study on Parenting Styles and Emotional Intelligence of the Gifted Students in Junior High School
Chia-Wei Tsai Yu-Fong Pan (2017)	Periodicals -2014 Thesis	A Study of Correlation between Parenting Styles and Leadership of Scholastic Gifted Students in Junior High School.

DATA ANALYSIS RESULTS

This article then summarizes the domestic research literature on the parenting styles of gifted students in recent years in terms of "educational stage", "research method", "research tool" and "research results."The overall status of family upbringing for gifted students is summarized in Table 2 & Table 3.

Table 2 A summary table of the current situation of family upbringing in the analysis literature

Author	Parenting style
Wan-Ni Chung (2005)	Democratic style is mostly adopted by parents, and the least one is permissive.
Yuh-She Tsay Yu-Ting Chang Meng-Chen Shieh (2006)	Parents who use a "democratic" parenting style and provide a supportive learning environment for their children learn well and perform well in emotional intelligence.
Ke Liqing (2007)	Generally, parents of gifted children show family upbringing traits of respecting their children's decisions.
Chia-Ching Lai Hui-Chin Yang Ing-Cheau Sheu (2007)	The father's authoritative parenting attitude dominates the parenting responsibility.
Chi-chu Liao (2008)	The parental attitudes towards gender roles of gifted female students are significantly different only by gender, which is the tradition of fathers than mothers.
Ling-hui Lin (2008)	Parents have appropriate expectations and expectations of them, providing encouragement and support, caring for and respecting their choices.
Yung-Yi Wu (2009)	Family upbringing mostly presents an enlightened and democratic way of upbringing.
Min-ying Tsai (2010)	Half of the parents of Chinese gifted students are mainly dictatorial, authoritative and enlightened.
Yuan-Yuan Hu (2012)	The creative parenting attitudes of elementary school parents are all positive.
Te-Han Chung (2017)	The parenting style received most by the gifted students is authoritative.
Chia-Wei Tsai Yu-Fong Pan (2017)	The parenting situation of the gifted students in Guozhong County is the most common use of enlightened and independent methods.

Table 3 Summary table of background variables and research results of the analysis literature

Author	Individual variable			The results of the study of related factors		
	Gender	Social Status	Birth order	Achievement motivation	Emotional Intelligence	Leadership skills
Wan-Ni Chung (2005)	*	*	*	*		
Yuh-She Tsay Yu-Ting Chang Meng-Chen Shieh (2006)	**n.s.**	**n.s.**			*	
Chi-chu Liao (2008)	*					
Min-ying Tsai (2010)	*		**n.s.**			
Te-Han Chung (2017)	**n.s.**		**n.s.**		*	
Chia-Wei Tsai Yu-Fong Pan (2017)	**n.s.**	**n.s.**	**n.s.**			*

Note. Insignificant=*, Nonsignificant=n.s.

* $p < .05$

Summary list of themes and research results of the analyzed literature. Findings are as follows:

1. Discuss the current situation in parenting methods for gifted students.

(1) The current situation of family upbringing for gifted students.

Domestic parenting methods for gifted students mostly adopt open-minded, independent, high-caring, and high-authority methods. (Wan-Ni Chung, 2005; Yung-Yi Wu, 2009; Min-ying Tsai, 2010; Te-Han Chung, 2017; Chia-Wei Tsai and Yu-Fong Pan, 2017). Relevant studies have shown that parenting styles are the most enlightened and independent, and the least hostile. it can be seen that for families of outstanding students, the enlightened and independent parenting method is adopted by most parents.

(2) Background variables of gifted students and parenting styles.

A. There are significant differences in the relationship between gender and parenting style.

The results that show significant differences between gender and parenting styles include studies by Wan-Ni Chung (2005) and Min-ying Tsai (2010)； The results showing no significant difference between gender and family parenting style include the research of Yuh-She Tsay, Yu-Ting Chang, and Meng-Chen Shieh(2006), Chia-Wei Tsai and Yu-Fong Pan (2017). It can be seen that the results of domestic research on gender and family upbringing are inconsistent.

B. Family social status is less correlated with the family upbringing style.

Only Wan-Ni Chung's (2005) study showed significant differences, there is no significant difference between other studies by Yuh-She Tsay, Yu-Ting Chang, and Meng-Chen Shieh (2006), Te-Han Chung(2017), Chia-Wei Tsai and Yu-Fong Pan(2017). It shows that most parents with gifted children in their families will not affect their parenting style due to the level of family socioeconomic status.

C. Birth order has little to do with parenting style.

The results show that there are significant differences between birth order and family upbringing, only the research of Wan-Ni Chung (2005)； The results showing no significant difference between birth order and parenting style include Min-ying Tsai (2010), Te-Han Chung(2017), Chia-Wei Tsai and Yu-Fong Pan(2017).

2. The influence of gifted students' parenting style on the learning performance and potential development of gifted students.

(1) In The section on motivation for achievement, The research of Wan-Ni Chung (2005) and Ling-hui Lin (2008) found that parents treat their gifted children in a democratic, open, and caring way, Under this parenting style, their gifted children feel more love, encouragement, and reasonable requirements, so they have a strong motivation to pursue achievement and strive for perfect performance.

(2) In The section on emotional intelligence, Yuh-She Tsay, Yu-Ting Chang and Meng-Chen Shieh (2006), and Te-Han Chung (2017) found that parental discipline is related to emotional intelligence. And democratic caring parenting style can improve children's emotional intelligence.

(3) In The section on leadership skills, Chia-Wei Tsai and Yu-Fong Pan(2017).found that there is indeed a correlation between the parenting style of gifted students and their leadership skills. Enlightened and independent parenting style and

leadership ability are positively predicted, while neglectful and spoiled parenting style and leadership ability are negatively predicted.

CONCLUSION

The data analysis results of this study show that parents treat their gifted children in a democratic, open, and caring parenting style. Under this parenting style, their gifted children feel more love, encouragement, and reasonable requirements, and thus have better overall performance. Therefore, domestic parenting methods for gifted students are more open-minded, independent, caring, and authoritative. The data analysis results of this study show that there is little correlation between gifted students of different gender, family social status or family structure, and parenting style. The changes in the modern family structure and the general reduction in the number of children have led to changes in the way parents discipline their children. The eldest son, the youngest, and the gender are no longer the same as in the past. Parents with gifted children will be more actively involved in the upbringing of their children, and their upbringing attitudes and methods will not be affected by the social and economic status of the family. Parents adopt open-minded, independent, caring, and authoritative parenting, which has a positive impact on the achievement motivation, emotional intelligence, and leadership skills of gifted students.

Therefore, schools should pay attention to the influence of parenting experience on gifted students and actively and systematically cooperate, planning parenting education activities for students and parents, and combining them with family education. Such as: setting up parent education course lectures, or issuing related publications, so that parents can understand the correct parenting style and establish a good parent-child relationship. It also encourages the establishment of parent groups to allow parents from different families to interact and discuss and share their parenting experiences. Furthermore, school teachers communicate with parents more to promote a positive attitude, so that children can grow up with a caring and encouraging parenting style.

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Everybody Can Shine: Assessment for Learning in Everyday Lessons

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ABSTRACT
Though assessment for learning (AfL) has been promoted for more than two decades, it may not be widely adopted in the classroom. One of the reasons is that assessment of learning (AoL) still dominates. Since schools are held accountable for helping students to meet standards, great importance is attached to students' learning outcomes. Despite tension between AfL and AoL, there is still a place for AfL in everyday lessons. In this essay, practical strategies to stretch students to fulfil their English Language potential will be discussed. By creating favourable conditions, recognizing students' strengths and providing constructive feedback, students actively engage with learning. This paves the way for students striving for excellence.

KEYWORDS
Assessment for Learning, Feedback, Engagement, English Language Learning

Being experts in language teaching, English language teachers in Hong Kong are used to marking most of the students' errors in writing. The intention is helping students to learn from mistakes and improve their language competence. Yet, it could be disheartening, and the learning foci can become blurred. In designing curriculum and assessment tasks, indeed, teachers should first consider both the students' strengths and learning targets, then create a positive classroom climate for students to be actively engaged in the learning process. This requires the change of mindset among teachers.

ASSESSMENT OF/FOR LEARNING (AOL/ AFL)

AoL with a purpose of reporting results is summative and norm-referenced in nature (Earl, 2003). The polarizing roles of teachers being the assessor and students being a passive recipient of marks and grades is common. Without understanding how well the progress they have made, and how to build on their strengths, students become puzzled in finding proper ways to improve. On the other hand, the top priority of AfL lies in using assessment to promote student learning (Black & Wiliam, 1998).

With the guidance and coaching of teacher, students become assessors in self and peer assessment. They understand the requirements and success criteria as well as their strengths and weaknesses better. Teacher's feedback further indicates their mastery of particular skills or concepts. Most importantly, the co-construction of meaning and co-assessing of tasks among students and the teacher take place (See Table 1).

Table 1. A comparison between AoL and AfL

	AoL	AfL
Nature	Summative	Formative
Purpose	Making judgements Reporting Producing a rank order	Creating descriptions Understanding (strengths & weaknesses of students) Progression
Teacher's role	Assessor	Co-assessor, coach
Student's role	Assessee	Co-assessor
Feedback	Marks or grades	Strengths and weaknesses of student Direction and advice for improvement

In actualizing AfL, first, it requires the change of teacher's mindset to allow flexibility in curriculum and assessment design. Teachers also need to recognize the change of roles of teachers and students, and provide ample opportunities for students to take an active role in learning. As high performers in English Language are often placed in a self-contained class in Hong Kong, provision of challenging and meaningful learning experiences for students is of utmost importance. According to the English Language curriculum guide in Hong Kong (CDC, 2017), four strategies to maximize the potential of gifted students in mainstream classroom are suggested.

FOSTERING GIFTED BEHAVIOUR IN ENGLISH LANGUAGE CLASSROOM

Strategy 1: Allowing flexibility with curriculum to address learner diversity

Developing a curriculum that encourages thinking, enquiry and self-reflection is beneficial to stretch students' potential. Diagnosis of students' starting point including competence and needs is the first step in curriculum and assessment design. Then, explanation of rubrics of each task to students enable them to understand the learning targets, then formulating their own goals. In AfL, teacher's timely and constructive feedback is provided to let students know to what extent they have achieved their goals.

Instead of picking all the mistakes students made, it is advisable to stick to the specific learning outcomes stated in the rubrics so that the feedback is well-focused. Recognizing what students have achieved, suggesting concrete ways for improvement, encouraging them to reflect and ask questions are some practical ways. Together with suggestions from classmates in peer assessment, it forms the basis for creating opportunities for students to act upon (Adamson, 2011), and leads to self-reflection and self-improvement. On the other hand, to address learner diversity, no matter in regular or self-contained class, tiered tasks with clear success criteria and multifaceted assessment strategies should be designed to stretch students' potential.

Strategy 2: Promoting original thinking

Encouraging students to identify problems and find solutions promotes original thinking. The use of marking codes in writing is one of the strategies to boost student thinking. This can also be extended to the whole class by highlighting several common errors that are related to the target language items and inviting all students to discuss. Every student becomes a detective and hammers out the ways to make modifications. Sometimes there is a heated debate over how and why to change certain words as there can be multiple alternatives. After a series of reasoning, persuasion, and rebuttals, they solve the problems and co-construct knowledge together. The beauty of such learning process is the high engagement of students in behavioural, emotional, and cognitive aspects. Behavioural engagement refers to student involvement; emotional engagement enhances interest, enjoyment, and a sense of belonging; cognitive engagement is demonstrated through students' learning process that goes beyond the minimum requirements (Fredricks et al., 2005). In this sense, self and peer evaluation as a form of feedback practice engages students with critical evaluation of their own writing and further develops their meta awareness and writer autonomy (Lee et al., 2019).

