

The effectiveness of a training program based on Betts' model of autonomous learner on improving the creativity product

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Abstract

Aim: The present research sought at investigating the effectiveness of a training program on the basis of Betts' model of autonomous learner on improving the creativity product among a sample of gifted 10th grade female students.

Method: This was a quasi-experimental study that included a sample of 68 gifted 10th grade female students from King Abdullah II School for Excellence. The students were randomized into a control group (n=34) that received traditional teaching and an experimental group (n=34) that was subjected to the training program based on Betts' model of autonomous learner. The creative product semantic scale was adopted to perform a pre- and post-assessment of the students' creative projects (a telescope). The data gathered in this study was analyzed using the statistical package of social sciences.

Results: The findings of the study showed that there was significant statistical differences in the experimental group creativity product between pre- (3.18±0.73) and post-training assessment (5.81±0.70), (t=15.1628, p≤0.05).

Conclusion: The study ended up with that the training program based on Betts' model of autonomous learner had a statistically significant positive effect on improving gifted students' creativity products. The study recommends adopting the concepts of learning autonomy in teaching gifted students and designing various training programs aiming to improve the creativity capacities of the gifted students.

Keywords: Betts' model, autonomous learner, creativity product, gifted students

INTRODUCTION

The scientific and technological progress, the great informational acceleration, the rapid increase in the applications of human knowledge, and human innovations bear witness to the role of thinking and innovation (Samawi et al., 2020). Competition between peoples and nations has become a competition of information and inventions in various fields (Berg et al., 2021). As a result of this competition, the thought industry movement emerged, according to which thinking is no longer an individual activity or task undertaken by the thinking individual, to achieve a self-goal, rather it has become a collective activity carried out by a group of thinkers in different fields that work to produce ideas and solutions to problems like any group

that manufactures and produces (Chalkiadaki, 2018; Meyer & Norman, 2020). Based on this approach, the development of thinking, especially creative thinking, has become a basic goal. Based on this trend, the development of thinking, especially creative thinking, has become a primary goal that advanced educational systems are working to achieve in all its various institutions (Malik, 2018).

The development of creativity and its skills is the responsibility of all state institutions, especially educational institutions, which contribute to the development of thinking skills of different types of learners through different curricula or through training programs independent of the curricula (Nakano & Wechsler, 2018).

Contribution to the literature

- The findings of the present study would be beneficial in improving the creativity product among gifted students throughout enhancing the autonomous learning and increasing gifted students' motivation and engagement in their learning process.
- The proposed training program used in this study might be implemented to different settings and populations in order to be validated and ensured for reliability within different settings concerned with gifted students from different age ranges.
- The present study provided a theoretical framework that could be used in future research studies exploring the creativity products among gifted students at different educational settings.

The learner may face many problems in which he/she is confused about the solution or making the appropriate decision, so the learner finds him/herself facing a challenge that requires him/her to find alternatives, generate ideas, and develop various solutions to reach an appropriate solution to the problem he/she faces, and to the extent that the learner can generate new ideas and different ones are to the extent that his/her decision is closer to the truth, more valid and objective (Khoiriyah & Husamah, 2018). This is because the breadth in generating ideas means the breadth, comprehensiveness, and depth of thought processes, where the problem is looked at from multiple angles and in different directions surrounding the problem and works to analyze it in its various dimensions (Mahanal et al., 2019).

This period has made important achievements in the development of tools and methods of measurement for creators and the creative process, as hundreds of tests and objective measurement tools were designed (Supena et al., 2021), and these tests were validated and tested on a wide range of environments and cultures in the world, instead of relying on traditional intelligence tests that studies conducted decades ago showed that it cannot predict the occurrence of the creative output of specific individuals, as it was noted that despite the necessity of having a minimum level of intelligence for creative activities (Verawati et al., 2019), this minimum varies from one field to another, and the availability of the upper limit of intelligence in some individuals does not necessarily leads to the growth of creativity (Nozimovich et al., 2020). There are conflicting opinions of educational and psychologists regarding the relationship between intelligence and creativity. Creativity literature mentions that there are two opinions in this field. The first is that creativity in its various fields is a manifestation of the general intelligence of the individual, or that creativity is a mental process linked to intelligence (Yalcin & Erden, 2021).

