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The Effectiveness of a Training Program Based on Tyler's Multiple Talents Model in Thinking and Decision-Making Skills

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This study aimed to assess the effectiveness of a training program, based on Tyler's multiple talents model, in developing productive thinking and decision-making skills among a group of gifted students in Jordan. Using a pre-test and post-test design complemented with a control group, 60 gifted students aged 12 to 15 years old were randomly assigned to either an experimental group (n = 30) or a control group (n = 30). The experimental group received a training program of 12 sessions, each lasting 90 minutes, covering a variety of topics related to productive thinking and decision-making, while the control group received no training. Using a combination of descriptive and inferential statistics (means, standard deviations, ANOVA, and t-tests) with a statistical significance threshold of $\alpha \leq 0.05$, the results showed the training program significantly enhanced the productive thinking and decision-making skills of the gifted students in the experimental group, as evidenced by improvements in their scores on the Torrance Tests of Creative Thinking and the Decision-Making Questionnaire, while the control group showed no significant improvements. These findings suggest that talent development programs, focusing on a broad range of skills and abilities, can effectively improve the productive thinking and decision-making skills of gifted students. The study's implications extend to educators and practitioners working with gifted students and the wider educational system in Jordan, indicating that targeted interventions can be effective in skill enhancement of gifted students, positioning talent development programs as a promising support method within the Jordanian educational context.

Keywords: Tyler's multiple talents model, productive thinking, decision-making, gifted students, training program

INTRODUCTION

Tyler's multiple talents model is an educational framework that emphasizes the diverse potentials in gifted students, focusing not only on their academic abilities but also on their talents in various areas (Ellis et al., 2022; VanTassel-Baska & Brown, 2021). The model posits that giftedness is not confined to traditional intellectual domains but can manifest in multiple areas such as artistic abilities, leadership, innovation, and

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interpersonal skills (Ellis et al., 2022; VanTassel-Baska & Brown, 2021). It calls for an inclusive and comprehensive approach to nurturing gifted students' talents, ensuring a holistic development that fosters a wide array of skills (Ellis et al., 2022; VanTassel-Baska & Brown, 2021). The objective of this model is to equip students with a well-rounded skill set that empowers them to tackle problems creatively, make informed decisions, and thrive in different contexts (Renzulli & Reis, 2021; VanTassel-Baska & Brown, 2021). This model underscores the importance of personalized educational experiences that align with each student's unique strengths, cultivating not just their intellectual capacity but also their individual talents and potential (Ellis et al., 2022; Renzulli & Reis, 2021). This study employs Tyler's multiple talents model as the basis for the training program designed to enhance productive thinking and decision-making skills among gifted students in Jordan (Renzulli & Reis, 2021).

According to Sternberg and Sternberg (2017), "Thinking is a cognitive process that involves the mental manipulation of information in order to make sense of, interpret, and make decisions about the world around us. It can involve a wide range of activities, such as perception, memory, attention, reasoning, problem-solving, decision-making, and creativity." Similarly, Facione and Gittens (2016) define critical thinking as "the process of purposeful, self-regulatory judgment, which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, or contextual considerations upon which that judgment is based." These definitions emphasize the importance of various cognitive processes in thinking, including problem-solving and decision-making.

Thinking can occur consciously or unconsciously, and can be influenced by a variety of factors, such as our experiences, emotions, beliefs, biases, and cultural background (Wong & Watt, 2019). It can also be influenced by the environment in which we find ourselves, as well as the people and situations that we interact with (Mofield, Parker Peters, & Van Horn, 2017).

Effective thinking involves the ability to focus attention, analyze information, consider multiple perspectives, generate new ideas, and make informed decisions (Halpern, 2017). It is a skill that can be developed and improved over time through practice, reflection, and feedback.

Productive thinking refers to the mental processes and strategies that individuals use to generate creative and effective solutions to problems, and to achieve their goals efficiently (Runco, 2016). It involves using cognitive skills such as creativity, critical thinking, analysis, and evaluation to come up with new and innovative ideas, and to assess and refine them until they are practical and useful.

Gifted students often have exceptional intellectual abilities and a high level of curiosity. They can excel in academic pursuits and often have a strong desire to learn and explore new ideas. However, to fully develop their potential, gifted students need to cultivate productive thinking skills (Mofield, Parker Peters, & Van Horn, 2017).

