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**THE EFFECTIVENESS OF SCAMPER AND CoRT PROGRAMS
ON CREATIVITY AMONG GIFTED AND TALENTED
STUDENTS**



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Abstrak

Pelajar pintar dan berbakat memiliki kebolehan-kebolehan khusus. Terdapat keperluan untuk meningkatkan kebolehan, idea dan kreativiti mereka. Justeru, terdapat pula keperluan untuk menentukan dan menggunakan program pemikiran kreatif yang membangunkan kemahiran berfikir, kegunaannya dan kesesuaiannya serta kesahannya. Walau bagaimanapun, didapati kurangnya kajian, khususnya berkaitan penggunaan program SCAMPER and CoRT, dalam kalangan pelajar pintar dan berbakat di King Abdullah Schools for Excellence (KASE), Jordan. Kajian ini bertujuan menentukan keberkesanan program SCAMPER and CoRT ke atas kreativiti dalam kalangan pelajar di KASE, Jordan. Kajian ini telah menggunakan pendekatan kuantitatif dan kualitatif. Reka bentuk kajian kuasi-eksperimen dan ujian telah digunakan untuk peroleh data kuantitatif manakala data kualitatif diperoleh melalui temu bual semi-struktur. Kumpulan eksperimen terdiri daripada 42 pelajar, di mana 21 dalam kumpulan SCAMPER dan 21 juga di dalam kumpulan CoRT. Kumpulan Kawalan juga terdiri daripada 21 orang pelajar. Ujian The Torrance Test of Creative Thinking (TTCT) telah digunakan bagi ujian pra dan pos untuk mengukur pemikiran kreatif pelajar. Hasil kajian menunjukkan keberkesanan yang signifikan program SCAMPER dan CoRT ke atas pemikiran kreatif pelajar. Walau bagaimanapun, hasil kajian menunjukkan tidak terdapat perbezaan yang signifikan antara program SCAMPER dan CoRT ke atas pemikiran kreatif pelajar. Analisis data kualitatif menunjukkan bahawa persekitaran pembelajaran di KASE adalah berbeza berbanding dengan sekolah biasa lain. Perbezaan ini nampaknya telah menyumbang kepada proses pembelajaran yang positif yang menambahbaik kebolehan berfikir pelajar. Dapatan kajian juga menunjukkan bukti bagi keberkesanan program SCAMPER dan CoRT ke atas kreativiti dan keluwesan dalam berfikir dalam kalangan pelajar. Dapatan kajian menyumbang kepada pengetahuan tentang pengajaran di KASE, Jordan dan boleh dimanfaatkan sebagai panduan untuk meningkatkan pembelajaran dalam pelajar pintar dan berbakat. Kajian ini juga amenyumbang kepada kajian ke atas pelajar pintar dan kreativiti di Jordan.

Kata kunci: SCAMPER, CoRT, Program Pemikiran, Kreativiti, Pelajar Berbakat.

Abstract

The gifted and talented students possess special abilities. There is a need to enhance their special abilities, ideas and creativity. Hence, there is the need to determine and utilize creative thinking programs that develop thinking skills, their usefulness and relevance as well as their validity. However, there are limited numbers of studies, in particular on the use of SCAMPER and CoRT programs, among gifted and talented students at the King Abdullah Schools for Excellence (KASE) in Jordan. The present study examines the effectiveness of the SCAMPER and CoRT programs on creativity among the students at KASE in Jordan. The study had used quantitative and qualitative approaches. Quasi-experimental research design and tests were used to obtain the quantitative data while qualitative data was collected via semi-structured interviews. The experimental group consisted of 42 students, with 21 were in the SCAMPER program group and 21 were in the CoRT program group. The control group was comprised of 21 students control group. The Torrance Test of Creative Thinking (TTCT) was used to measure students' creativity for pretest and posttest. The research findings show a significant effectiveness of both the SCAMPER and CoRT programs on students' creativity. However, the research findings show that there is no significant difference between the SCAMPER and CoRT programs on the students' creativity. Analyses of the qualitative data indicate that the learning environment in KASE is different from other regular schools. This difference seemingly had contributed to positive learning process that improved students thinking ability. The research findings also provide evidence for the effectiveness of the SCAMPER and CoRT programs on the students' creativity and flexibility in thinking. The findings in this study contribute to the knowledge about teaching within KASE in Jordan and can be used as a guide for the enhancement of learning among excellent students. This study also contributes to studies on gifted and talented students in Jordan.