Studies conducted on large samples of gifted children and normal children indicate that gifted children in general enjoy high physical strength and have general and special mental abilities that exceed other ordinary people, and that they are interested in scientific, artistic,

and literary interests and applied tendencies to theoretical aspects (Worrell et al., 2019). They think carefully about solving problems and have a high ability to offer solutions and alternatives to the same problem (Yalcin & Erden, 2021). In addition, gifted children are not all of the same pace in abilities and interests, but they differ from each other just like ordinary children, for some of them have high mental characteristics and abilities in various scientific, literary, artistic, and technical fields (Singer, 2018). In addition, some of them are characterized by some of these characteristics and features only, so they are gifted and creative in one or two types of activity or manifestations of creativity (Lassig, 2020).

If we want to move forward in identifying the personalities of the gifted and presenting their characteristics, we should refer to the most important definitions contained in the educational and psychological literature heritage of the gifted and creative (Angela & Caterina, 2020). The gifted child has been defined as "every child who is distinguished by mental superiority over his/her age stage in some abilities that make him a great and effective contributor to the well-being of society." (Hamza et al., 2020).

Psychological and educational encyclopedias refer to the description of the gifted and creative child as the child who performs any work with high efficiency and better than those of his/her age, and in a manner that promises high achievements and contributions in the future (Leikin, 2020). Another definition is Spearman's definition of a child's creative thinking as the ability to perceive the relationship between two things in a way that results in the emergence of a third thing that is different from their first two forms (Sorrentino, 2019).

The Gestalt School of Psychology holds that the gifted creator is that individual who is able to re-integrate knowledge and ideas in a new way (Leikin & Sriraman, 2022). There is another set of definitions that emphasize the excellence of the gifted with higher mental abilities. The gifted and creative are those individuals who obtain high degrees of intelligence by 1% of the young children (Gagné, 2021).

Statement of Problem

Childhood is one of the most important developmental stages that a person goes through, as it represents the starting point for growth in its various physical, mental, emotional, and social manifestations (Renatovna & Renatovna, 2021). It is also the basis for building personality, acquiring knowledge and skills, and forming tendencies and attitudes (Zdanevych et al., 2020). Hence, psychologists- especially analytical ones - stress the need to take care of the childhood stage and create the appropriate environment to stimulate the child's motives and creativity, starting from the home environment, then the kindergarten environment, and the school environment (Behnamnia et al., 2020). These environments are the source of creative inspiration for the child and are responsible for his/her growth and advancement or his/her frustration and failure. This facilitates the process of creativity, so the talent grows and thrives towards perfection to achieve tremendous achievements in the future (Dere, 2019). But if it is poor, destitute in its intellectual stimuli, dominated by the spirit of domination and fear, and lacks self-confidence, and does not have the material and cultural elements necessary for the creative process, then it is often the cause of the talent's frustrations and his/her failure (Piotrowski & Meester, 2018).

Thus, it can be said that attention to the process of developing creative thinking should focus on two aspects (Richardson & Mishra, 2018). The first is the environment in its broadest sense, which includes the social, psychological, and material environment in its three dimensions: the family (the home environment), the school, and the community with its multiple sports, social and cultural institutions (Chawla, 2020). The second aspect is the child itself as the main focus of the creative development process, and both dimensions complement each other, as caring for the environment is caring for the child itself (Berti et al., 2019).

In the context of this interest in the integrated aspects of the gifted and the development of their creative thinking, we ask the extent to which the current Jordanian educational system responds to the demands of creative education and is it possible to take some professional measures and training programs based on the knowledge and content of the educational process to meet the needs of the gifted child in our schools? The thorough review of the previous studies indicates a significant lack of the studies that discusses the effectiveness of training programs based either on educational models or theories on improving the creative product of the gifted students. Therefore, the present study sought to investigate the effectiveness of a training program based on Betts' model of autonomous learners on improving the creativity product among a sample of gifted 10th grade female students. It is noteworthy here that female students were chosen in

this study because the literature gap mainly is concerned with female gifted students.