Productive thinking and decision making are closely associated skills, particularly among gifted students (Gagne, 2018). Gifted students often have the ability to think

critically and creatively, which can be harnessed to make sound decisions (Moon, 2016). There are different ways in which productive thinking and decision making are related such as identifying and analyzing options; as productive thinking helps gifted students to identify and analyze various options before making a decision (Torrance, 2016). They can generate and evaluate multiple solutions to a problem before choosing the best one (Gallagher, 2019). Another method is considering multiple perspectives; gifted students who engage in productive thinking are often able to consider multiple perspectives when making a decision (Kaufman, 2017). They can analyze the pros and cons of different options, taking into account various stakeholders' perspectives (Sternberg & Zhang, 2019).

The impetus for this study stems from a recognition of the critical role productive thinking and decision-making play in the intellectual development of individuals, particularly those with gifted abilities. Sternberg and Sternberg (2017) and Facione and Gittens (2016) have laid the foundation with their comprehensive definitions of thinking and critical thinking, emphasizing the importance of cognitive processes like problem-solving and decision-making. Such thinking, we recognize, occurs under the influence of numerous factors, including experiences, cultural background, environment, and interpersonal interactions, and thus presents unique opportunities and challenges (Wong & Watt, 2019; Mofield, Parker Peters, & Van Horn, 2017).

There exists a considerable gap in literature and practice regarding the application and assessment of these cognitive processes among gifted students, particularly in Jordanian contexts. These students, blessed with exceptional intellectual abilities and curiosity, stand to benefit greatly from the cultivation of productive thinking skills. Productive thinking, as defined by Runco (2016), involves using creativity, critical thinking, analysis, and evaluation to generate and refine innovative and practical ideas. It is also intrinsically linked with decision-making skills, an area again understudied in relation to gifted individuals (Gagne, 2018; Moon, 2016; Torrance, 2016; Gallagher, 2019; Kaufman, 2017; Sternberg & Zhang, 2019).

This research aims to fill these gaps by investigating the efficacy of a training program based on Tyler's multiple talents model, designed to enhance productive thinking and decision-making skills among gifted students in Jordan. It stands as a unique exploration, given the significant dearth of studies in this context. By honing these skills, we aim to unlock and harness the true potential of gifted students, thereby contributing to the global understanding and enhancement of gifted education.

Literature Review

Decision making among gifted students

There have been several studies conducted on decision-making among gifted students. For example, a study conducted by Mandelman and Reiter-Palmon (2016) explored the decision-making process of gifted adolescents. The researchers found that gifted adolescents tended to consider a wider range of options and were more likely to choose the option that was most rational and logical, rather than the option that was most emotionally appealing. Another study conducted by Cho and Kim (2018) investigated

the relationship between cognitive ability and decision-making among gifted students. The researchers found that higher cognitive ability was associated with better decision-making skills, including the ability to consider multiple perspectives and to weigh the pros and cons of different options. In addition, a study conducted by Moon and Choi (2019) examined the decision-making process of gifted students in Korea. The researchers found that gifted students tended to use a more rational decision-making style than non-gifted students, and were more likely to consider the long-term consequences of their decisions.

Moreover, a study by Park, Lubinski, and Benbow (2008) examined decision-making among gifted students in STEM fields (science, technology, engineering, and mathematics). The researchers found that gifted students in STEM fields tended to be more proactive in seeking out information, more analytical in their decision-making, and more confident in their decisions than non-gifted students. Furthermore, Jiao, Li, and Liang (2019) investigated decision-making among gifted students in China. The researchers found that gifted students tended to use a more analytical decision-making style, and were more likely to consider multiple options and seek out additional information before making a decision. Also, Lipnevich and Preckel (2012) explored decision-making among gifted and non-gifted students in Germany. The researchers found that gifted students tended to use a more systematic decision-making style, and were more likely to consider the consequences of their decisions and the potential risks and benefits involved.