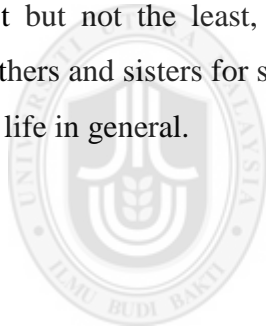
Keywords: SCAMPER, CoRT, Thinking Programs, Creativity, Gifted and Talented Student.

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Table of Contents

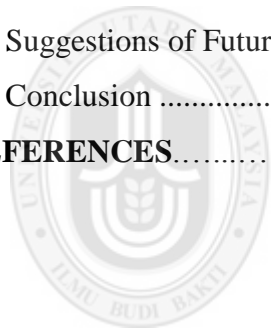
Permission To Use.....	i
Abstrak.....	ii
Abstract.....	iii
Acknowledgement	iv
Table of Contents.....	v
List of Tables.....	x
List of Figures.....	xi
List of Appendixes.....	xii
CHAPTER ONE INTRODUCTION	1
1.1 Background of Study	1
1.2 Jordanian Education System	10
1.3 Problem Statement	11
1.4 Purpose of the Study	16
1.5 Research Objectives	17
1.6 Research Questions	18
1.7 Research Hypotheses	19
1.8 Conceptual Framework	19
1.9 Significance of the Study	22
1.10 Scope and Limitations of the Study	23
1.11 Operational Definition	24
1.11.1 Effectiveness	24
1.11.2 SCAMPER	24
1.11.3 CoRT	25
1.11.4 Creativity.....	26
1.11.5 Gifted and Talented Students.....	26
1.11.6 King Abdullah II Schools for Excellence KASE	27
1.12 Chapter Summary.....	27
CHAPTER TWO LITERATURE REVIEW	29
2.1 Introduction	29
2.2 Theoretical Framework	30
2.3 Gifted and Talented.....	34

2.3.1 Definition Gifted and Talented	34
2.3.2 Characteristics of Gifted and Talented Students	40
2.3.3 Models and Programs for Gifted and Talented Students.....	44
2.3.4 Nurturing Gifted and Talented Students in Jordan.....	44
2.3.4.1 Programs Offered by the Public Sector (MOE).....	45
2.3.4.1.1 King Abdullah II Schools of Excellence	45
2.3.4.1.2 Pioneer Centres	47
2.3.4.1.3 Academic Acceleration.....	48
2.3.4.1.4 Resources Room	49
2.3.4.2 Programs Offered by Private Sector (Quasi-Government).....	50
2.3.4.2.1 Jubilee School.....	50
2.3.4.2.2 Al Hussein Fund for Excellence (HFE).....	51
2.4 Creativity.....	52
2.4.1 Introduction	52
2.4.2 Definition of Creativity	54
2.4.2.1 Creative Person.....	58
2.4.2.2 Creative Process	58
2.4.2.3 Creative Product	58
2.4.2.4 Environment	59
2.4.3 History and Theories of Creativity	60
2.4.4 Characteristics of Creative Individuals	65
2.4.4.1 Positive Characteristics	65
2.4.4.2 Negative Characteristics	66
2.4.5 Teaching Creativity	67
2.4.6 Methods for Enhancing Creativity.....	70
2.4.6.1 Brainstorming	70
2.4.6.2 Open-ended Activities	71
2.4.6.3 Questioning Techniques	72
2.4.6.4 Drawing	73
2.4.7 Measuring Creativity	73
2.4.7.1 Divergent Thinking	74
2.4.7.2 Biographical Characteristics.....	75
2.4.8 Benefits of Creativity Development	76
2.4.8.1 Motivation	77