Research Significance

The importance of the current study lies in the fact that it provides a training program that teachers of gifted students may employ in order to improve the creative output of gifted students at various stages. In addition, the importance of the current study stems from the importance of its subject, which aims to improve the level of creative output among gifted students, which provides the opportunity for researchers to design similar educational and training programs aimed at upgrading and refining the skills of gifted students. The current study also enriches the available literature on the creative output of gifted students, especially in light of the severe lack of studies at the local and regional levels regarding the creative output of gifted students and ways to improve and develop it.

Research Definitions

1. **Creative output:** It is defined as the output resulting from creativity as a new and unprecedented achievement, and this achievement may be artistic, literary or scientific, where the creative output can be judged by evaluating it in the light of four aspects according to the following: first, the availability of **novelty** in techniques, processes or concepts, and the extent to which this output is capable of producing more future works, as well as creating potentially radical transformations in its field. A second aspect is the **resolution**, which means the extent to which the creative output is able to satisfy needs or solve situations. The third aspect is the **elaboration**, which is the elegance and attractiveness of the creative output. Finally, the **synthesis**, which is the extent to which the creative output combines dissimilar elements into a whole.
2. **Autonomous learner:** Autonomous learners are any learners who functioning correctly or generates fresh ideas on their own, with little help from other sources, in a few chosen fields of effort is said to be autonomously (Betts et al., 2016).
3. **Autonomous learner model:** This model was developed in 1999 by George Betts and Jolene Kercher (Betts & Kercher, 1999). As Betts and Kercher (1999) stated, the model's objective is to support learners' progress as independent, self-directed learners by helping them acquire knowledge, ideas, and constructive perspectives in the areas of cognition, emotional, social interaction, and physical aspects (p. 43). The key components are that students navigate through activities with minimal external guidance, there is

a large focus on personal development and self-esteem as well as an underestimating of giftedness, and the model provides many opportunities for career development.

LITERATURE REVIEW

Different studies focused their attention on developing and improving gifted students' skills in different fields. For example, Aladwan (2021) conducted a study that aimed investigating the effectiveness of a training program based on Betts' model of autonomous learner on improving leadership and problem solving skills. The sample of the study consisted of 60 gifted students who were randomized into a control group and interventional group equally. The results of the study showed that the training program based on autonomous learners model by Betts significantly improved the gifted students' leadership skills and problem solving skills.

A study by Jarwan and Alabadi (2014) sought to determine how a curriculum based on a creative problem-solving approach affected the development of innovative reasoning capabilities in exceptional individuals with educational impairments. In particular in the governorate of Amman, the research participants included 28 male and female students enrolled in public schools. Participants have been divided evenly between the two groups—the interventional and the reference. An educational program based on the creative problem solving technique was created to address the research topics. It consisted of 18 practice sessions that have been administered over the course of six weeks, three days a week, with two sessions in each. Torrance test of creative thinking was applied to the two groups before applying the program and after completing the application, the data for the pre- and post-tests were processed using the analysis of covariance. The survey's findings showed that there were statistically significant differences between the experimental and control members of the group' average score on the abilities of fluency, flexibility, originality, and the test in its entirety at the level 0.05, favoring the achievement of the experimental group members. This suggests that kids with IQs between 115 and 124 and students with higher IQs experienced instructional program's effects similarly.

In a research reported in 2015, Aldulami (2015) sought to determine the effects of sub- and non-sub-summer enrichment programs on the academic achievement of gifted adolescents. Thus, it sought to investigate the impact of gifted students' achievement on sub-programs vs. non-programs. The talented kids who participated in the sub- and non-sub-summer enrichment programs were randomized to make up the research group, which included 115 participants from the sub-programs and 137 participants from the non-sub-programs. The researcher used the student performance measure. The achievement of the students

was measured by the investigator. According to the study, there are statistically significant disparities between pre- and post-application arithmetic mean for the participants who participated in the sub-programs in terms of the measures of scientific knowledge, scientific research skills, creative thinking, problem-solving skills, critical thinking, leadership, motivation, and autonomy, as well as the total rating on the participants' achievement test.