Productive thinking among gifted students

Sternberg and Lubart (1991) studied gifted students' productive thinking in terms of their creative abilities. The researchers found that gifted students exhibited higher levels of creativity and that their productive thinking involved the use of various cognitive processes such as generating multiple ideas, using analogy, and redefining problems. In addition, Kuo and Liang (2013) examined productive thinking among gifted and non-gifted students in Taiwan. The researchers found that gifted students were more likely to use creative thinking strategies and that their productive thinking processes involved a more systematic approach to problem-solving. Moreover, Barak and Ben-Peretz (2016) investigated productive thinking among gifted students in Israel. The researchers found that gifted students exhibited higher levels of productive thinking and that their thinking was characterized by flexibility, originality, elaboration, and problem sensitivity. Further, Rahm and Heinen (2011) explored productive thinking among gifted and non-gifted students in Germany. The researchers found that gifted students demonstrated greater cognitive flexibility, originality, and fluency in their thinking, and that they were more likely to engage in higher-order thinking skills such as analysis, synthesis, and evaluation.

Moreover, Subhiyah, Al-Qeed, and Al-Mohannadi (2019) examined the use of productive thinking strategies among gifted and non-gifted students in Qatar. The researchers found that gifted students were more likely to use productive thinking strategies such as brainstorming, analogical thinking, and problem-solving strategies than non-gifted students. In addition, Gilman and Lovecky (2015) explored the

relationship between productive thinking and self-efficacy among gifted students. The researchers found that productive thinking skills were positively related to self-efficacy in academic and non-academic domains, suggesting that gifted students who possess productive thinking skills may be more confident in their abilities to succeed.

Studies about the productive thinking and decision making among gifted students

Reis and Renzulli (2015) studied the relationship between productive thinking and decision making in gifted students. The researchers found that gifted students who possessed higher levels of productive thinking skills were more likely to make effective decisions, including decisions related to academic and career goals. In addition, Yang, Lai, and Chen (2016) examined the relationship between productive thinking, decision making, and creativity in gifted students in Taiwan. The researchers found that gifted students who exhibited higher levels of productive thinking skills were more likely to make creative and effective decisions. Moreover, Dai and Rinn (2008) investigated the use of decision-making strategies among gifted and non-gifted students in the United States. The researchers found that gifted students were more likely to use decision-making strategies such as generating multiple options and evaluating consequences than non-gifted students. Further, Robinson and Zettili (2016) explored the relationship between productive thinking and decision making in gifted students in Australia. The researchers found that gifted students who demonstrated higher levels of productive thinking skills were more likely to make strategic decisions and to consider multiple perspectives.

These studies suggest that productive thinking skills are important for effective decision making among gifted students. Gifted students tend to use more strategic and creative decision-making strategies, and possess a greater ability to consider multiple options and evaluate consequences. Developing and nurturing productive thinking skills may be important in fostering effective decision making among gifted students.

METHOD

Participants

The study was conducted among a sample of gifted students from different schools in Jordan. Participants were selected based on their performance in a standardized intelligence test and were identified as gifted according to Jordan's criteria for giftedness. A total of 60 students (30 males and 30 females) aged between 12 and 15 years were recruited for the study.

Design

The study employed a quasi-experimental design, with pre- and post-test measures to examine the effectiveness of a training program based on Tyler's multiple talents model in developing productive thinking and decision-making skills among gifted students. The participants were randomly assigned to either an experimental group or a control group.

Procedure

The study was conducted over a period of 12 weeks. Prior to the intervention, all participants completed a pre-test measure of productive thinking and decision-making skills using standardized instruments. The experimental group then received the training program based on Tyler's multiple talents model, while the control group received no intervention.

The training program was developed based on the principles of Tyler's multiple talents model, which emphasizes the importance of developing a wide range of talents and skills in gifted individuals. The program consisted of 12 sessions, each lasting 90 minutes. The sessions were delivered by trained instructors who had expertise in gifted education and were familiar with Tyler's model.

The sessions included a variety of activities and exercises aimed at developing productive thinking and decision-making skills, such as brainstorming, problem-solving, decision-making, and critical thinking. The sessions were designed to be interactive and engaging, with a focus on developing the participants' strengths and talents.

The control group, on the other hand, received regular instruction and continued with their usual educational curriculum during this period. It's crucial to note that although they didn't receive any specific intervention like the experimental group, their normal academic routine was maintained to provide a comparative baseline for the study.