2.4.8.2 Efficacy.....	77
2.4.8.3 Socialization	78
2.4.8.4 Achievement.....	78
2.5 Thinking Programs.....	78
2.5.1 Programs and Strategies	82
2.5.1.1 The Six Thinking Hats Concept	82
2.5.1.2 Good Bad Interesting (GBI)	83
2.5.1.3 Mind Mapping	84
2.5.1.4 Thinking outside the Box	85
2.5.1.5 TRIZ	85
2.5.1.6 SCAMPER Program (Technique)	86
2.5.1.6.1 SCAMPER Acronym.....	86
2.5.1.7 CoRT (Cognitive Research Trust).....	89
2.6 Empirical Studies Review	94
2.6.1 Introduction	94
2.6.2 Studies Related to Development Creativity	95
2.6.3 Studies Related to SCAMPER Program	103
2.6.4 RelatedStudies to CoRT Program.....	107
2.7 Chapter Summary.....	111
CHAPTER THREE RESEARCH METHODOLOGY	113
3.1 Research Design.....	113
3.1.1 Quantitative Approach.....	114
3.1.2 Qualitative Paradigms.....	116
3.2 Population	118
3.3 Sample Selection.....	119
3.3.1 Sampling	121
3.4 Research Programs and Instruments	122
3.4.1 Programs	122
3.4.1.1 The SCAMPER Program.....	122
3.4.1.1.1 SCAMPER Program Content	123
3.4.1.2 CoRT Program.....	123
3.4.1.2.1 CoRT Program Content	124
3.4.2 Research Instruments.....	128

3.4.2.1 The Torrance Test of Creative Thinking (TTCT)	128
3.4.2.2 Interview	131
3.5 Data Collection Procedures	134
3.6 Validity and Reliability	136
3.6.1 Validity	136
3.6.2 Reliability and Pilot Study	137
3.7 Data Analysis Techniques	140
3.7.1 Quantitative Data Analysis Techniques	140
3.7.2 Qualitative Data Techniques	141
3.7.2.1 Interviews	141
3.8 Chapter Summary	143
CHAPTER FOUR FINDINGS	144
4.1 Quantitative Analyses	144
4.1.1 Equality of study Sample Groups	144
4.1.2 Means and standard Deviations Executed for Control Group and Each Experimental Groups	147
4.1.2.1 Control Group	147
4.1.2.2 CoRT Experimental Group	148
4.1.2.3 SCAMPER Experimental Group	148
4.1.3 Hypothesis Testing	149
4.1.3.1 First Hypothesis	149
4.1.3.2 Second Hypothesis	150
4.1.3.3 Third Hypothesis	152
4.1.3.4 Forth Hypothesis	153
4.1.3.5 Fifth Hypothesis	154
4.1.4 Quantitative Findings Summary	155
4.2 Qualitative Analysis	157
4.2.1 The Differences in Teaching Methods and Learning Environment Between Kase and the Other Regular Schools.	159
4.2.2 The Using of Thinking Activities (Six Hats Or TRIZ etc..) In KASE, Either Directly or Through Integrated With the Curriculum.	160
4.2.3 The Effect of Using the Strategic Thinking Through Learning Process	161

4.2.4 The Effectiveness of Creativity on the Learning Environment.	161
4.2.5 The Effectiveness of (SCAMPER-Cort) Programs on Students' Ability to Generate a Large Number of Flexible Alternatives in a Creative Way.	162
4.2.6 The Advantages and Disadvantages of Using (SCAMPER and Cort Programs.	163
4.2.7 The Effectiveness of the (SCAMPER- Cort) Programs on the Students' Creative Skills and Academic Achievement.	163
4.2.8 Using the (SCAMPER-Cort) in Other Curriculum and Teaching Materials.	164
CHAPTER FIVE THE DISCUSSION OF THE FINDINGS	166
5.1 Introduction	166
5.2 Summary of Findings	166
5.3 Discussions.....	169
5.4 Recommendations	171
5.5 Suggestions of Future Research	172
5.6 Conclusion	173
REFERENCES	174