Alsultan and Alharbi (2021) performed a study that aimed to investigate the effectiveness of a distance-training program based on a problem-solving strategy in developing creative thinking among talented students in Jubail industrial city, where the quasi-experimental approach was used for its relevance to the purpose of the study. The study sample consisted of 40 high school students who passed the Mawhiba multiple mental abilities scale. The results of this study concluded that there is a statistically significant effect of the distance training program based on the problem-solving strategy in developing creative thinking for gifted students, where the value of t for the total degree was -15.93 with a significance level of 0.00 and it is statistically significant at the level 0.05. The results also revealed that there was no difference in the impact of the distance training program based on the problem-solving strategy on the development of creative thinking for gifted students due to the grade variable (first, second, and third secondary), where the value of Chi-square for the total score was 0.887 with a significance level of 0.642 and it is not significant at the level 0.05. The study recommended expanding the use of this training program based on a problem-solving strategy with gifted students in general, for its effective contribution to the development of their creative thinking.

Al-Otaibi (2017) carried out a study that aimed to investigate the effect of a training program based on web quests in developing the reading comprehension skill in English for gifted students. The study sample consisted of 60 first-year secondary students from Al-Haditha schools in the city of Al-Qurayyat, and they were intentionally assigned to two groups (experimental and control). To achieve the objectives of the study, the experimental group was subjected to the program based on cognitive trips, and the groups were subjected to a pre-test before undergoing the training program in the event that the control group did not undergo any training, and the application of the training program was followed by a post-test at the end of the training to determine the effect of the training program. The results showed that there are statistically significant differences in the performance of the experimental group students on the post-reading comprehension test on all its dimensions (literal, explanatory, and critical), where the students of the experimental group outperformed their counterparts from the control group.

Table 1. 7-point Likert scale

Item		Scale							
Novelty									
Surprise	Usual	1	2	3	4	5	6	7	Unusual
Originality	Original	1	2	3	4	5	6	7	Conventional
Resolution									
Logicalness	Important	1	2	3	4	5	6	7	Unimportant
Useful	Useless	1	2	3	4	5	6	7	Useful
Value	Inessential	1	2	3	4	5	6	7	Essential
Understandability	Uninfluential	1	2	3	4	5	6	7	Influential
Elaboration/synthesis									
Organic design	Well-made	1	2	3	4	5	6	7	Botched
Well-craftedness	Operable	1	2	3	4	5	6	7	Inoperable
Elegance	Disordered	1	2	3	4	5	6	7	Ordered

Going through the previous studies, it is clear that there is a lack of studies, especially in the Jordanian context, that discuss the use and effectiveness of autonomous learner's model developed by Betts, particularly among gifted students category, which is considered a strength point of the present study.

METHODOLOGY

Research Design

The present study adopted the quasi-experimental research design. This design was adopted to investigate the effectiveness of the independent variable (the training program based on Betts' model of autonomous learner) on the dependent variable (creative product) among the experimental group in the presence of controlled conditions (the control group).

Research Population

The population of the present study was all tenth grade gifted female students from King Abdullah II schools for Excellence in Al-Salt City. His Majesty King Abdullah II bin Al Hussein took the grand initiatives to improve schools for exceptional students in each of the kingdom's regions in order to include a stimulating learning atmosphere and train leaders for the future in a variety of fields. The first school of King Abdullah II School for Excellence was opened at the beginning of the year 2001/2002 school year in Al-Zarqa Governorate, and the opening of these schools continues to include all governorates of the Kingdom. Objectives of establishing King Abdullah II Schools for Excellence to provide the distinguished with a solid theoretical background in basic knowledge at its mastery and development level, to provide the distinguished students with beneficial life skills related to science and technology, to develop the talents and creativity of the distinguished and to invest his/her energies to a maximum extent, to develop the personality of the distinguished by enhancing his/her confidence in him/herself and his/her abilities, developing his/her vision of the future and planning for it, developing the distinguished to face the challenges

he/she faces in an applied manner, developing higher-order thinking skills and scientific techniques for the distinguished, developing the sense of belonging, providing new educational opportunities in which the distinguished practice methods of learning and teaching that achieve his/her talent and creativity.

Research Sample

The study used the purposeful sampling in order to recruit the study participants. The study sample consisted of all tenth grade gifted female students enrolled in King Abdullah School for Excellence in Al-Salt City. The sample consisted of 68 students who were randomly assigned into an experimental group (n=34) who received the training program based on Betts' model of autonomous learner, and a control group (n=34) that received traditional learning.