Strategy 3: Empowering student ownership of learning

Apart from adopting a whole-class approach in AfL, it is important to ensure that every student makes sense in their own learning. In writing tasks, there are seven steps to take to empower student ownership. First, explanation of assessment criteria sets the scene. After understanding the criteria, students read their previous work as well as teacher's feedback. Questions like "How well did I perform in content, language and organization domains?" and "Am I able to challenge a higher level in content?" may arise. In other words, they go through self-evaluation. Third, they do research and collect relevant ideas and language items from textbooks and sometimes the Internet to prepare for the writing task. Next, they refer to the assessment criteria again and

project their own level of performance with reference to the preparation they have made. The teacher may also negotiate learning goals with individual students (Wu et al, 2021). Fifth, they predict what level they can attain according to the task requirements and their own competence. This empowers students to "set individual goals that are specific, measurable, ambitious yet realistic; developing language learning strategies and metacognitive skills to facilitate independent learning and self-reflection" (CDC, 2017, pp. 76-77). After writing, usually ten to fifteen minutes are allocated in class for self and peer assessment against two or three major learning targets. This helps students monitor and evaluate their progress against set goals, reflect, then fine-tune their work on the one hand. On the other hand, it helps them form a habit of proofreading that many students today lack. For students who complete their task early, they have the autonomy to walk around the classroom and offer help to their classmates. Finally, teacher assesses the work and provides feedback that is sensible and encourage thinking (Black & Wiliam, 2009). Specifically, it focuses on finding where every student is in the learning progression. The continuous and ongoing learning process and progression of individuals are stressed. Furthermore, after identifying difficulties students encountered, teacher provides clear directions and workable steps to be taken to enhance learning (Berry, 2008). From the written feedback, students then know better how they perform and what to do next for improvement (See Table 2). To encourage fluency and creativity in writing, as well as autonomy, corrections can be up to students' choice of five sentences that they would like to consolidate and re-use later, instead of the customary practice of corrections of the whole piece of work. This practice can encourage students to write more without the fear of making mistakes and spending much time on doing corrections (which can be a sort of punishment from students' perspectives).

Table 2. Meta-cognitive strategies in learning

Steps of AfL in writing	Meta-cognitive strategies Berry (2008)
Understanding the assessment criteria	Planning
Reading pervious work and teacher feedback	Planning
Doing research and preparation work	Planning
Projecting own levels of performance	Planning & evaluation
Setting learning goals	Planning
Monitoring and evaluating progress against set goals; reflecting on learning & fine-tuning work	Evaluation & monitoring
Choosing essential sentences for corrections	Evaluation

In everyday lessons, students also take charge of their learning and adopt peer assessment in speaking tasks. Apart from the abovementioned steps, students give oral feedback to their classmate right after an oral presentation using PMI strategy, that is, noticing the plus, minus and interesting points of the presentation. For one thing, it facilitates students' critical thinking. For another, they become used to showing appreciation (which is relatively scarce in Hong Kong classrooms) to others. Students gradually form a habit of praising others first, then giving suggestions and sharing their discovery. By doing so in a harmonious environment, it further strengthens their emotional engagement and bond. Sometimes other assessment tools such as Two Stars and A Wish are employed to empower students to be owners of their learning and encourage positive peer interactions.

Strategy 4: Transferring learning to new contexts

To make learning more challenging and fun, providing opportunities for students to apply what they have learned in English Language lessons to authentic situations is practical. Language teachers may consider adopting inter-disciplinary project-based learning to stretch students' potential. By choosing a topic of interest, investigating and searching for solutions to an authentic issue with peers, not only do students apply what they have learnt in various disciplines, but develop generic skills, such as collaboration and critical thinking skills, and positive attitudes also. Indeed, AfL should include diversified assessments that can express the various aspects of learning such as analysis of case studies, group portfolios, self-assessment, and peer assessment, and it can involve community members as well (Tal et al., 2000; Tal & Miedijensky, 2005). Here are some examples of project-based learning on social issues that our junior secondary students did: "Making Ping Shan Heritage Trail an attractive tourist spot" and presenting their study and recommendations in front of their schoolmates and parents; "Examining water pollution in Lam Tsuen River" and writing a letter to Environment Bureau about the issue; "Development of Ngong Ping on Lantau Island" and writing a letter to Town Planning Board to make suggestions. During the process, they monitored their progress against a checklist, took advice from the teacher advisor, evaluated their performance through self and peer assessment, gave feedback to group members, and presented their findings and recommendations to spontaneous audience. The learning experience was rewarding as they were serious in learning and tried to solve real-life problems together. The reply letter from Environment Bureau was another impetus to the drive and hunger to achieve excellence among our students.

CONCLUSION

To unleash student potential, well-designed learning experiences and assessment based on student need and competence are fundamental. In view of the exam-oriented education system in Hong Kong and the deeply rooted practice of AoL, it is high time for teachers to change their mindset. By taking assessment as an integral part of teaching and learning, creating a positive classroom climate that encourages students to be actively involved in learning and assessment, and building a trusting relationship with students, the teaching-learning-assessment cycle becomes of the students and for the students.

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Experience Sharing on the Implementation of the Cope and Grow Model Through ODYLP for Music Talented High School Students

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ABSTRACT

The purpose of this study is to investigate the implementation effect of the project “On Demand Youth Leadership Program” (ODYLP), based on the Cope and Grow Model for musically talented high school students. The Satisfaction Questionnaire for participants was conducted among 16 students and 4 teachers through email. This Questionnaire was divided into two parts, a satisfaction survey and open-ended questions. The findings demonstrated that students and teachers were extremely satisfied with all project activities and courses of this program, including attending some lectures different from the classic and masterclasses, participating in the volunteer activity, engaging in leadership workshops, and planning and implementing follow-up projects in Taiwan. In the second part, the open-ended question feedback from students illustrated that they widened their perception of the world, and fuelled their eternal desire for music through this program. Furthermore, they described that after participating in this whole program, they not only experienced the power of music for helping and influencing people but also deeply understood the importance of interpersonal relationships and leadership and the value of life.

KEYWORDS

Cope and Grow Model, Leadership, Musically talented student.

INTRODUCTION

Gifted students differ from general students in terms of cognition and affect. In addition to cognitive differences that affect gifted students' personality, self-concept, and learning motivation, social-emotional adaptation exerts a great influence on gifted students’ learning adaptation and development as well (Wu, 2013; Kuo, 2000). Gifted students’ competitiveness, unrealistic self-judgment, perfectionism, social detachment and high self-expectations make gifted students more liable to feel stress than general students, which results in difficulty with social-emotional adaptation (Parker & Adkins, 1995; Silverman, 1993; Torrance & Sisk, 1997).

Therefore, stress adaptation can be considered to be one of the factors affecting social-emotional adaptation. The importance of stress adaptation can be seen in VanTassel-Baska's (1994) introduction of a variety of affective curriculum for gifted students that are mostly related to stress adaptation. From the transactional perspective of stress, there is a dynamic interaction between stressors and coping methods (Lazarus & Folkman, 1984; Selye, 1956). On the premise that individual cognitive appraisal and coping skills affect each other, appropriate affective curriculum can facilitate positive interactions between stressors and coping methods, and thus cultivate effective individual problem- and emotion-focused coping mechanisms. From the perspective of talent development, affective education also plays an important role in nurturing gifted students (Moon, 2021; Van Tassel-Baska et al., 2021). Putting too much emphasis on skill learning and ignoring the affective needs of artistically talented students will result in differences in academic development, life adaptation, and career development (Kuo, 2000; Kuo et al., in press). Therefore, exploring an affective curriculum for artistically talented students to cultivate the ability of social-emotional adaptation is crucial.

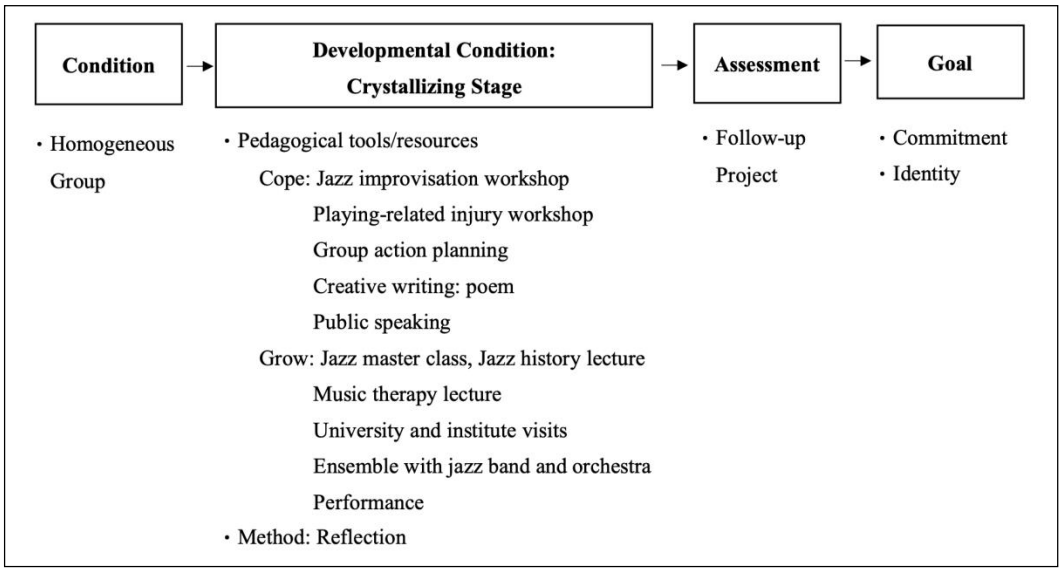
Regarding affective curricula, Dai and Speerscheider (2012) argue that an affective curriculum should focus on developing personal strengths and learning how to deal with internal and external negative influences. Considering age-related maturity and personal characteristics, educators should offer appropriate curricula that are relevant to personal interests, life topics, areas of engagement, and experiences, so that students can develop a personalized trajectory while creating individual milestones through sustained commitment and motivation. Thus, Dai et al. state the Cope and Grow Model, one of the modern social-emotional theories, which is a two-way process, and bidirectionally has an enactive and reflective dimension above the age-related talented development. This model can be divided into 4 stages (foundational stage, transitional stage, crystallizing stage, and advanced stage) and 3 conditions (homogeneous conditions, mixed conditions, and marginalized conditions), and has been proven effective in the STEM field (Dai et al., 2012; Dai et al., 2015). However, no research has been found that this model has been applied in the field of art.

Thus, the purpose of this study is to conduct a survey of participating teachers and students to examine their satisfaction with this program and assess the impact and effect on musically talented high school students after participating in the program based on the Cope and Grow Model.

IMPLEMENTATION OF ODYLP

On Demand Youth Leadership Program (ODYLP) is a youth leadership exchange program sponsored and hosted by the Bureau of Educational and Cultural Affairs (ECA) of the U.S. Department of State. In celebration of the 40th anniversary of the American Institute in Taiwan (AIT), the main purpose of this program is to promote the community engagement, social change, and international understanding of students and teachers in Taiwan and to foster youth leadership by means of music. Furthermore, music activities and social action inspire participants to cope with the opportunities and challenges of making an unwavering commitment to music. According to the three components of curriculum design (goal, method, and assessment), this program followed the decision flow of the Cope and Grow Model to generate a framework (see Figure 1).

Figure 1 A framework of the project ODYLP



Four music-talented students and one teacher from each of the four participating senior high schools in Taiwan were selected. The process of selection included reviewing their personal statements and conducting face-to-face interviews in English. Criteria for selection involved social engagement and leadership (Participants should be interested in using music to serve their community, and demonstrate leadership potential), English proficiency (English will be the working language of the program), and age (Participants must be between the age of 15 and 18).

The program included three weeks of site visits, workshops, and lectures, as well as ensemble, performance, and cultural activities in the United States. Participating students and teachers were required to develop a follow-on community service project and put it into practice in Taiwan after six months. The activities and courses in the United States were varied. Besides visiting schools and participating in jazz courses, music therapy courses, and jazz improvisational ensembles, what makes this program unique is that they also visited and participated in the Rainey Institute, Toddler Rock Session, and the Beck Center for the Arts.

The Rainey Institute, which is dedicated to social change for Cleveland's economically disadvantaged youth, provides one of the most impactful after-school programs for disadvantaged youth in the Greater Cleveland Area. The purpose of this institute is to promote the self-discipline, persistence, compassion, confidence, and social behavior of participating youths, and to help them make their career choice through art education. Therefore, this session is intended to provide our students with the opportunity to inspire young people to have a passion for music and for life through their musical performance.

Toddler Rock uses popular music to teach children from the project Head Start, the nation's largest preschool program, problem-solving and communication through multi-sensory interventions (e.g., music, movement, singing, and storytelling). In this session, our students used drums to make improvisational rhythm and dance moves with the goal of improving children's positive interaction with other children, their parents, and their teachers.