List of Tables

Table 2.1 De Bono's Six Hats.....	83
Table 3.1 Non-equivalent Control Group Design.....	116
Table 3.2 Quantitative Phase Design Of Study.....	116
Table 3.3 The General Research Approach	118
Table 3.4 Population of the Study.....	119
Table 3.5 Sample of Study.....	121
Table 3.6 Correlations (pilot sample)	139
Table 4.1 Means and Std. Deviation in the Differences between Gifted and talented Students in pre-test	145
Table 4.2 Levene's test of Homogeneity of Variance between Groups in pre and post-Tests.....	145
Table 4.3 Means and Std. Deviation on the Differences between Gifted and Talented Students in pre and post- test.....	147
Table 4.4 Means and Std. Deviation of Gifted and Talented Students in Control Group in post-test Descriptive Statistics Control Group	147
Table 4.5 Means and Std. Deviation of Gifted and Talented Students in CoRT Experimental Group in post-test Descriptive Statistics Control Group	148
Table 4.6 Means and Std. Deviation of Gifted and Talented in SCAMPER Experimental group in post-test Descriptive Statistics Control Group	149
Table 4.7 Paired t-test for SCAMPER Program	150
Table 4.8 Means and Std. Deviation in the Differences between Gifted and Talented Students of control and SCAMPER in post Groups.....	151
Table 4.9 ANCOVA test.....	151
Table 4.10 Paired t-test for CoRT Program	153
Table 4.11 ANCOVA test.....	154
Table 4.12 Mean and Standard Deviation of the Two Groups	155

List of Figures

Figure 2.1 Conventional teaching and learning process (Lin, 2009)	32
Figure 2.2 The three elements of creative pedagogy (Lin, 2009).	32
Figure 2.3 Shows the theoretical framework underlying this study.....	33
Figure 2.4 Three-Ring Model of Giftedness (Renzulli).....	40
Figure 3.1 Procedure for data collection.....	136
Figure 4.1 Mean Differences in TTCT between the Three Groups in the pre-test	156
Figure 4.2 Mean Differences in TTCT between the Three Groups in the post-test.....	157



List of Appendixes

Appendix A How To Present The SCAMPER	199
Appendix B Contents Of The SCAMPER Program	206
Appendix C Example Of SCAMPER Program In Arabic	213
Appendix D Description Of The CoRT Lesson*	223
Appendix E The CoRT (1) And CoRT (4) In Arabic	236
Appendix F Example Of The TTCT Verbal	249
Appendix G The TTCT Verbal - Modified Version For Jordanian Environment	251
Appendix H Description Torrance Scoring Guide.....	257
Appendix I Interview Schedule.....	259
Appendix J Arbitrators List	261
Appendix K Official Letter From Ministry of Education	262
Appendix L Training certificates	263



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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

An interest in the gifted (talented) students is a necessity and is imposed by today's scientific as well as technological progress. However, if matters related to the gifted and talented students do not receive sufficient attention and care towards the right direction, the students' talent will gradually fade and vanish, and could probably lead to these gifted and talented students to only reach the level of the normal individuals. Keen interest in the gifted and talented students has been observed among researchers and scholars during the last few decades. Educators and parents of such students are also paying increasing attention on their special needs as well as their potentials. In many countries, the gifted and talented students are considered as national resources and they may influence the modernization of the society (Davis & Rimm, 2004).

According to Bailey (2007), there are various kinds of gifted students, including nature and forms, and as well with different degrees, motivation and knowledge. Hence, the first challenge to understand this population of students is to have the knowledge of what is meant by the term "gifted student". Currently, there is no universal definition for the term. Moreover, the criteria also vary from one school system to another school system. Nevertheless, in general, the term "gifted student" implies a student with extra-ordinary mental ability or intelligence. The term "gifted student" has also been used as both a measure of potential and achievement.

According to the United States Department of Education (2001), the term “gifted and talented,” when used with respect to students, children, or youths, would refer to students, children, or youths who possess signs of high achievement capability in areas such as intellect, creativity, artistic, or leadership capacity, or in specific academic fields, and these “gifted and talented” students need services or activities that are not ordinarily provided by the school in order to develop those capabilities (Bailey, 2007).