Research Instrument

In this study, the creative output of the enrolled gifted female students was assessed through a telescope as a final project. The telescope was chosen as a final project as it contains concepts of geometry studied at the second, third and fourth units of the mathematics curriculum of the tenth grade. To assess the creative output of the enrolled students, the researchers used the revised version of the creative product semantic scale (CPSS) developed by O'Quin and Besemer (1989). CPSS is based on conceptualizing the dimensions of novelty, resolution, elaboration, and synthesis. The novelty domain included two items (surprise and originality), the resolution domain included four items (logicalness, useful, value, and understandability), whereas the elaboration and synthesis domain included three items (organic design, well-craftedness, and elegance). Each item is scaled using a 7-point Likert scale, as shown in **Table 1**.

The previous rubric was used to assess the creative product made by students and it was assessed by the researcher and the mathematics teacher independently. The average assessment was used as a final score of the product creativity.

Table 2. Correlation coefficients between creative output assessment rubric items & total rubric score

Item	With domain	With scale
Novelty		
Surprise	0.462	0.517
Originality	0.536	0.610
Resolution		
Logicalness	0.627	0.719
Useful	0.540	0.600
Value	0.681	0.570
Understandability	0.839	0.477
Elaboration/synthesis		
Organic design	0.866	0.739
Well-craftedness	0.692	0.809
Elegance	0.943	0.581

Validity and Reliability of the Study Scale

The content validity of assessment rubric was ensured through submitting the assessment rubric to five experts and academic teaching staff who are specialized in teaching gifted students and curriculum development. In addition, the internal consistency was ensured through assessing previously projects made by 15 10th grade students in science subject. The Pearson's correlation coefficient was calculated between the items and the domain on one hand and the total score on the other hand. It was found that the value of the Pearson's correlation coefficients ranged between 0.462 and 0.943, which indicated an acceptable internal consistency of the assessment rubric (Table 2). Moreover, the reliability of the assessment rubric was ensured through calculating the Cronbach's alpha coefficient. It was found that the reliability of the novelty domain was 0.79, the resolution domain was 0.841, the resolution/synthesis domain was 0.793, and for the total instrument was 0.834.

The Training Program

Aim of the program

The aim of the training program was to improve the creative product produced as a final project by the tenth grade gifted female students in King Abdullah II School for Excellence in Al-Salt City through providing the students with the necessary knowledge and skills based on the autonomous learner model developed by Betts and Kercher (1999). This training program based on Betts' model of autonomous learner is clearly designed to integrate the emotional, social, and cognitive aspects of education, facilitating students' growth as independent and self-directed learners while developing skills, concepts, and positive attitudes within the cognitive, emotional, and social environment.

Philosophy of the training program

One of the most important objectives of the gifted care programs is to help gifted and talented students to

identify their abilities and the most appropriate areas for their scientific and professional future, and to provide various experiences to nurture those abilities and energies in a range in which the student reaches a high level of self-realization and excellence.

The proposed training program presented in this study stems primarily from the aforementioned objective, bearing in mind the right of talented students to obtain educational programs, teaching methods and educational opportunities that foster this superiority and excellence, an integrative sequential care characterized by a logical gradation of the stage.

As it is well known that the gifted student has a set of mental abilities that outperform his peers, and his presence in the ordinary class or receiving the same educational material in the same ways that are used with ordinary students makes the chances of taking into account these high abilities are limited in light of the focus of the general curriculum on the slide The largest number in the school environment, which often shows a greater need to learn basic skills and pre-determined scientific content, which forces the teacher to ignore the needs of gifted mentally students on the pretext that he is able to the scientific amount determined for all students in a specific period of time, which makes most of the times spent in these The category of students in the school is few and of limited interest.