The Beck Center for the Arts is a nonprofit organization that combines professional theater with art education. They offer over 230 performances and 780 classes and programs to people of all ages and abilities in the belief that the arts can be communicative and influential. In this session, their faculty gave our students a lecture regarding music therapy and let students directly experience the effects of muscle tension. What's more, our students had a jazz master class conducted by the Music Director of Orchestral Studies of the Baldwin Wallace Conservatory and had a rehearsal with a jazz band to expand their music vision and enrich their experiences.

After each activity and class, the supervisor of this program would spend an hour leading a reflection and writing exercise, particularly in the form of group discussion.

Last but not least, six months after their return, our students designed a follow-on community service project and carried it out in Taiwan. The project included music therapy activities to improve behavior in children with mild learning disabilities; a well-designed performance for the elderly in a nursing home; a public charity performance at a city hospital for the visitors, patients and their families, and medical professionals who work there; and performing community care and music therapy through music and art to the children from broken families in a nursery school.

RESEARCH TOOLS

For the purpose of this study, online questionnaires were used as a tool for participating students and teachers. The questionnaire was divided into two parts—a satisfaction survey and open-ended questions. In the first part, the content was the same for students and teachers, who checked “satisfied” or “dissatisfied” to represent their feelings about the activities and courses included in the program. The questions were divided into two types, activity-oriented and course-oriented. The activity-oriented questions included satisfaction with accommodation, type of activities, and the number of hours. The course-oriented questions included the course types, course contents, lecture quality, and teaching styles. In the second part, students were asked about which activities and courses they thought they had benefited the most from and that they would keep participating in in the future; what reflections and changes they had made after this program; what suggestions they would like to offer; and their willingness to participate in a similar program again. Teachers were asked about which activities and courses they thought students had benefited from the most; what reflections and ideas for their teaching they would have after this program; what suggestions they would like to offer, and their willingness to participate in a similar program again.

RESEARCH METHODS

This research was conducted by using online questionnaires to understand the satisfaction of participants with this program one year after they had returned home. There were four students and one teacher from each of the four schools from northern Taiwan to southern Taiwan (including Wuling Senior High School, Hsinchu Senior High School, Taichung Second Senior High School, and Kaohsiung Senior High School) who went together to the United States. All participating students in this program were 1st and 2nd-year senior high students and were studying in the music-talented classes. The students were composed of 3 boys and 13 girls, and the teachers 1 male and 3 females. It took one month to complete the questionnaire survey through e-mail, telephone and the social media Line. We received 4 replies

from teachers, which is a 100% response rate, and 10 replies from students, a 71.4% response rate. Each student and teacher who responded gave complete answers.

RESEARCH FINDINGS

Students' feedback

a. In the first part of the student questionnaire, 100% of students were satisfied with the activities and courses.

b. In the second part, the open-ended questions, in terms of activities, students indicated that "making music together," "city adventure," "rehearse with a jazz band," "think outside of the box," and "building tower" were the most beneficial for them. They considered that they were able to experience cultures of different nations as well as different concepts of music, teaching styles, and mindsets through practical participation, allowing them to think more flexibly and to develop their leadership skills.

c. In terms of courses, students indicated that "jazz history and improvisation," "English poetry writing," "how to relax," and "leadership" were the most beneficial for them. They stated that they learned different musical styles, the importance of team communication and trust, the importance of physical fitness, and the importance of using musical or non-musical creativity to convey positive messages to society.

d. In terms of comprehensive reflection, they thought that they had become more confident, more willing to accept new things and challenges, and more courageous in sharing their ideas, and had a new understanding of the ability of music to change people and society.

Moreover, they hoped that one day in the future they would contribute to society with their expertise. In the future, they suggested that there should be more high school participation, more diverse courses, more time, and more opportunities to interact with students from local schools. The willingness to participate in programs like this in the future is 100%.

Teachers' feedback

a. In the first part of the teacher questionnaire, 100% of teachers were satisfied with the activities and courses as well.

b. In the second part, the open-ended questions, in terms of activities, teachers indicated that “social benefit” and “hands-on programs” (e.g., orchestra participation, community volunteer activities, and musical creation with social justice) were the most beneficial for students. They considered that in addition to broadening students’ horizons and understanding and acceptance of diversity, these activities can give their students’ multidimensional ideas and show them the meaning and impact of music.

c. In terms of courses, teachers indicated that “jazz music,” “music therapy,” and “exploration of multiple music types” were the most beneficial for students. They considered that through exposure to diverse learning opportunities, these courses provide well-rounded education since they help students develop multiple intelligences and establish the right values.

d. In terms of the reflection on self-teaching, teachers felt that they should apply more inspiring questions and self-directed learning and reflection and integrate more social issues and public service activities when teaching musically talented students. They suggested that in the future there should be more visits and introductions to a conservatory of music or music department and more advanced courses and exchanges at different educational stages. The willingness to participate in programs like this in the future is 100%, the same as the students’.

CONCLUSIONS

Through a variety of activities and classes (coping and growing, 2-way pedagogical tools), reflection (method), and follow-up project (assessment), this program provided our students an opportunity to reconstruct the role of music, polish their leadership skills, increase their civic engagement, and make an unwavering commitment to music. Undoubtedly, ODYLP completely met its goal and has also proven that the Cope and Grow Model is effective and feasible for musically talented high school students. Another key factor to remember, in addition to allowing students to sharpen their leadership skills and provide social services based on the effects of diverse cultures, music, thoughts, and teaching methods, this program also allows participating teachers to have the opportunity to experience and observe different teaching methods and thus design an effective curriculum to improve their teaching. I believe that the successful experience of this program will definitely bring more reflections and suggestions to teachers teaching artistically talented students in the future.

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A Narrative Exploration on the Reconciling Multiple Identities of a Gay Medical student

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ABSTRACT

Cultural studies focus on the process by which we become a human being, how we are shaped as subjects, and how we identify with, or become emotionally invested in, our gender, ethnicity, or age characteristics (Barker, 2000). The purpose of this study is to explore the complex adjustment faced by a medical student during his studies and to consider how we can support students in adjusting to multiple identities. The participant, A-Bai, has multiple roles. His mother is a new resident from Vietnam. He is a mathematics and science gifted student, a university medical student, and a gay. The Theory of Quadruple Consciousness (Means & Mitchell, 2014) and Scholar Identity Model (Whiting, 2006) were applied in the interviews to explore A-Bai identity process and coping with being labeled a gay. Interviews included participant's experiences of oppression, stigmatized identities and the cooperation or devoured of multiple identities. Results were as follows:

1. A-Bai experienced stigmatized bullying by peers and family neglect. However, his status as a math and science gifted student enabled him to gain recognition for his learning advantages. He actively integrated into the community, made his peers identify with multiple roles, and expressed his sexual orientation not invisibly, but visible and spoken, of which fits Whiting's (2006) pattern.
2. Just as Mitchell and Means (2014) predicted, A-Bai vacillated between the heterosexual and non-heterosexual categories. Although he entered college with complicated relationships with other gays, he found his natural space and voice. He understood how and when to adjust his identity and get the competencies he needs to achieve in college.

Based on the finding, the researchers suggested that students should not be left alone to undertake adjustment as they are in transition and need the necessary support to reinvent themselves on the continuum of identity (Sewell & Goings, 2019).

KEYWORDS

Math and Science Gifted Student, Reconciling Multiple Identities, Theory of Quadruple Consciousness, Scholar Identity Model

INTRODUCTION

A-Bai, a participant in this study, has multiple roles, his mother is a new Vietnamese resident, he is a gifted student of mathematics and science, and he is a university medical student. A-Bai used to be obsessed with life and couldn't integrate into the people around him. He perceives his own emotional identity, especially prefers boys more than girls.

A-Bai is a gay. The moral constraints of the traditional society and the blackmail of family emotions make him only focus on his studies, and he has no time to take care of others, nor can he express his true feelings. Until the university stage, the mature thinking and strategy enabled him to escape the barriers, liberate himself, and seek the successful identification of gay and non-gay friends.

Mardell (2016) believes that everyone should have their own gender identity, sexuality and emotional orientation identity. The purpose of this study is to explore the experiences of individual cases in adjusting their own spirituality and gaining recognition from others and self-identification during these processes.

PROBLEMS

Aiming at the identity dilemma of male medical student A-Bai, this study intends to explore three questions.

1. Gifted student A-Bai faces multiple dilemmas of role identification?
2. Gifted student A-Bai’s coping strategies and transition process towards others and self-identity?
3. What counseling assistance has been given by significant others and teachers?

REVIEW OF LITERATURE

Adler (1919, The Science of Living) argued: “All human troubles come from interpersonal relationships. Troubles in gender identity come first from the biological sex label at birth, and then from the acquired gender orientation. When the two conflicts and social inclusion is not enough, anxiety arises.”

As the multicultural scholar Taylor (1992) said: our identity is partly due to the recognition of the other, or the absence of recognition, and is often the misrecognition of the other.

The term "identity" has been widely used since the 1960s. It has been baptized by various theories such as sociology, psychology, and ethnicity, and has been influenced

by post-modern, post-structural, post-colonial, and feminist ideological trends. Identity is not fixed. It is generally agreed that identification is fluid, negotiable, and a rolling process of definition through continuous interaction with others and the external environment (Hall, 1996; Mathews, 2000; Rapport & Dawson, 1998). The strongest and most transformative power comes directly from our self-identification, and it is possible to end the continued oppression of us by others (Wang, 2012).

In his youth, Barack Obama struggled to gain social acceptance because of his multiracial background, did not know the meaning of life, smoked marijuana and cocaine, and was reluctant to think about whom am (Washington Post, 2007, January 3). After his transformation, he became the 44th President of the United States (2009-2017), the first African American president. According to Obama's growth experience, perhaps the elders and teachers should not let children bear the adjustment problem alone, because they are in a transition period and need the necessary scaffolding to learn and shape themselves in the continuous process of identification (Sewell & Goings, 2019).

BACKGROUND AFFECTS IDENTITY

1. Math and Science Gifted Student

Mathematically gifted students face emotions, career development, and life pressures. Each child may have different strategies for dealing with them. Dialogue, coordination and affirmation with themselves are required courses for them.

Wang, Cai, Zhang & Wang (2003) explored the career development readiness of high school mathematics and science gifted students. The results of the study showed that the career development readiness scores of high school gifted students were mostly lower than the average. In addition, the mathematics and science gifted students of Southern High School showed a high interest in studying medicine in the future.

Gifted students in high school mathematics and science have the need to cope with the pressure of life. Wang and Zhang (2015) used self-compiled questionnaires to study mathematics and science gifted students in grades one to three in southern middle schools. The conclusion is that the life pressure of the gifted students in mathematics and science in the Southern Middle School tends to be mild, with the "admission policy" being the heaviest, and the "friend interaction" being the least stressful.

2. Children of new immigrants

New immigrants in Taiwan and their children born in wedlock have very different life situations. They have different family stories, school experiences, work and social

interactions, and have different degrees of feelings and sense of identity.

Chen, Li, and Yang (2016) conducted a research on teaching adjustment in a rolling manner, and discussed the learning process and teaching impact of 36 gifted students of new immigrant children in Taipei City and New Taipei City. The results show that the teaching plan affects the social and cultural circles of gifted families, and through in-depth interviews, it is confirmed that the new immigrants "mothers" of gifted children are active providers of educational resources.

Chen (2015) studied the construction of "ethnic identity model of new immigrant youth", and then examined the mediating effect of self-esteem on academic achievement, risk behavior and subjective well-being. The conclusion of the study is that the strength of ethnic identity of new immigrant adolescents is related to the number of resources and support given by their families of origin.

IDENTITY THEORY INVOLVES

A-Bai's personal characteristics, goals, and commitments interact in multiple identities, and in the multiple contexts of campus and society, there will be many internal and external conflicts, dialogues, coordination and compromises, which affect the individual's degree of identification with different events. Two theoretical models are introduced, which will be used to explore A-Bai's identification dilemma and its solutions.

1. Theory of Quadruple Consciousness

Mitchell & Means (2014) believed that referring to the intersection of ethnicity and sexual orientation can shape experience and psychosocial development, and proposed Theory of Quadruple Consciousness to explain the psychosocial development of black homosexuals and bisexuals on white college campuses.