The term ‘talent’ is often used interchangeably. At times, the concept of talent was seen to be less than the idea of talent. Morelock (1996) points this term to a hierarchical classification showing preparations that are supposed to have nothing to do with general intelligence and talent. In the mid-1990s, the word talent was used in the place of the word ‘gifted’, which meant “getting something for nothing”, or is chosen in particular in one way or another. Gagné (1991) distinguished between the terms ‘gifted’ and ‘talented’ by realizing giftedness as above average efficiency in human capacity, and above-average talent in a given field. Talent indicates human capabilities such as mental or inventive abilities. Talent is shown in the field of human activity such as mathematics, literature or music. This can be explained by Munro’s (2001) differentiating between talented students as showing special ability in areas in which they have been explicitly taught, and gifted students as those who show special ability in confirmed areas without explicit education. Hence, it can be seen that a gifted student may not need to be defined as talented.

Many official documents related to the field of education, including the Ministry of Education in Jordan (2005), use the terms ‘gifted’ and ‘talented’ interchangeably, implying a single-concept approach. Frequently, the terms are joined together and referred to as ‘gifted and talented’ (Page, 2006).

Several studies has indicated that creative potential can be acquired or developed into a creative performance using different methods, such as; initiating discussion groups that encourages creativity, offering rewards, attracting expertise, providing an encouraging environment at schools, or conducting the needed trainings. The most common and frequently applied method is providing the necessary training on developing creative potential which has proved its efficiency in helping learners from different levels, especially talented ones, to achieve a creativity and potential (Ozyaprak, 2016).

In today's global education, learners who are flexible, critical and creative are more stressed. Similarly learners who make use of the ample data in yielding new innovation or ideas are preferred compared to those who lack the power to engage information to develop new ideas in solving problems. The miles of information determine new levels in every attempt to attain the new skills and ideas necessitated for development. Which expose the emerging curiosity in teaching, learning and thinking skills. It is not astonishing hence, growing tending is required in developing the intellectual and learning potential of colleges and schools learner (Hmeadat, 2016).

Therefore it is important to encourage the gifted and talented students to pursue creative and critical thinking (Gray, 2011). Furthermore, as pointed out by Gray (2011), there are number of abilities that need to be considered when defining giftedness, which include, creativity, leadership, academic aptitude, psychomotor, and intellectual ability. Academic education is expected to provide these students with practical and theoretical knowledge that will be able to assist them to face future challenges. Logical thinking and creativity are also important to be added to the knowledge being taught to these gifted and talented students (Gray, 2011).

Furthermore De Bono (2007), purports that thinking can be learned because thinking is considered as an attitude that simplifies things and does not work on complexity. De Bono further argues that we must look at thinking as a simple process, and that will only be acquired through teaching thinking. He added that thinking can be learnt and taught to all individuals with different degrees of motivation with available and appropriate training. The adoption of the methods of developing thinking into the curriculum within the educational system would help to improve the related thinking skills.

While creativity programs and techniques are designed overall to enhance creativity, each is aimed at developing a different process and way of thinking. Some programs for example, focus on the theoretical aspect, such as; lateral thinking, problem solving, or productive thinking. Some programs on the other hand provide some practical techniques, like brainstorming and metaphors that helps individuals in acquiring the required skill for creativity and developing it. Meanwhile, other programs suggest that creative thinking can be developed through disciplined creativity, which relies on disciplined knowledge and skills to create a creative performance. In conclusion, each of these mentioned programs is designed to meet a specific need and situation, and no strategy works for all situations (Ozyaprak, 2016).

Creativity is generally related to gifted and talented individuals. Being one of the most complex products of the human mind, creativity, in general terms, is the ability to produce new, original, unexpected and high quality thinking associated with the task involved in a particular problem (Sternberg, 2003). Creativity can also be defined as the ability to think in an extraordinary way, and create fresh and unknown solutions to problems and is a trait that can be taught. Sternberg further suggests that

creativity is a decision which is developed rather than a natural ability specific to some individuals (Sternberg, 2003).

According to Sen and Hagtvet (1993) the creativity and giftedness are sometimes considered to be synonymous, one as a characteristic of the other, or as two entirely distinctive terms. Also points to the fact that the relationship between creativity and intelligence is influenced by definitions and the measures used to assess both terms. Some theorists and researchers have argued that creativity is intelligence or part of it; some others claim that the production of novel, appropriate ideas is different from the production of accurate, logical but unoriginal ideas. Intelligent thinking must include some degree of creativity and that there exists a limited overlap of creative thinking with intelligence (Sen & Hagtvet, 1993).