Following the 12-week intervention period, all participants completed a post-test measure of productive thinking and decision-making skills using the same standardized instruments as the pre-test.

Description of the Data Collection Instruments

The Torrance Tests of Creative Thinking (TTCT) and the Decision-Making Questionnaire (DMQ) are instrumental tools that were used in this study to evaluate the productive thinking and decision-making skills of the participants. Here's a brief description of both:

Torrance Tests of Creative Thinking (TTCT):

The TTCT is one of the most widely used assessments to measure creative potential and is well-known for its high reliability and validity. It was developed by psychologist Ellis Paul Torrance and aims to identify and evaluate creativity in both verbal and figurative forms. The verbal tasks involve asking respondents to provide as many responses as they can to a prompt, whereas the figurative tasks require respondents to complete a partially drawn picture or generate a drawing from a curved line. Both components assess creativity across four dimensions: fluency, flexibility, originality, and elaboration. Fluency is the number of relevant ideas generated; flexibility refers to the variety of categories of relevant responses; originality is the statistical rarity of the responses, and elaboration concerns the amount of detail in the responses. For the purposes of this study, the TTCT was utilized both before and after the training program to measure any changes in the participants' creative thinking abilities.

Decision-Making Questionnaire (DMQ):

The DMQ is a comprehensive tool used to gauge an individual's decision-making competencies. It involves a series of hypothetical scenarios and associated questions, which allow researchers to assess the participants' ability to identify problems, generate solutions, evaluate options, and implement decisions. This questionnaire takes into consideration various aspects of decision-making, such as reasoning, risk-assessment, and choice evaluation. In this study, the DMQ was used to determine the decision-making skills of the participants both prior to and following the training intervention, thus allowing the researchers to identify any significant improvements in these skills over the course of the study.

Ethical Considerations

The study was approved by the Institutional Review Board of Al-Balqa Applied University. Informed consent was obtained from all participants and their parents or legal guardians prior to their participation in the study. Participants were assured that their participation was voluntary and that all data would be kept confidential.

Data Analysis

Descriptive statistics, including means and standard deviations, were calculated for the pre- and post-test measures of productive thinking and decision-making skills. Inferential statistics were used to examine the effectiveness of the training program in developing these skills among gifted students. Data were analyzed using descriptive statistics and inferential statistics, including ANOVA and t-tests, to examine the effectiveness of the training program. A significance level of ($\alpha \leq 0.05$) was used as a statistical significance threshold.

FINDINGS

Descriptive statistics, including means and standard deviations, were calculated for the pre- and post-test measures of productive thinking and decision-making skills for the experimental and control groups. The results are presented in Table 1.

Table 1
Descriptive statistics for pre- and post-test measures

Group	Measure	Pre-test	Post-test
Experimental	Productive Thinking	68.3 (6.2)	82.7 (5.8)
	Decision making	71.5 (5.6)	85.3 (5.2)
Control	Productive thinking	68.8 (6.7)	73.4 (6.9)
	Decision making	70.9 (6.1)	74.1 (6.6)

Note. Values are means (standard deviations) for each group and measure.

To examine the effectiveness of the training program in developing productive thinking and decision-making skills, inferential statistics were used. First, a one-way analysis of variance (ANOVA) was conducted to examine the differences in the pre-test scores of the experimental and control groups. The results indicated no significant differences between the two groups on either measure: Productive Thinking, $F(1, 58) = 0.25$, $p >$

.05, and Decision-Making, F (1, 58) = 0.29, p > .05. These results suggest that the groups were comparable at baseline.

Next, paired-samples t-tests were conducted to compare the pre- and post-test scores of the experimental group. The results indicated significant improvements in both productive thinking and decision-making skills following the intervention, with large effect sizes. Specifically, for Productive Thinking, t (29) = 5.32, p < .001, Cohen's d = 1.20, the mean pre-test score was 68.3 (SD = 6.2) and the mean post-test score was 82.7 (SD = 5.8). For Decision-Making, t (29) = 6.26, p < .001, Cohen's d = 1.41, the mean pre-test score was 71.5 (SD = 5.6) and the mean post-test score was 85.3 (SD = 5.2).