Mitchell & Means (2014) proposed the Quadruple Consciousness Theory to explore that black gays often vacillate between four main states of consciousness when seeking acceptance and not wanting to be stereotyped, hurt or excluded (see Table 1): (I) White and heterosexual, (II) whites and non-heterosexuals, (III) blacks and heterosexuals, (IV) blacks and non-heterosexuals.

Table1. Quadruple consciousness

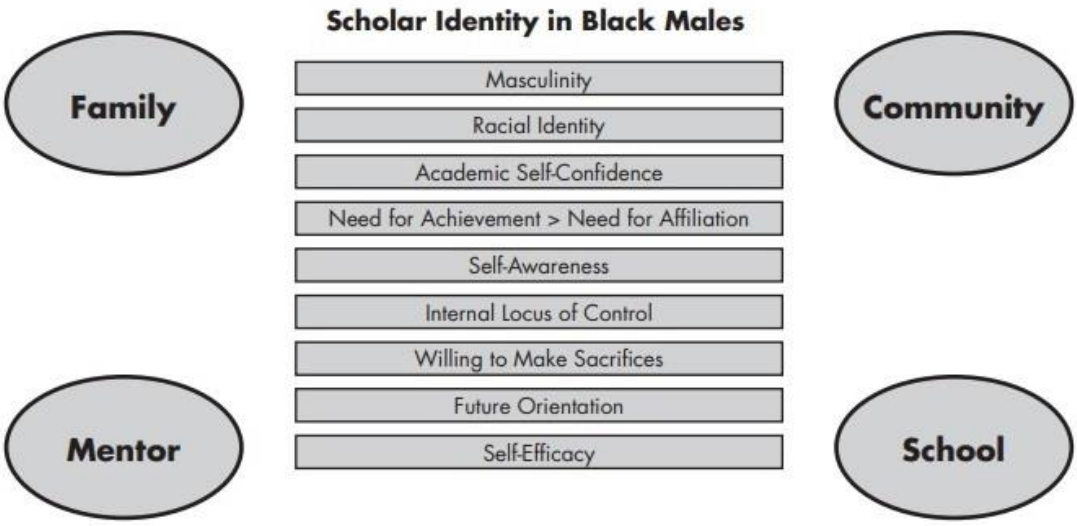
Identity Ⅰ	IdentityⅡ	IdentityⅢ	IdentityⅣ
White	White	Black	Black
Heterosexual	Non-heterosexual	Heterosexual	Non-heterosexual

This theory has been applied to investigate the representation of characters in TV series. Sewell (2020) uses characters from the TV series Dear White People (2017) as the research object, and indirectly witnesses the complex adjustment and transformation of multiple identities faced by black and gay men in top white-dominated colleges and universities, enlightening we think about how to support students in adjusting to multiple identities.

2. Scholar Identity Model

Many black and Hispanic men underperform in white school settings (Whiting, 2009), and even in schools for gifted education, both groups are chronically under recognized and underserved. The Scholar Identity Model attempts to fill gaps in the lives of Black and Hispanic students and enhance their academic identity. The goal is to change their academic self-perceptions and their attitudes towards learning and success. Avoid apathy, misbehavior, and underachievement, and then fall into a vicious cycle (Whiting, 2009).

Figure1. Quoted in Whiting, G. W. (2006), p. 224



Whiting's (2006) theoretical model includes four supporting forces: family, tutor, community, and school, which will affect the degree of individual's identification with

academic performance (scholar identification). Dimensions affecting identity include masculinity, racial identity, academic self-confidence, need for achievement, self-awareness, internal locus of control, willing to make sacrifices, future orientation, and self-efficacy.

METHODS

This study conducted an in-depth interview with A-Bai, a gay medical student. According to the research questions, the participants were asked about the dilemmas faced by the participants and their solutions, as well as the actions or omissions of teachers and significant others. The interview materials used Theory of Quadruple Consciousness and Scholar Identity Model as observation models to simulate and infer the impact of A-Bai's multiple identities on identity. For the triangulation verification of the interview data, the researchers confirmed the accuracy with A-Bai's mother and the dean of the Department of Medicine through home interviews and video chats.

Figure2. The influence of A-Bai's multiple identities

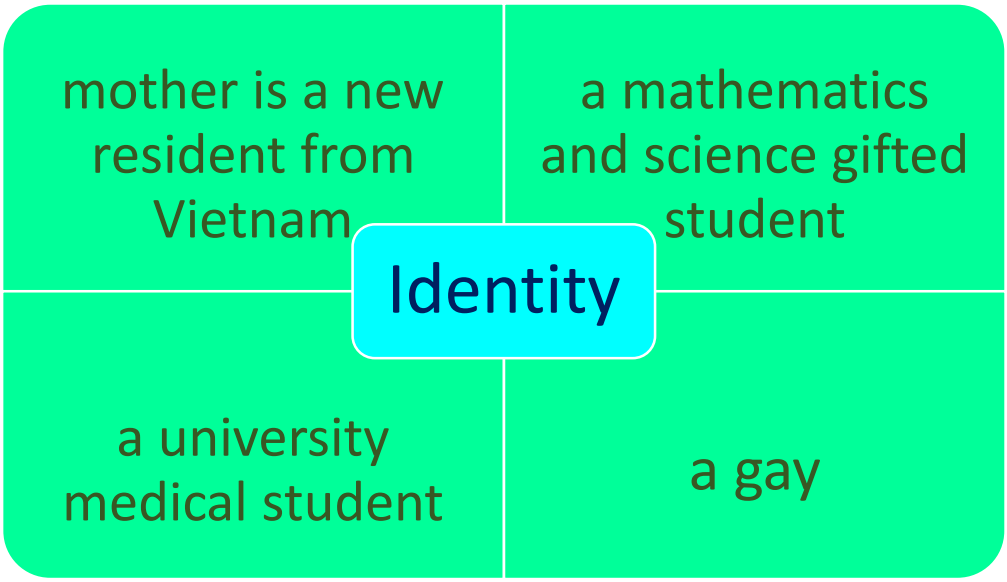
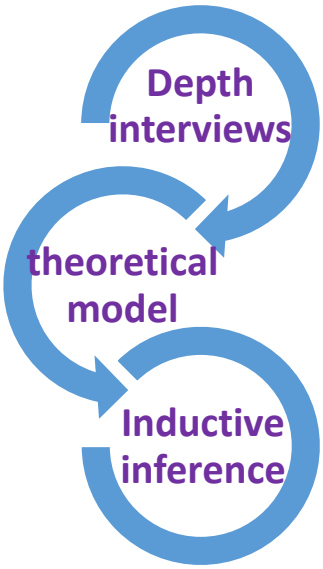


Figure3. A brief overview of the research architecture



RESULTS AND DISCUSSION

1. Gifted student A-Bai faces multiple dilemmas of role identification

A-Bai's mother is from Vietnam. He is a gifted student, a medical student, a gay and these roles bring him some difficulties.

> *When I was a child, I lived in the countryside of Changhua, and the gossip of my mother-in-law next door really made me uncomfortable. However, I know my Mẹ (mom) is even less happy. So, I made up my mind to make Mẹ happy, which is why I study hard, but I also want to thank her for giving me the gene of "good head and strong body ".*

> *I'm GAY and I like boys. When I was in middle school, I once wondered if I was broken somewhere, and I couldn't catch up on the topic of love between men and women discussed by my classmates in the classroom, and I wasn't interested. At the time, I felt like I was in a weird place between the two genders.*

> *Maybe I was more "feminine" at the time. When I heard my classmates call me "shemale", I was anxious and angry. I did everything I could to make myself a MAN, including changing the way I spoke, how I dressed, had a girlfriend, and kept the first place in my homework so that the word "shemale" would disappear from me.*

Mardell (2016) believes that everyone should have their own gender identity, sexuality and emotional orientation identity. In the face of the multiple dilemmas of character identification, A-Bai actually has a sequence and importance. Gifted students and medical students are the external halo, comradeship is the attribution of physical needs and feelings, and the sons of new immigrants are the driving force of struggle. These factors should have led to the distortion of identity, but they can be integrated into the mature A-Bai and become a fortune in life, echoing Chen (2015) that the power of happiness for the children of new immigrants comes from the warm support of the family of origin.

2. Gifted student A-Bai's coping strategies and transition course towards others and self-identity

A-Bai's predicament is due to pressure from others and himself. He does something to change or elevate other people's identification and self-identity with him, and the process is torturous.

> *It was around the fifth grade (11 years old) of elementary school that I felt the embarrassment of liking boys for the first time. When I see a dark boy in the next class who loves to play dodge ball, I get an erection. He is my dream first love. This kind of thing happened more and more times. I felt it was abnormal, and I didn't dare to tell others at that time.*

> *I am now a junior in the medical department, 21 years old, after 10 years. Gifted students are human beings, nothing special, and have biological needs. Gifted students and GAY identities do not conflict, even if I become an attending physician in the future, I will not escape the fact that I like boys. I often tell myself in my heart, "Accepting yourself is what really matters."*

> *I think self-identity is very important, rather than using socially established labels. My previous lack of relevant ethnic identity, gender education made me lives in a stereotyped frame. Now that I'm more mature, I can accept my gender, my ethnic identity, and I love Vietnam as well as Taiwan.*

> *I've come out, but I don't like the word "coming out", it's negative. My classmates in the department and the club don't know me very well. I don't usually have contact with them. I don't care about them, because "begin well and end well" is the highest principle of life. Everyone minds their own business.*

Chen et al. (2016) proposed that mothers of gifted children of new immigrant children are active providers of educational resources. Echoing in the process of A-Bai's achievement, the mother provides a warm and real comprehensive recognition for the growth of her children.

Mitchell & Means (2014) pointed out that external factors (human-environment interactions) can influence and shape an individual's psychosocial development. A-Bai has oscillated between heterosexuality and queerness, as described by Mitchell & Means (2014), with a role-identity shift. After entering university, A-Bai began to have some complex interactions with her gay friends, and found her subject talent and professional skills in campus life. He has learned how and when to deal with his own identity and competence.

A-Bai has experienced stigmatized peer bullying and family neglect, and his status as a mathematically gifted student has enabled him to gain the recognition of his learning advantages, and actively integrate into the community, so that his peers recognize his multiple roles, expressing his sexual orientation is not invisible, but What can be seen and spoken, partially conforms to the Whiting (2006) model.

3. Counseling assistance given by significant others and teachers

When A-Bai was in trouble, some people helped him and did some things.

> *Mẹ (mother) and I both speak Vietnamese and talking to her makes me feels warm and private and I don't need Mẹ to do anything for me. We have video chat every week, there are some questions that I can't talk to her, I don't let her worry, I just want to see her and listen to her voice, and I will be refreshed.*

> *Teacher (researcher), when you went home with me last time, Mẹ thought I had changed my boyfriend, and thought you were too old. It's so funny.... Mẹ knew that I liked boys, she didn't object, she just didn't like me changing boyfriends so often. I once said to her mischievously, "I like bố (Dad)!", and she squeezed me hard and said seriously, "Don't rob me."*

> *I have gay friends who share each other's problems and happiness. There are several female students in the school's department who are close to me. We discuss homework and chat with boys. There are also a few seniors and younger brothers who I met in high school who occasionally gather for dinner. I feel very relaxed and home-like during the gathering. As for the school teachers, they hardly cared about my sexuality and would always encourage me to keep my TOP 1 score.*

Teacher and role modeling are important for LGBT college students' sense of identity (Mitchell & Means, 2014), and will improve opportunities for LGBT students to have teacher support and role models who can more fully interact socially with others as they enter higher education. It is confirmed that the interaction with friends in the university life, and the encouragement of teachers will give A-Bai a firm self-identity.

During this process, if A-Bai undertakes the adjustment alone, he will not be able to reshape himself in the identity continuum without the necessary support during the transition period (Sewell & Goings, 2019).

CONCLUSION & SUGGESTION

The theoretical model has no distinction between nationalities and ethnic groups, and uses the theoretical framework of multiculturalism. In higher education and academic research, we may need to recognize that multiple "sexual orientations" and "identities" are part of the social structure. Awareness and explicit recognition of social construction and oppression are the first steps to support gay and lesbian groups and other marginalized and oppressed groups. Helping the client to have a sufficient "sense of security" and "feeling of acceptance" can successfully overcome the obstacles in the process of identity development and grow into a healthy adult both physically and mentally.