Content of the training program

The sessions of the training program were organized, as follows:

1. **Orientation dimension sessions:** This dimension lasted for two sessions; each session was 45 minutes that when followed lead students to become autonomous lifelong learners. In the sessions of this dimension, students and their teachers learned about the model, its goals, and the training program that was provided. In addition, the researcher provided the students with sufficient knowledge related to what is intelligence and what is creativity, what does it mean to be gifted.
2. **Individual development sessions:** Every session of this dimension was 45 minutes and continued for two sessions. The researcher gave students the chance to build the cognitive, emotional, social, physical, and conceptual skills, attitudes, and behaviors required for lifelong learning. Through personal growth, learners acquired the abilities necessary to actively participate in their learning process in this dimension. This component comprised knowledge regarding engagement in future careers, leadership abilities, inter- and intra-personal growth, literacy, and technological utilization.

Table 3. Means & standard deviations of experimental & control group members on dimensions of CPSS

Item	Experimental group	Control group	t	p-value
Novelty	3.73±0.51	3.89±0.58	1.2080	0.2314*
Surprise	3.18±0.39	3.24±0.51	0.5449	0.5876*
Originality	4.32±0.71	4.26±0.68	0.3559	0.7231*
Resolution	4.45±0.83	4.28±0.44	1.0552	0.2952*
Logicalness	3.27±0.60	3.09±0.34	1.5219	0.1328*
Useful	5.81±1.01	5.69±0.83	0.5352	0.5943*
Value	4.76±0.66	4.51±0.47	1.7991	0.0766*
Understandability	3.97±0.80	3.81±0.51	0.9834	0.3290*
Elaboration/synthesis	3.55±0.68	3.44±0.67	0.6719	0.5040*
Organic design	2.56±0.70	2.61±0.77	0.2802	0.7802*
Well-craftedness	3.91±1.11	3.66±0.91	1.0156	0.3135*
Elegance	4.18±0.63	4.06±0.52	0.8566	0.3948*
Total	3.18±0.73	3.23±0.51	0.3274	0.7444*

Note. *Statistically significant at significance level ($\alpha \leq 0.05$)

- 3. Enrichment dimension sessions:** Three sessions were spent in this domain. It took 45 minutes for every round. The reinforcement component is when students start investigating material that is not part of the standard syllabus. Students can find material that meets their educational styles outside of what the school offers. They begin with inquiries and investigations, finish them, and go on to cultural events, which enable involvement in neighborhood events, and civic engagement, which motivates students to lead to a positive society.
- 4. Seminar dimension sessions:** Six periods were spent in this domain. It took 45 minutes for every session. For learners participants to become thinkers, they should have the chance to study independently both individually and in groups. This requires a framework that supports and encourages the growth of new knowledge for the individuals, which is what the colloquium component aims to do. This component sought to provide learners with the opportunity to operate individually on a topic of interest before presenting a seminar to others based on their study.
- 5. In-depth study sessions:** In-depth study makes up the independent learner model's last and fifth level. This is the time when students decide what they will learn, how they will learn it, how they will deliver it, and whether or not they will need facilitation. Additionally, students are able to choose how their learning process will be evaluated.

Validity of the program

The validity of the training program based on Betts' autonomous learning model was ensured through submitting the content of the training program to a group of eight jury members from different Jordanian universities who are specialized in education and

development of curricula for gifted students. The researcher kindly asked the jury members to review the content of the training program, the appropriateness of the content and its capability of achieving the aim of the training program. No comments were received on the type of content except few comments on language and headings of the sessions.

Implementing the Training Sessions

The training program was implemented between March and April 2022. The program lasted for 13 sessions covering the first four dimensions and one week was given for the students for the in-depth reading dimension. These sessions in addition to the free reading dimension were accomplished in four weeks period. The training program was implemented in young talents room in King Abdullah II School for Excellence.

Data Processing

The study used the statistical package of social sciences version 25 (IBM Corporation, Chicago, IL, USA). The descriptive statistics were used to calculate the total score on CPSS. In addition, paired samples t-test was used to assess the differences in CPSS scores based on the participants' characteristics.

RESULTS

Homogeneity of the Study Groups

We assessed the normality of the study data using the Shapiro-Wilk test because of the small sample size. We found that the Shapiro-Wilk test revealed a significance value of 0.831, which indicated that the study data is normally distributed. To ensure the homogeneity of the experimental group and the control group, the pre-assessment project was assessed using the rubric described previously.