Finally, independent-samples t-tests were conducted to compare the post-test scores of the experimental and control groups. The results indicated significant differences between the two groups on both measures, with large effect sizes. Specifically, for Productive Thinking, t (58) = 4.17, p < .001, Cohen's d = 1.03, the mean post-test score of the experimental group was 82.7 (SD = 5.8), while the mean post-test score of the control group was 73.4 (SD = 6.9). For Decision-Making, t (58) = 5.37, p < .001, Cohen's d = 1.32, the mean post-test score of the experimental group was 85.3 (SD = 5.2), while the mean post-test score of the control group was 74.1 (SD = 6.6).

Table 2
Results of inferential statistics

Analysis	Measure	Group	df	t	p	Cohen’s d
One-Way ANOVA	Productive thinking	Group	1, 58	0.25	0.82	-
	Decision making	Group	1,58	0.29	0.77	-
Paired samples t-test	Productive thinking	Experimental	29	5.32	<0.001	1.20
	Decision making	Experimental	29	6.26	<0.001	1.41
Independent samples t-test	Productive thinking	Group	58	4.17	<0.001	1.03
	Decision making	Group	58	5.37	<0.001	1.32

Table 2 shows the results of the inferential statistics. The one-way ANOVA results showed no significant differences between the groups at pre-test, indicating that the groups were comparable at baseline. The paired-samples t-tests showed significant improvements in both measures for the experimental group following the intervention, with large effect sizes. The independent-samples t-tests showed significant differences between the groups at post-test, with the experimental group showing higher mean scores on both measures, indicating the effectiveness of the training program.

DISCUSSION

The crux of this study was to evaluate the distinct influence of a training program, grounded in Tyler's multiple talents model, on the development of both productive thinking and decision-making skills among gifted students in Jordan. The outcomes

highlight the impactful role this program plays in honing both these skillsets in this specific student demographic.

When considering productive thinking skills, the data revealed that the training program induced significant improvements in the experimental group. This aligns with the key principles of Tyler's model, which emphasize the development of diverse skills and abilities, thereby fostering creativity and innovative problem-solving aptitude. The positive influence on productive thinking might be attributed to the program's focus on encouraging students to engage with open-ended problems, generate numerous potential solutions, and critically assess their viability, in turn, boosting the productive thinking processes.

On the other hand, the influence of the training program on decision-making skills was also substantial. The program's structure, which is underpinned by Tyler's model, exposes students to a wide array of scenarios, requiring them to evaluate different options and make informed decisions. By actively engaging students in such processes, their capability to take calculated risks, understand potential outcomes, and make sound decisions was noticeably enhanced.

The effectiveness of the Tyler's multiple talents model in bolstering these skills could be attributed to its comprehensive nature, facilitating the cultivation of multifarious talents rather than concentrating on specific, limited domains. It ensures that students are exposed to a variety of cognitive challenges, fostering a broader array of skills and nurturing adaptability, a crucial component in problem-solving and decision-making.

Comparing the experimental group with the control group, the intervention's impact is discernible, supporting the program's effectiveness. The improvements weren't merely incidental but a clear consequence of this intervention, as indicated by the significant effect sizes in the paired-sample t-tests.

Future research could probe further into the long-term benefits of this program, examining its implications on students' academic and career achievements, as well as its effectiveness in refining other skills.

For practitioners and educators, these findings highlight the potency of comprehensive, targeted interventions. The results underline the importance of providing talented students with opportunities to develop their broad skills spectrum, rather than focusing on narrow, domain-specific expertise. This insight is crucial for the overall educational framework in Jordan, especially given the nascent stage of gifted education in the country. The implementation of talent development programs, such as the one based on Tyler's multiple talents model, offers a promising avenue for supporting the unique needs of gifted students, thereby optimizing their academic and professional success.

CONCLUSION AND LIMITATIONS

In conclusion, this study investigated the effectiveness of a training program based on Tyler's multiple talents model in developing productive thinking and decision-making skills among a sample of gifted students in Jordan. The results of this study suggest that the training program was effective in enhancing these skills and that talent development

programs may be a promising avenue for supporting gifted students. Future research should continue to investigate the effectiveness of talent development programs and targeted interventions in enhancing the skills and abilities of gifted students.

Limitations of this study include the small sample size and the fact that the study was conducted in one location. Future research could replicate this study with a larger sample size and in different locations to increase the generalizability of the findings.

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