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Part F

Researches in Gifted Education

Adolescent Leadership in Taiwan: Exploring the Relationship among Multiple Assessments and Their Predictor Variables

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ABSTRACT
Studies on adolescent leadership in Taiwan are scant. For this study, we assessed adolescent leadership by combining subjective performance-based assessments (self-assessed leadership, peer-nominated leadership, teacher-observed leadership, and parent-observed leadership) with an objective, constructed-response test (objectively assessed leadership). Afterward, we explored the effects of certain variables that might act as predictors of adolescent leadership. We recruited 174 eighth-grade students (44.8% were boys, and 41.4% were gifted students talented in music, the arts, dance, mathematics, and science) in the northern region of Taiwan. The results of correlation analysis and multiple hierarchical regression analysis revealed that adolescent leadership from different perspectives might be correlated with each other. Moreover, academic achievement, leadership traits, gender, leadership experience, and gifted eligibility might be variables that are critical for predicting adolescent's leadership levels according to multiple assessments.

KEYWORDS
Adolescent Leadership, Constructed-Response Test, Giftedness and Talents in Leadership, Multiple Assessments, Performance-Based Assessments, Predictors for Leaderships

INTRODUCTION
Leadership has been classified as a category of giftedness in Taiwan since 1997 (The Special Education Act, 1997). However, most studies on leadership have focused on adult leaders; the topic of adolescent leadership remains unpopular in the past decades, especially for the high school students whose ages are under 18 years old. Adolescence is a period during which young people learn to accept responsibility, to make decisions, and to gain independence in order to become adults (Arnett, 1997). It is also a crucial moment for developing skills that are critical for effective leadership (Brumbaugh, 2005; van Linden & Fertman, 1998).

What is the adolescent leadership? Liu and Nadel (2006) stated that young people do not possess explicit, official power in schools and organizations and that they must rely on their persuasive skills for accomplishing tasks. Cheng (2013) indicated several differences between adult and youth leadership, which included leading context, the team mission, action outcomes, relationship between leader and followers, and responsibility for success or failure. Paustian-Underdahl, Walker, and Woehr (2014) found that women were determined to be significantly more effective than their male counterparts when other ratings were examined. Conversely, when self-ratings were examined, the results were reversed. Lee and Olszewski-Kubilius (2006) concluded that the gifted students they examined exhibited higher-than-average leadership ability compared with the normal group. However, the results obtained by Muammar (2015) revealed that the relationships between intelligence and a set of leadership skills were nonsignificant. Karnes and Bean (1990) argued that adolescents' experiences during extracurricular activities offer them unique opportunities to gain acceptance, support others, and learn various leadership styles.

There are two pathways for identifying giftedness and talent in leadership (Regulations Governing the Identification for Students with Disabilities and Giftedness, 2013): (a) obtaining scores on standardized assessments for leadership abilities and traits and (b) being nominated by scholars, experts, teachers, parents, or peers and producing documentation regarding their leadership traits and performance. Mattews (2004) pointed that people who display their leadership abilities are influenced by particular contexts. This implies that various nominators tend to be cautious when identifying leadership behaviors embedded in different circumstances. Oakland, Falkenberg, and Oakland (1996) reported that a preference for using observer ratings rather than self-ratings could increase the truthfulness of measures and reduce bias. Chen (2000) compared adolescents' self-reported leadership with leadership observations made by their teachers and parents and observed a significant correlation between self-reported leadership and the leadership scores reported by parents and teachers. In an empirical study, Edmunds (1998) examined the relationships among four types of leadership indicators: pencil-and-paper tests; various forms of elections, nominations, and rankings; actual, observed leadership behavior; and past leadership behavior. The results revealed significant positive relationships among the leadership indicators.

There are few studies that have developed instruments for measuring self-rated, peer-nominated, teacher-observed, parent-observed, and objectively assessed leadership (Cheng, 2006, 2013; Wang, 2000/2005). Additional research is required to

examine the relationships among these leadership types. Furthermore, identifying the critical variables associated with adolescent leadership would contribute to the development of adolescent leadership.

The primary purpose of this study was to investigate the relationships among different leadership types, and the secondary purpose of this study was to explore the effects of certain variables that may act as predictors of different leadership types.

METHODS

Participants and Procedure

The target participants were junior high school students from the northern region of Taiwan. We considered the limited resources of the study and the degrees to which the students' teachers and peers would be familiar with the students. The total participants were 174 eighth-grade students aged 13–14 years from four schools; 78 were boys (44.8%) and 96 were girls (55.2%); 102 were regular students (58.6%) and 72 were gifted students (41.4%), who were talented in music (n = 26), the arts (n = 24), dance (n = 6), and mathematics and science (n = 16).

Participants completed the measurements in the classroom after school. Their parents and teachers were invited to complete the scales within two weeks.

Measures

We collected data using numerous measurements and applied them for different variables. The first variable set, background information, comprised gender and regular/gifted student; the second variable set, personal characteristics, consisted of academic achievement, high-level reasoning abilities, and leadership traits; the third variable set, experiences with leadership, involved extracurricular activity involvement, leadership experience, and accepting leadership training; all three variable sets were the independent variables in this study. The leadership types, namely self-rated, peer-nominated, teacher-observed, parent-observed, and objectively assessed leadership, were the dependent variables.

RESULTS

Correlations

The correlation analysis results showed that gender had a significantly positive relationship with objectively assessed leadership and parent-observed leadership. Being gifted student also had a significantly positive relationship with objectively

assessed leadership. However, it correlated insignificantly negatively with peer-nominated and teacher-observed leaderships.

The results also revealed that academic achievements had a significantly positive correlation with objectively assessed, peer-nominated, and teacher-observed leadership, but not with parent-observed leadership. High-level reasoning abilities had a significantly positive relationship with objectively assessed, peer-nominated, and teacher-observed leadership. Leadership traits had a significantly positive relationship with self-rated leadership and peer-nominated leadership.

The correlation coefficients of the adolescents' experiences with leadership were nonsignificant for most of the leadership assessments, except for the relationships between leadership experience and self-rated leadership and between leadership experience and teacher-observed leadership.

The relationships among the different types of leadership were significantly positive. Because of the nonsignificant relationships between extracurricular activity involvement, accepting leadership training, and all leadership types, these two variables were excluded from the subsequent regression analysis.

Predictor Variables for Different Leadership Types

Hierarchical regression analyses were performed to determine the linear combinations of several variables that could predict different leadership types.

The results of hierarchical regression analyses revealed that academic achievements, leadership traits, and leadership experience were significant predictors of self-rated leadership. Academic achievement was the only predictor which significantly explained peer-nominated leadership. For teacher-observed leadership, there were two independent variables significantly predicted teacher-observed leadership: academic achievement and regular/gifted student. However, the negative coefficient of regular/gifted student represented a negative relationship between giftedness and teacher-observed leadership. Gender was the only significant predictor of parent-observed leadership. Finally, there were two variables significantly predicted objectively assessed leadership. In-depth analysis revealed that academic achievement had a substantial impact, whereas gender had a more minor impact.

DISCUSSION

In the current study, the leadership types of 174 eighth-grade students were evaluated to determine the relationships among different leadership types and to determine the predictors of those leaderships. The results were partially consistent with previous studies in terms of the significantly positive relationships among leadership scores assessed by teachers, parents, and participants themselves (Chen, 2000), and scores on pencil-and-paper tests had significant positive relationships with self, peer, and teacher nomination scores (Edmunds, 1998). Extending past research, the results also revealed significant positive relationships between peer-nominated leadership and the leadership assessed by others (i.e., teachers and parents). In addition, administering the constructed-response test as a pencil-and-paper test to obtain more objective information on adolescent leadership and determine the positive relationships between objectively assessed leadership, self-rated leadership, and leadership assessed by others represented a major departure from previous studies.

In addition to these results, we identified some unique findings. First, we found that gender was the only variable that could explain the variation in parent-observed leadership. The results implied that the three variable sets in this study might not be the key variables for parent-observed leadership. What were the parents' perspectives on their children's leadership? What were the variables that had significant relationships with the parents' perspectives on adolescent leadership? The parents' perspectives on adolescent leadership might be a topic of interest for future investigation.

Second, being gifted student had a significantly negative relationship with teacher-observed leaderships in this study. This finding was opposite to the previous impression that leadership was accompanied by giftedness and gifted and talented students would get higher leadership scores than their regular peers. Further research is warranted.

Third, the integrated results revealed that academic achievement was the most influential variable of adolescent leaderships. Surmising that academic achievement was related to objectively assessed leadership might be reasonable. However, similar results were obtained for self-rated, peer-nominated, and teacher-observed leaderships. This might imply that academic achievement influences adolescent leadership, which is evaluated by others and by the participants themselves. Is it a myth that adolescents with higher levels of academic achievement are effective

leaders? Is the relationship a phenomenon that is specific to the unique culture of Taiwan, or is the result generalizable? These questions warrant further investigation.

Finally, the results indicated that the “experiences with leadership” variable set did not significantly predict adolescent leaderships, except for leadership experience, which was a significant predictor of self-rated leadership. These findings were not consistent with the results of previous studies (Karnes & Bean, 1990). The possible explanation might be that the participants’ experiences did not produce a sustained effect on their leadership abilities (Kress, 2006). How to construct meaningful experiences with leadership for adolescents should be considered carefully in future research.

The present study had some limitations. First, the sample structure was designed for statistical power, not as a comprehensive survey of the population frame. Furthermore, the participants were restricted to the northern region of Taiwan; therefore, caution should be exercised in generalizing the results.

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Arts-Based Research in Gifted Education: Thoughts from Researchers and Educators

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ABSTRACT

Considering the diverse profiles and complex needs of gifted children, arts-based research (ABR), in particular the medium of documentary, provides new insights into gifted individuals and gifted and talented education (GATE). Despite the research potential of documentaries, little has been said about how documentaries can be used as a more systematic and comprehensive research tool. The goal of the study is to understand the field practitioners' perspectives, considerations, and inspirations regarding ABR and research-based documentary. This study aims to answer the following questions: (1) How is ABR perceived in GATE?, (2) As a form of media-based research, can a documentary disseminate knowledge effectively to academics and educators?, and (3) What are possible opportunities and further directions to extend the employability of documentaries in GATE and educational research in general? The study employed an experimental design using one-shot case study. The screenings of the documentary were treated as an intervention for raising awareness of art and research. Research participants (N=135) included K-12 teachers, graduate students, and university researchers/lecturers/faculty members who participated in one of two international conferences. Chi-square test of independence was utilized for analysis. Despite providing encouraging insights for the use of ABR, researchers were concerned about funding, a lack of artistic abilities, and time commitment. If provided more funding opportunities and collaborators for technologies, participants would be inclined to conduct ABR. The study holds the distinction of being the first to examine the perceptions of ABR in GATE professionals. This study can help practitioners and researchers to comprehend the challenges of ABR, facilitate the removal of barriers that block the employment of documentaries in research, and develop a better understanding of the unique

trajectories of highly able learners.

KEYWORDS
Gifted education, Arts-based research, Documentary, Knowledge dissemination

INTRODUCTION

Arts-based research (ABR) has been gaining attention and popularity in recent years (Coemans & Hannes, 2017; Foster, 2012; Grenwood, 2012; Leavy, 2009; Pentassuglia, 2017). One manifestation of such is the increased adoption of research-based documentaries as a means of research in the gifted and talented education (GATE) field (e.g., *RISE* (Jackson, 2014), *The G Word* (Smolowitz, 2022)). However, there has been little systematic and comprehensive research on how documentaries can also be adopted as a research tool.

ABR practices support researchers in obtaining and expressing numerous points of view that might be neglected by traditional research (Leavy, 2009). By using the potential of art and media, it could be possible to gain a profound understanding of phenomena and access meanings that would otherwise be invisible (Barone & Eisner, 2012). Art facilitates the generation of embodied modes of knowing, which indicate an intimate interaction between the body (with its perceptions, experiences, and reactions) and the material world (Barbour, 2011).

The prevalence of documentaries has increased significantly during the last two decades, and the rising prominence of web-based media has created an opportunity for documentaries to make a wide-reaching social and educational impact. However, the impact of such has not been fully examined (Karlin & Johnson, 2011). Examining documentaries' impact will aid in the use of documentaries in gifted education research and provide a richer understanding of phenomena occurred among gifted individuals and their surroundings. This paper lays out the foundations for comprehending the potential for ABR to be implemented in gifted education.