The results shown in **Table 3** represent the average scores of the experimental and control group students on

Table 4. Mean & standard deviation of experimental & control group members on dimensions of CPSS post-training program implementation

Item	Experimental group	Control group	t	p-value	Effect size
Novelty	5.83±0.49	3.66±0.53	17.5299	0.0001*	0.90
Surprise	5.61±0.71	3.16±0.46	16.8865	0.0001*	
Originality	6.04±0.37	4.15±0.77	12.9003	0.0001*	
Resolution	6.09±0.63	4.18±0.69	11.9197	0.0001*	0.82
Logicalness	6.18±0.45	3.33±0.82	17.7666	0.0001*	
Useful	6.31±0.66	5.41±0.63	5.7516	0.0001*	
Value	5.76±0.84	4.36±0.90	6.6309	0.0001*	
Understandability	6.11±0.61	3.60±0.73	15.3847	0.0001*	
Elaboration/synthesis	5.50±0.61	4.18±0.70	8.2896	0.0001*	0.71
Organic design	4.61±0.58	3.09±0.51	11.4757	0.0001*	
Well-craftedness	5.81±0.77	3.40±0.31	16.9296	0.0001*	
Elegance	6.10±0.75	4.30±0.61	10.8567	0.0001*	
Total	5.81±0.70	3.60±0.48	15.1826	0.0001*	0.88

Note. *Statistically significant at significance level ($\alpha \leq 0.05$)

Table 5. Mean & standard deviation of experimental group members on dimensions of CPSS post-training program implementation

Item	Pre-training	Post-training	t	p	Effect size
Novelty	3.73±0.51	5.83±0.49	17.3136	0.0001*	0.90
Surprise	3.18±0.39	5.61±0.71	17.4915	0.0001*	
Originality	4.32±0.71	6.04±0.37	12.5268	0.0001*	
Resolution	4.45±0.83	6.09±0.63	9.1772	0.0001*	0.74
Logicalness	3.27±0.60	6.18±0.45	22.6241	0.0001*	
Useful	5.81±1.01	6.31±0.66	2.4164	0.0184*	
Value	4.76±0.66	5.76±0.84	5.4583	0.0001*	
Understandability	3.97±0.80	6.11±0.61	12.4034	0.0001*	
Elaboration/synthesis	3.55±0.68	5.50±0.61	12.4469	0.0001*	0.83
Organic design	2.56±0.70	4.61±0.58	13.1492	0.0001*	
Well-craftedness	3.91±1.11	5.81±0.77	13.1492	0.0001*	
Elegance	4.18±0.63	6.10±0.75	11.4299	0.0001*	
Total	3.18±0.73	5.81±0.70	15.1628	0.0001*	0.88

Note. *Statistically significant at significance level ($\alpha \leq 0.05$)

the three domains of CPSS. The findings indicate that there was no significant statistical variations between the research groups in the dimensions of CPSS. These findings pointed to the homogeneity of the study groups; thus, any change in the experimental group mean scores is attributed to the training program.

The results presented in **Table 4** represent the independent samples t-test to assess the differences in CPSS mean scores between the experimental group and the control group participants. The results showed that the experimental group had higher mean scores than the control group on all dimensions of CPSS. The results revealed that there were significance statistical differences in novelty between the experimental group (5.83±0.49) and the control group (3.66±0.53), ($t=17.5299$, $p \leq 0.05$). In addition, the results revealed that there was significant statistical differences in the resolution dimension between the experimental group (6.09±0.63) and the control group (4.18±0.69), ($t=11.9197$, $p \leq 0.05$). Moreover, the results showed that there was significant statistical difference in the elaboration/synthesis dimension between the experimental group (5.50±0.61) and the control group (4.18±0.70), ($t=8.2896$, $p \leq 0.05$). In

total, the results showed that there was significant statistical difference in CPSS between the experimental group (5.81±0.70) and the control group (3.60±0.48), ($t=15.1826$, $p \leq 0.05$).

The results presented in **Table 5** represent the paired samples t-test to investigate the differences in the mean scores of the experimental group between pre- and post-implementation of the training program. The results showed that on all dimensions of CPSS, there was significant statistical variation in novelty between pre- (3.73±0.51) and post-training (5.83±0.49), ($t=17.3136$, $p \leq 0.05$). In addition, the findings indicate that there was statistically significant difference in the resolution dimension between pre- (4.45±0.83) and post-training (6.09±0.63), ($t=9.1772$, $p \leq 0.05$). Moreover, the findings pointed to that there was significant statistical difference in the elaboration/synthesis dimension between pre- (3.55±0.68) and post-training (5.50±0.61), ($t=12.4469$, $p \leq 0.05$). In total, the results showed that there was significant statistical difference in CPSS between pre- (3.18±0.73) and post-training (5.81±0.70), ($t=15.1628$, $p \leq 0.05$).

DISCUSSION

This research sought to identify the effectiveness of a training program on the basis on Betts' autonomous learners model on improving the creative output. The findings of the present study revealed that there is a significant effect of the proposed training program on improving the novelty, resolution and elaboration/synthesis of the creative product developed by the enrolled students in the experimental group.

The findings of the study showed the superiority of the experimental group members over the control group members in their creative output, which could be referred to the training program provided for the students in the experimental group and built on the basis of learning autonomy as described by Betts and Kercher (1999). On the opposite of traditional teaching classroom, where the teacher is at the front of the room and the students are sitting at their desks listening to what the teacher says and writing down, thus the teacher is quite an active role and the learners are quite a passive role, learner autonomy is about learners being more active in their own learning process by understanding the skills that they need and the knowledge of them and having more knowledge of the learning process, so that they can learn inside the classroom more effectively and also outside the classroom.

The findings of the study highlighted the significance of learning autonomy in improving students' capacity to take charge of their own learning. However, capacity is not natural, it needs to be developed and it is in the learner not in the situation, which is an issue that was addressed in the training program through the individual development sessions provided for the gifted students in the experimental group. Therefore, the training program provided for the students had formulated autonomy as an acquired capacity students develop to take charge of their own learning.

However, autonomy is not confined to developing students' capacity to take charge of their own learning, but other core concepts were developed through using the training program based on Betts' model of autonomous learner. These core concepts included improving students' self-awareness through allowing students to their strengths and weaknesses and recognize what they are good at and also recognize the things that should be improved. Another concept is the self-direction, which implies students' activities to identify or create choices to follow. In addition, self-reliance was a concept that was developed by the training program provided for the students in the experimental group, which is basically about building independence, and it is connected to information literacy because students were going to evaluate the kind of information that they needed. Moreover, self-monitoring was improved through helping students creating the tools to measure or to identify changes in

specific skills needed for their final project. Finally, the training program helped the students to self-assessment, which basically assesses the success and quality of their learning as a whole.

In addition, the effectiveness of the provided training program based on Betts' model of autonomous learner might be referred to that the training program provided the students with highest levels of competition, especially in the higher-order thinking skills that requires generation of creative ideas and in-depth thinking, and this is a situation that is normally preferred to the gifted students.

The findings of the present study are supported by the research-based evidence provided by Scott et al. (2004) who found that creative training program significantly affect the quality of the creative output through improving the learners' creative capacities and their motivation to learning due to the presence of a competitive environment with their peers. In addition, the findings of the present study are supported by the findings reported by Vally et al. (2019) who found that creativity training programs positively improves students' self-efficacy and the quality of their creative output. However, Vally et al. (2019) study was performed over students' from higher education institution, which is different from the context of the study.

Despite the significant findings reported in this study, still there are limitations that could limit the generalization of the study findings, including the geographical limitations, as the present study was performed in a single geographical area and a single school. In addition, the sample size and nature limitations might limit the generalization of the study findings because only a low sample size of females were recruited in this study. Therefore, extending the scope of this study might provide more valid and reliable findings regarding the effectiveness of creativity training program based on Betts' model of autonomous learner on the creative output of gifted students.

CONCLUSION & RECOMMENDATIONS

The present study concluded that the training program based on Betts' model of autonomous learner positively improved the quality of the creative output and product among gifted female tenth grade students at King Abdullah II School for Excellence, Jordan. The present study recommends building valid and reliable training programs based on the concepts of learning autonomy and use it in improving gifted students' creative activities and projects. In addition, the study recommends extending the present study to include larger sample size of gifted students from different educational settings.

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Data sharing statement: Data supporting the findings and conclusions are available upon request from the author.

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