Superkids 2: A Documentary on Life Trajectories of Five Gifted Individuals

Participants in the documentary are the five young individuals who took part in both *Superkids* (Beairsto & Killas, 2004) and *Superkids 2*. They first appeared in the Superkids documentary in 2004, when they were elementary school students assigned to a gifted classroom. At that time, they were searching for high school programs that matched their learning needs, and several of them were hoping to be admitted into a highly accelerated program that might allow them to start university at

the age of 14. The Superkids 2 documentary, a longitudinal research-based study, follows them as they complete their formal schooling and begin their jobs in their early twenties (Killas et al., 2020). They self-evaluate their experiences in school (both public and private) and share a range of opinions on the advantages and drawbacks of the segregated educational paths they pursued. Their stories are portrayed in the light of international experts who offer a critique of the complex issues that these young adults encountered, such as identification, labelling, segregation, and acceleration.

Superkids 2 was created as part of a Social Sciences and Humanities Research Council of Canada-funded research project in collaboration with Emily Carr University of Art + Design and the University of British Columbia. Participants in the documentary helped us understand what elements influence the development of competencies throughout the lifespan by focusing on individual patterns of development.

METHODOLOGY

Research Design

This study used an experimental study design with a cross-sectional one-shot case study. To examine practitioners' perceptions of ABR, the 92-minute Superkids 2 documentary was screened for the attendees of two conferences. The screening was utilized as an intervention, and the participant's attitudes about ABR were assessed by a questionnaire.

Participants

This study used convenience sampling to select participants from two international gifted conferences (the 67th Annual Convention of the National Association for Gifted Children (NAGC) and the 16th Asia Pacific Conference on Giftedness (APCG)). In total, 135 respondents completed the survey. Of the survey participants, 93.3% were attendees to NAGC and the rest (6.6%) were attendees to APCG. The majority of the participants were female (90.4%), were between 41-59 years of age (61.4%), resided in North America (91.9%), spoke English as a first language (87.4%), were K-12 teachers (48.9%), had 10+ years of experience in gifted education (42.2%), and had a graduate degree (83.7% (either Masters or PhD)).

Instrument

The research team designed a self-report questionnaire for use in this investigation. A survey instrument was constructed following an extensive examination of the literature, supervisor and peer comments, and pilot research. The survey questionnaire largely consisted of closed-ended questions due to the benefits of these kinds of questions, which include enhanced consistency, a more comfortable design for people to answer, and easy coding possibilities for researchers (Fraenkel et al., 2012).

RESULTS

Frequency counts, contingency tables, and Pearson's chi-square tests were employed to see if there were statistical differences across demographic groups. More than 95% of the participants believed that Superkids 2 presents important issues in the field of gifted education, offers great learning opportunities, and contributes to the field of gifted education. When asked about aspects participants enjoyed about watching Superkids 2, key aspects included: being able to witness the longitudinal development of the individuals filmed, hearing voices from the participants, being provoked with some thoughts, hearing perspectives from some field experts, and the experiencing nuances of the interviews with the participants (e.g. their gestures, facial expressions, undertones).

The chi-square test was used to assess relationships between categorical variables, including the association between perception of ABR and age, current occupation, highest earned degree, research background (qualitative or quantitative), years of gifted education experience. The effect size was calculated using the Phi and Cramer's V tests to measure the strength of the relationships (0.1 small effect size, 0.3 medium effect size, and 0.5 large effect size). For two-by-two tables, the Phi value was employed, while for larger tables, Cramer's V measurement was utilized (Field, 2013).

The chi-square test revealed that the relationship between age and developing greater appreciation for ABR was significant, X^2(1, N = 132) = 6.580, p = .037. Specifically, participants who are between 21 and 40 years old were more likely to have a greater appreciation. Cramer's V value was .223, indicating a small effect size. Additionally, there was an association between feeling inspired to conduct media-based or ABR and age as well, X^2(1, N = 132) = 5.941, p = .05, with participants between the ages of 21 and 40 being significantly more motivated to participate in ABR than the other older age groups.

A significant link was also discovered between a qualitative research background and a willingness to learn more about ABR, $X^2(1; N = 135) = 5.787$, $p = .016$. The Phi value was found to be .207, indicating a small effect size. Respondents having a background in qualitative research were more eager to learn about ABR. The current study revealed no evidence of a link between conducting ABR and current occupation, highest degree obtained, or years of experience in gifted education.

Even though participants overall have developed a greater appreciation for ABR (72.6%) and wanted to learn more about it after watching Superkids 2 (64.4%), a vast majority of participants did not feel inspired to conduct or get involved in media-based or ABR (72.6%). Securing funding (64.3%) and the time commitment involved in pursuing ABR (60.5%) were major shared concerns among participants. Participants indicated finding proper collaborator(s) for technologies (52.8%), taking a course on ABR (43.2%) and having more funding opportunities for ABR (40.8%) would make it more likely for them to conduct arts-based research. In this study, it was evident that the participants had positive attitudes toward ABR but were concerned about getting involved in it.

DISCUSSION

Regardless of age, present career, research background, or years of experience in gifted education, nearly all participants had a favourable view regarding the enjoyability and informativeness of Superkids 2. According to participants' responses, Superkids 2 as a research-based documentary is making significant contributions to GATE. Participants, on the other hand, indicated concerns about conducting media-based or arts-based research themselves.

It is hoped that our study will contribute to the progress of ABR in gifted education research. Since the participants were selected from certain conferences and the number of participants in the study was limited, the findings on perceptions of ABR should not be regarded as a general phenomenon among all practitioners in gifted education. Further research conducted in different academic and diverse settings is needed to assert the findings conclusively.

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Explanatory Factors Predicting Reading Success of Academically Gifted Students Through the Perspective of Ecological Model

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ABSTRACT
This study aims to discover explanatory factors that predict reading scores for academically gifted students in Canada by using the PISA 2018 database. The ecological model was utilized to investigate the ecological background of reading success in this study. In line with the literature, five potential explanatory factors were examined among the items in the student questionnaire. Exploratory factor analysis (EFA) was used to detect factors. Structural equation modeling (SEM) was performed to create a model explaining reading success. Afterwards, indices of goodness-fit-criteria were examined. The findings indicated that there is a complex background for reading. All predictive factors (i.e., Disciplinary climate in the classroom (DC), sense of belonging (SB), perception of competence in reading (PC), perception of difficulties (PD), and cognitive flexibility/adaptability (CF)) have a positive effect on reading.

KEYWORDS
Giftedness, Gifted education, Reading success, PISA.

INTRODUCION

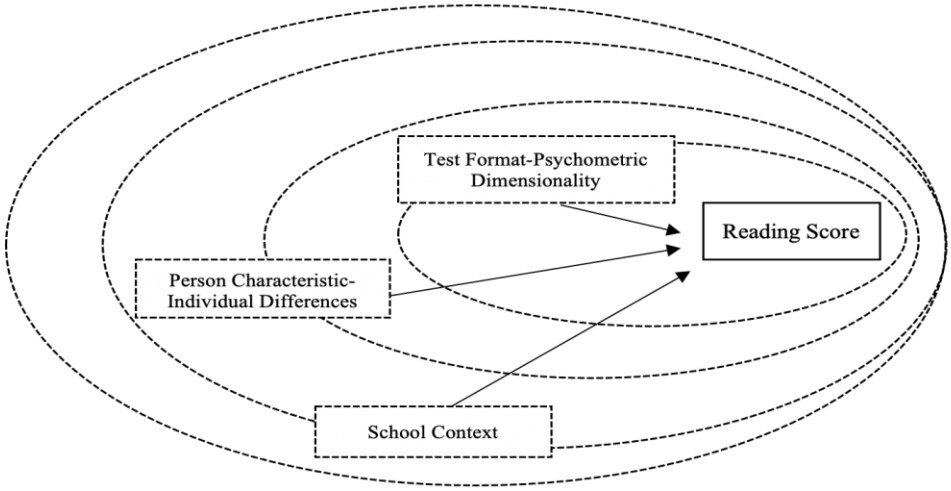
In 21st century, students in many nations are required to get proficient math and reading scores in order to be considered as successful (Duncan, 2011; Paige et al., 2012). Improving talented pupils' communication abilities has become a focus in the twenty-first century (Renzulli, 2021). Reading skills are crucial in gifted education and a component of improving learning and innovation skills since they are key communication skills (Shastina et al., 2018; Trilling & Fadel, 2009). Even in today's educational environment, one of the most elusive instructional abilities that pupils must learn is reading (Keyes et al., 2017). Whilst some factors have a negative impact on advanced learners' reading (Haymon & Wilson, 2020), other some factors may help advanced learners achieve considerable academic improvement in reading.

Reading is both an effective component for improving academic achievement and a comprehensive talent that is affected by an enormous number of factors, as evidenced by its complex structure, as well as cognitive and psychomotor skills (Arıcı, 2017) and its multilayered ecological backdrop (Goktenturk, 2021). In order to research a complex structure, the ecological system theory by Bronfenbrenner (1979), was proposed as an explanation for children's development, may help better understand possible explanatory factors of reading scores of exceptional students.

Zumbo et al. (2015)'s model proposes five layers to discover the ecological background: (1) the test format, item content, psychometric dimensionality; (2) personal characteristics, individual differences; (3) teacher, classroom, school content; (4) family and ecology outside of school; (5) characteristics of the community.

Although the ecological model was proposed for the clarification of latent classes that can explain the ecological background of an item's DIF results, the proposed layers have also the potential to explain the complex ecological background of any dependent variable (i.e., reading score in this study). To create a holistic frame and put a limitation with a meaningful factor group, only specific layers of the model were included in the structural equation modeling. All in all, excluding 2 layers from the research, three layers were adopted to drive the theoretical background of the study.

Figure 1 The layers of the ecological model in the study (adapted from Zumbo et al., 2015).



Reading content requires advanced levels of creative and critical thinking for students, including gifted and talented readers (Reis & Fogarty, 2020). However, this fact also suggests that gifted education requires additional research to better understand reading and build better learning environments. Hence, the study will examine five observed variables contained in PISA: disciplinary climate [DC], sense of belonging [SB], cognitive flexibility/adaptability [CF], perception of competence [PC], and perception of difficulties [PD].

The main research question for this study is:
Are the five possible explanatory factors above (DC; SB; CF; PC; and PD) can predict/explain the reading success of gifted students in PISA?

METHOD

Participants

The data of the current study was obtained in PISA 2018. PISA is an internationally comprehensive standardized assessment measuring the ability of 15-year-olds in reading, mathematics and science (OECD, 2019). A total of 79 countries participated in PISA 2018.

IQ in PISA

According to Weiss (2009) and Rindermann (2007), there is a significant high correlation between national IQ scores and success in math, reading, and science in PISA. Based on this result, academically gifted students in the study were determined by using math scores due to reason that all three facets of PISA focus on

cognitive ability (Godor & Szymanski, 2017, 2017; Rindermann, 2007; Weiss, 2009). In PISA 2018, the mean of these ten plausible values was ranked per student for the 95 percentile within the dataset for Canada (n= 22.653). This resulted in 5% of the sample population in Canada (n=1133) accepted as academically gifted - male= 679 (59.9%) and female= 454 (40.1%).

Factor Structures of Independent Variables

All factors are shown with their question items, names, and Cronbach's Alpha values in Table 1.

Table 1 Factor Structures of Independent Variables

Factors	Question name	Question	Cronbach Alpha value
Perception of Competence (PC)	ST161Q01HA (PC1)	I am a good reader.	α= .846
	ST161Q02HA (PC2)	I am able to understand difficult texts.	
	ST161Q03HA (PC3)	I read fluently.	
Disciplinary climate (DC)	ST097Q01TA (DC1)	Students don't listen to what the teacher says.	α= .855
	ST097Q02TA (DC2)	There is noise and disorder.	
	ST097Q03TA (DC3)	The teacher waits long for students to quiet down.	
	ST097Q04TA (DC4)	Students cannot work well.	
Sense of Belonging (SB)	ST034Q01TA (SB1)	I feel like an outsider (or left out of things) at school.	α= .813
	ST034Q04TA (SB2)	I feel awkward and out of place in my school.	
	ST034Q06TA (SB3)	I feel lonely at school.	

Table 1 (Continue) Factor Structures of Independent Variables

Perception of Difficulties (PD)	ST163Q02HA (PD1)	There were many words I could not understand.	α= .831
	ST163Q03HA (PD2)	Many texts were too difficult for me.	
	ST163Q04HA (PD3)	I was lost when I had to navigate between different pages.	
Cognitive Flexibility/Adaptability (CF)	ST216Q01HA (CF1)	I can deal with unusual situations.	α= .824
	ST216Q02HA (CF2)	I can change my behaviour to meet the needs of new situations.	
	ST216Q03HA (CF3)	I can adapt to different situations even when under stress or pressure.	
	ST216Q04HA (CF4)	I can adapt easily to a new culture.	
	ST216Q05HA (CF5)	When encountering difficult situations with other people, I can think of [...]	
	ST216Q06HA (CF6)	I am capable of overcoming my difficulties in interacting with people [...]	

DATA ANALYSIS

The database from PISA might have plenty of missing observations. Maximum missing data was computed as 3.4% while the minimum was 0.9% of the data. In different studies, it is stated that deletion of the data will not cause a problem in cases where the rate of missing data is 5% or less (Garson, 2015). Hence, the study continued with 1133 students.

To determine explanatory factors (latent/predictive variables) in order to create a model explaining the reading success of gifted students, exploratory factor analysis (EFA) was done using varimax rotation by using SPSS program (Demir, 2020; Field, 2009). In the last form, 5 explanatory factors were determined and explained 67% of the reading success of gifted students cumulatively.

Regarding the goodness-of-fit criteria of this model consisting of 5 factors and 19 items, RMSEA (Root Mean Square Error of Approximation), CFI (Comparative Fit Index), NFI (Normed Fit Index), and TLI (Tucker-Lewis Index) were examined using the AMOS program. RMSEA is a fit index evaluating how a hypothesized model is far from an ideal model (Xia & Yang, 2019). An RMSEA smaller than .11 indicates a reasonable fit and a value of < 0.05 or less means a good fit in relation to the degrees of freedom (Hu & Bentler, 1999; Kline, 2005; Shek & Yu, 2014). Contrarily, CFI, NFI, and TLI are incremental fit indices, which compare the hypothesized model with a baseline one (Xia & Yang, 2019). The CFI, NFI, and TLI equal to or above .90 indicate a satisfactory model fit (Shek & Yu, 2014). When CFI, NFI, and TLI values are larger than .95, it is considered a very good model-data fit in general (Hu & Bentler, 1999; Kline, 2005; Xia & Yang, 2019).

RESULT AND DISCUSSION

Five observed variables (PC, DC, SB, PD, and CF) were added into the model as independent variables to test whether those are able to predict reading scores of gifted students. As can be seen in Table 2, the indexes suggest a sufficient fit of the model to the current data in terms of goodness-of-fit criteria.

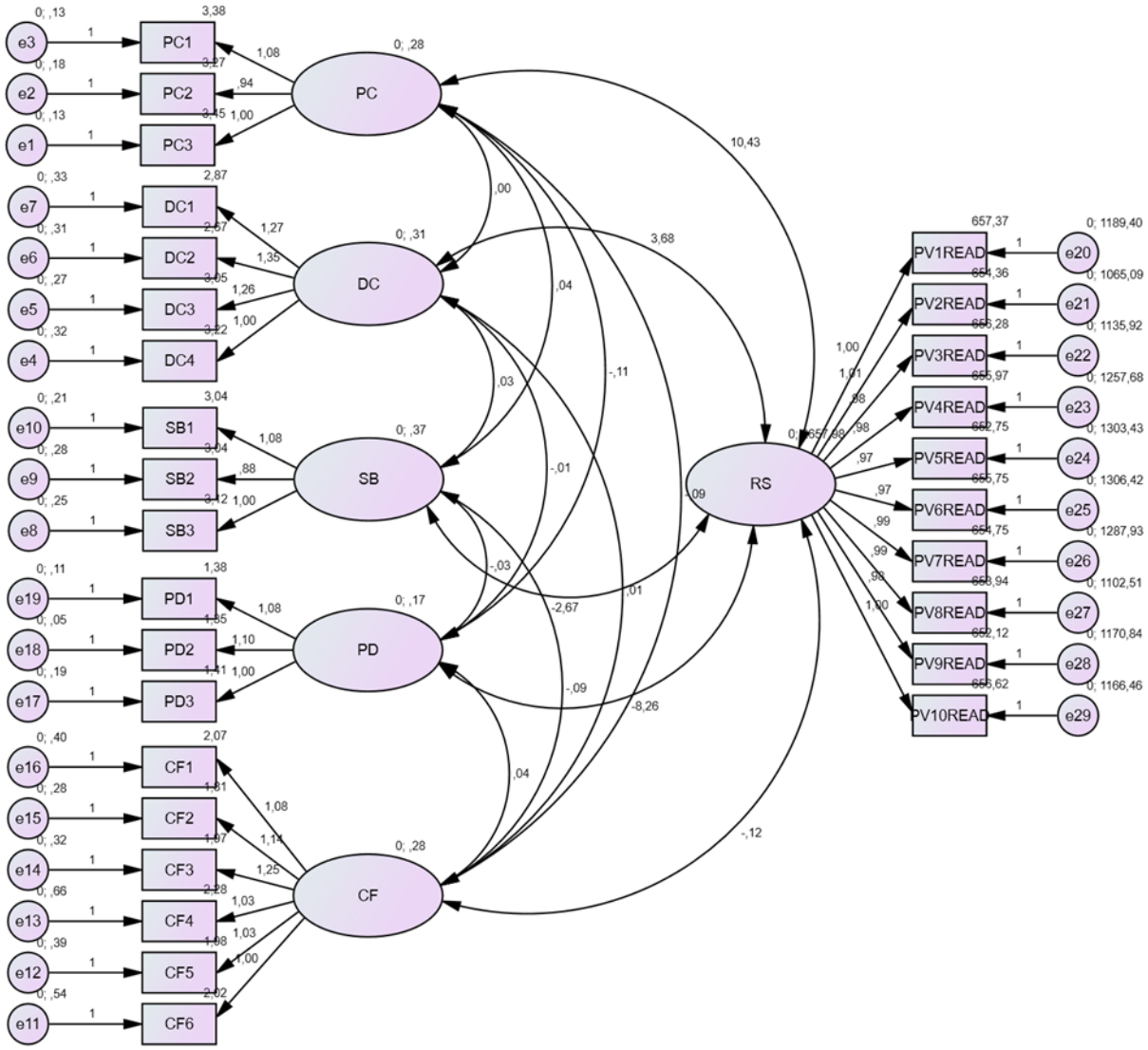
Table 2 Goodness-of-fit statistics for the five-factor CFA model.

Model tested	χ2	Df	CFI	TLI	NFI	RMSEA
Model performance	313.01	183	0.991	0.989	0.979	0.025
Criterion for goodness of fit	–	–	≥ 0.95	≥ 0.95	≥ 0.95	≤ 0.10

Note: CFI, comparative fit index; TLI, Tucker and Lewis's index of fit; NFI, normed fit index; RMSEA, root mean square error of approximation.

Regarding the final structural equation model (SEM), all paths of the model were significant. Parameter estimates and standardized factor loadings for the final structural model were shown in Figure 2. Observed variables (PC, DC, SB, PD, and CF) explained/predicted reading scores of academically gifted students significantly.

Figure 2 Path diagram of the model



List of Abbreviations used in Figure 2: PC, perception of competence; DC, disciplinary climate; SB, Sense of belonging; PD, perception of difficulty; CF, cognitive flexibility/adaptability; RS, reading score.

The result from the model demonstrated the existence of a relationship between five factors and the reading success of gifted students. *Perception of competence* [PC] and *perception of difficulties* [PD] predicted considerably higher *reading scores* [RS] than other observed variables (COV(PC, RS)= 10.43; COV(PD, RS)= -8.26). There is positive covariance between PC and RS, which means both variables (i.e., *perception of competence* and *reading score*) tend to be high or low at the same time. However, negative covariance between PD and RS (i.e., *perception of difficulties* and *reading score*) indicates that one of them is high, the other variable tends to be low. Therefore,

when the *perception of difficulties* towards reading is increasing for a student, his/her *reading score* tends to decrease. Regarding the *disciplinary climate* [DC] factor, the covariance between DC and RS (COV(DC, RS)= 3.69) indicates that increased discipline climate influences reading scores of academically gifted students to boost substantially. The *sense of belonging* [SB] factor has reverse coding in terms of answers in the test; hence, we expected to achieve a negative result of the relation of SB with RS, and received the score as being expected (COV(SB, RS)= -2.67). On the one hand, the relation of *cognitive flexibility/adaptability* with *reading score* was good (COV(CF, RS)= -0.12), which indicates that change in the cognitive ability of students' flexibility/adaptability affects their reading score in a positive way (because there is a reverse coding in the answers) and with very little effect.

This study contributes to the academic literature on reading success and its explanatory factor by employing Canada dataset of PISA 2018 although the current literature has been less focused on the reading success of gifted students (Haymon & Wilson, 2020). To the author’s knowledge, this is the first comprehensive investigation that aims to explore the reading success’ background of gifted students.

Perception of difficulties [PD] is the only factor inside of the test format-psychometric layer in the ecological model. The results of this study confirmed the level of difficulty perception is a significant predictor of gifted students' reading achievement as appropriate to the literature on the impact of test difficulty on reading achievement (Davey, 1988; Goktenturk, 2021; Zumbo et al., 2015). The components of personal characteristics-individual differences layer in the study are the perception of competence [PC] and cognitive flexibility/adaptability [CF]. Similarly, multiple research has found strong relations between reading performance and perceptions of competence (Cequeña, 2020; Gunardi, 2022; Souvignier & Mokhlesgerami, 2006; Soytürk, 2020). Finally, the results of the study also validated that disciplinary climate [DC] and social belonging [SB] factors are significant predictors of reading success in the school context layer. Therefore, the current study may be seen as a continuation of previous work as well as a fresh contribution to ecological background research.
These results also confirmed that to improve the reading success of gifted students, instructors or policymakers should also consider these variables. Via the factor structure of the model, we can make inferences that reading is not only a simple process that can be understood only with the reading him/herself but also a complex structure that is affected by a complex ecological background for academically gifted students.

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A Cross-Country Comparison of the Development on Gifted Education Acts, Policies, and Practices in Taiwan and Finland

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ABSTRACT

Taiwan and Finland are both committed to promoting gifted education or cultivating students with special talents. In recent years, they have performed well in large-scale international learning evaluations and student competitions as well. The way they cultivate talents has attracted worldwide attention. However, there are considerable differences between the two countries in terms of historical and cultural backgrounds, educational philosophy, the policies and practices of gifted education.

By means of cross-country comparison, we can understand their different development approaches of gifted education and realize its unique characteristics and values.

This paper compares the educational policy backgrounds of the two countries through the method of documentary analysis and the policy theory, trying to depict its development approaches, trends, similarities, and differences.

Besides, the researchers further analyzed and discussed the current situation of educational practice in two countries on four aspects, including the legal source, identification and placement, services provision, curriculum and teaching.

We look forward to taking this opportunity to thoroughly understand the diverse forms and developing trends of gifted education in Taiwan and Finland. Hoping to increase the understanding of the diverse concepts of gifted education for educators, and as a reference and reflection for future policy development of gifted education in the Asia-Pacific region.

KEYWORDS

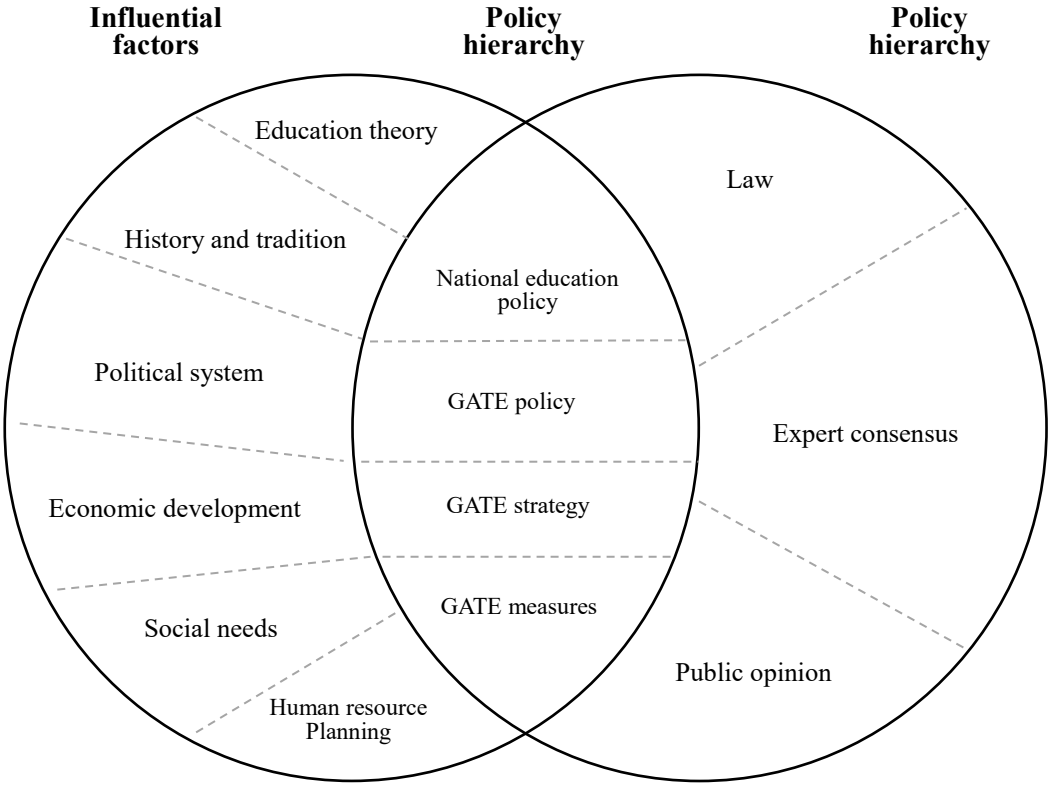
Cross-Country Comparison, Gifted Education, Legal Policy, Taiwan, Finland

BACKGROUND

In recent years, students from Taiwan and Finland have performed exceptionally in major learning assessments and competitions and have therefore received attention from scholars worldwide. With the outstanding quality of their education systems, Taiwan and Finland are considered representative “education exporters.” Comparing the policies and practices of gifted and talented education (GATE) in the two countries provides insight into their unique educational development experiences that may serve as a reference for educational development elsewhere.

The present study integrated and revised the GATE policy frameworks proposed by Wu (1996) and Wang (2012). The framework proposed herein assumes that a GATE policy is formulated through interactions between three policy sources and six influential factors. In addition, a four-level policy hierarchy (Figure 1) was developed as an extension of the proposed framework to facilitate the comparisons of the GATE policies of Taiwan and Finland.

Figure 1 Hierarchy of GATE policy formulation (revised from the frameworks of Wu [1996] and Wang [2012])



GATE Policy Development and Comparisons

Key events in the development of the GATE policies of Taiwan and Finland were examined to compare the temporal contexts and sources of the policies (Appendix I).

Development and sources of the GATE policies in Taiwan and Finland

The initial development of Taiwan's GATE policy was strongly affected by experts returning from overseas. The implementation of academic initiatives affected policy formulation. Academia and policy formulation were closely interrelated, and the policy formulation process emphasized empirical research. Experimental educational trials were conducted, and GATE policies were subsequently implemented through promotion by educational authorities or the adoption of relevant strategies or measures. This period was characterized by close collaboration between the Taiwanese government and academic institutions (AppendixⅡ). By contrast, the development of Finland's GATE policy was initially led by the government, the efforts of which were supplemented with debates among experts to reach consensuses regarding specific policy concerns. In addition, policy formulation was deeply affected by the emphasis on egalitarianism in Finnish culture. The Finnish government and public have expressed concern regarding the negative effects of labeling students as gifted and talented. Therefore, no GATE policy or relevant terminology has appeared in Finland's education regulations (Appendix Ⅲ). The government began to promote differentiated instruction in the 1970s (Tirri & Kuusisto, 2013), and trial acceleration courses were first implemented in 1994. Since 2010, international GATE camps have been hosted in Finland to expand the development of relevant education programs, prompting the government to officially incorporate the cultivation of gifted and talented students into national policy and education strategies (Brown & Wishney, 2017; Johnson, 2015).

Comprehensive comparisons

Of the three policy sources, law exerted the greatest effect on the development of the GATE policies of Taiwan and Finland, followed by expert consensus and public opinion. Collaboration between government education authorities and academic institutions also played a major role. Analysis through the lens of the aforementioned policy hierarchy revealed that Finland has not developed or implemented a formal GATE policy and has adopted a unique approach to implementing GATE. Nevertheless, although the countries have had distinct GATE development experiences, both have expended considerable efforts to cultivate gifted and talented students.

COMPARISONS BETWEEN GATE POLICY IMPLEMENTATION

Legal basis

The planning and development of GATE policies in Taiwan are overseen by designated governmental departments. Relevant regulations are established in accordance with clear legal bases, revised regularly, and complemented with various enforced rules and measures. By contrast, Finland lacks legal regulations to clarify its GATE policy; consequently, no GATE programs have been designed for compulsory education. Under the premise of avoiding labeling any students as gifted and talented, the Finnish government has instead established a multiple learning support to provide GATE services in line with each student's aptitudes (Laine & Tirri, 2016).

Student Identification

GATE programs in Taiwan comply with relevant legal standards that divide gifted and talented students into six categories. Standardized methods are used to identify such students through various multistage assessments (Ministry of Justice, 2019). Finland does not have standardized assessments or relevant regulations for GATE programs and emphasized that gifted classes are not set up in compulsory education.

Service provisions

Taiwan provides GATE through various services, including enrichment and acceleration courses. By contrast, Finland focuses on implementing differentiated instruction within its current education system; the provision of GATE services is less systematic than it is in Taiwan.

Course teaching

Taiwan's Curriculum Guidelines of 12-year Basic Education stipulate the course adjustments for gifted and talented students. In addition, Taiwan's education system provides courses for students with special needs to facilitate students' affective development, independent study, and the cultivation of leadership and creativity (Ministry of Education 2019). GATE in Finland encompasses both academic and nonacademic disciplines and places particular emphasis on the cultivation of music, arts, and sports skills in the education of young children. Between preschool and middle school, students may participate in multi-grade instruction, mixed-age instruction, and differentiated instruction. Since the 1980s, Finnish teachers in compulsory education are required to possess a Master of Research degree, which ensures the education quality and promotes GATE development nationwide.

CONCLUSION

This study compared the development and implementation of GATE policies in Taiwan and Finland and drew the following conclusions.

GATE ideals and values

Differences in cultural backgrounds have caused Taiwan and Finland to develop distinct GATE philosophies and ideals. Specifically, Taiwan emphasizes adaptive learning, whereas Finland focuses on educational equality. Both approaches yield favorable learning outcomes, indicating that GATE can be effectively implemented through diverse means.

GATE policy development

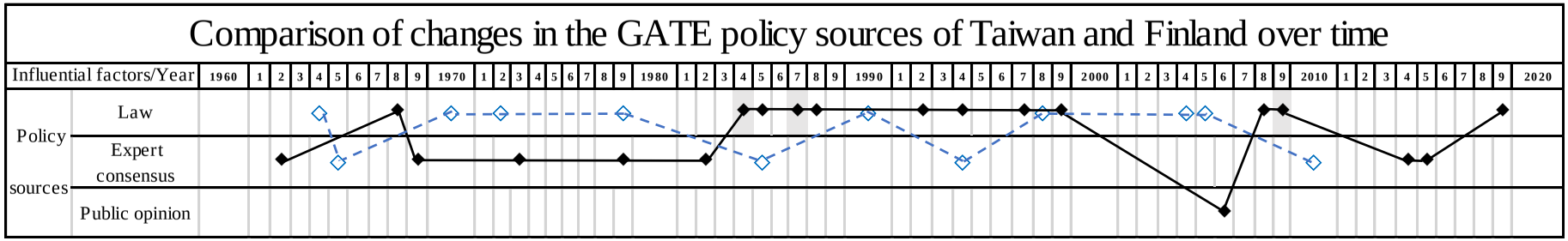
The GATE policies of the two countries stem from different sources. Nevertheless, law is the most influential factor in both countries, whereas public opinion is the least influential. In addition, expert consensuses exerted moderate effects on the initial planning of GATE policies in both countries. Educational relevant authorities in Taiwan engage in closer collaboration with academic institutions and emphasize the importance of empirical educational research. Influential factors, including politics, economics, education, and culture, exert varying effects across different stages of GATE development. From the perspective of the proposed policy hierarchy, Finland lacks legal regulations for GATE programs and has instead implemented GATE through general national education policies and other measures.

GATE policy implementation

Taiwan and Finland differ considerably in policy sources, student identification, service provision, and course teaching. Nevertheless, both countries' unique approaches have led to favorable student performance.

In summary, the GATE development experiences of Taiwan and Finland indicate that implementing GATE with consideration given to cultural context has enabled both countries to achieve favorable results. Taiwan's approach to GATE, which is strongly policy-supported and multiple development (Wu, 2013), and Finland's approach, which avoids labeling students as gifted and talented (Johnson, 2015), have been successful and may serve as a reference for the future development of GATE policies in other countries.

Appendix I: Comparison of changes in the GATE policy sources of Taiwan and Finland over time



Note: ◆Taiwan; ◇Finland; dots indicate key events and times in the GATE development history of the countries; gray-shaded cells in the law row indicate the years in which GATE regulations were implemented in Taiwan.

Appendix Ⅱ: Development of GATE regulations in Taiwan

Year	Regulation implementation/major event	Policy hierarchy	Policy sources
1962	Fourth National Education Conference	C	S
1968	Article 10 of the 9-Year Compulsory Education Implementation Act	A	L
1969	GATE experiment performed by Prof. Fuming Jia	C	S
1973	Phase-1 experiment of the Elementary School GATE Research Project	C	S
1979	Phase-2 experiment of the Elementary School GATE Research Project	C	S
1982	Phase-3 experiment of the Elementary School GATE Research Project	C	S
1984	Special Education Act	B	L
1985	Regulations on the Implementation of Pedagogy and Teaching Materials for Special Education	B	L
1987	Enforcement Rules of the Special Education Act	B	L
	Guidelines for the Grade Advancement of Secondary School Students Gifted in Music, Fine Arts, and Performing Arts		
1988	Regulations on the School Entrance Age, Academic Progression Time Limit, and Recommendation Admission of Gifted and Talented Students	B	L
1992	Regulations on the Grade Advancement and Subsidization for Students with Outstanding Sports Performance in Secondary Schools and Above	B	L
1994	Regulations on the Recommendation Admission of Secondary School Students Participating in the International Mathematical Olympiad	B	L
	Comprehensive GATE development and strategy integration research	C	S
1997	Amendment of the Special Education Act	B	L
1999	Taipei City White Paper on Gifted and Talented Education	D	L
2006	Joint admission of gifted and talented students by junior high schools in four cities and counties in central Taiwan	D	P
2008	GATE white paper	D	L
2009	Amendment of the Special Education Act	D	L
2014	Curriculum Guidelines of 12-year Basic Education	D	L
2015	Medium and long-term GATE development plan (2015–2019)	D	S
2019	Curriculum guidelines for GATE and special education	D	L

Note 1: Data were organized by the authors of the present study.

Note 2: A: national education policy; B: GATE policy; C: GATE strategy; D: GATE implementation; L: law; S: expert consensus; P: public opinion

Appendix Ⅲ: Development of GATE regulations in Finland

Year	Regulation implementation/major event	Policy hierarchy	Policy source
1964	9-year compulsory education	A	L
1965	Establishment of the teacher training reformation council	A	S
1970	Policy focusing on providing equal educational opportunity	A	L
	Comprehensive promotion of differentiated instruction	C	L
1972	Transition from dual-trajectory schools to integrated single-trajectory schools	A	L
1979	Research-oriented teacher cultivation	A	L
1985	Cancellation of competence-based class grouping	A	S
1990	Reduction of the power of the central competent authority in monitoring education	A	L
1994	Restoration of teaching autonomy in schools	A	L
	Trial acceleration programs	C	S
1998	Professional ethics of education workers	D	L
2004	Revision of basic education curricula	A	L
2004	LUMA Centre Finland	C	L
2005	Adoption of the European higher education credit system	A	L
2010	Millennium youth camps for gifted and talented students	D	S

Note 1: Data were organized by the authors of the present study.

Note 2: A: national education policy; B: GATE policy; C: GATE strategy; D: GATE implementation; L: law; S: expert consensus; P: public opinion

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