Other researchers have argued that a lot of children who demonstrated to be gifted and talented at school do not appear to advance into creativity, which may suggest that accomplishments valued at school may not involve most of the traits of creativity that are required for developing creativity. As mentioned earlier, 'intelligent' may not be one of the basic elements required so as to be able to demonstrate creativity (Sternberg, 2009, p. 286) also suggests that “precocious intellectual talent may be neither necessary nor sufficient for true creative achievement in adulthood”.

In fact the educational and psychological literatures point to the possibility of training and teaching students creativity has led to global focus on developing this kind of thinking which then result to bringing students from the conventional of thinking ways to new ways (Renzulli, 2005). Earlier, Newton (2000) pointed out

earlier than the result of conventional methods of education, of course, is a student who cannot respond flexibly, cannot think critically or creatively.

Therefore gifted and talented students need several educational programs that are commensurate with their special abilities of wide range of information and ideas, as well as their eagerness to explore new things, including their mental abilities, and undoubtedly these calls for designing educational programs that are proportional with the characteristics of these students (Al-Zoubi, 2011).

Thinking programs have become the most common kind of school programs in educating talented students, and have been internationally adopted because these programs have had increasing effectiveness (Renzulli, 2005). Some creativity training programs (thinking programs) has been developed much earlier and various studies have also been developed to assess the effectiveness of these programs (Nickerson, 1999). The intent of these training programs is to introduce creativity to different ages and levels of students. Examples of such programs are the Cognitive Research Trust (CoRT) program, the thinking instrument program to direct attention, the central thinking program, the six thinking hats program, and the SCAMPER technique (Program), which is a procedural program that helps in developing the individual's creativity through fiction, by using the forked thinking method and which also include set of games that differ in the contents (Glenn, 1997).

Eberle (1996) developed a program called "SCAMPER" which served as an alternative idea generation technique. Eberle (1996) later introduced this program to the education context. SCAMPER can be used to stimulate new ideas or to think differently about a subject. Eberle suggests that this program is most useful for

students when they are running out of ideas or when they are stuck. SCAMPER is an acronym for Substitute, Combine, Adapt, Modify, Put to other uses, Eliminate, Reverse (Eberle, 2008). One of the brainstorming methods is SCAMPER which is considered as a practical and an entertaining teaching technique that promotes creativity (Celikler & Harman, 2015).

Yagci (2012) defined SCAMPER program as "a sort of practical and entertaining brainstorming technique which is intrinsic in the discussion method, ensuring application of the method by putting it into practice" (p. 486). In this technique, to enhance creativity among the students, a person is chosen and then changed and developed through 'brainstorming'. Common stories that are well known by everyone can be also be used for this 'brainstorming'. Questions that have not been familiar to the child are directed to him/her. These questions will encourage the child to think about situations that are not familiar to him/her. Such questions are, in a sense, would function as a driving force to allow the students to acquire different thinking skills. Hence, this technique improves thinking in children and encourages them to discover. The technique also teaches a child on how to think in a flexible fashion and to break the old patterns (Yildiz & Israel, 2001).

The CoRT program (Cognitive Research Trust) is an institution of cognitive research established by De Bono, a theorist, at Cambridge. This program features ways to help students with different abilities to utilize the techniques effectively in personal and academic situations. The program assists all types of students with the inclusion of students with special needs and at-risk students (De Bono, 2004).

The Cognitive Research Trust (CoRT) is a specially-designed program by De Bono in (1970), a theorist at Cambridge that includes over sixty lessons to help students develop their cognitive thinking and abilities, the program benefits students from different levels, including students with special needs, to help them enhance and focus on their creative and critical thinking skills, whether in their personal or academic life (De Bono, 2004). CoRT has been implemented in various cultures and situation, and for students of different ages and abilities, and it has proven to be effective globally for over 38 years, the program has reached USA, Malaysia, Australia, Singapore, Canada, UK, Ireland, Italy, France, Japan, South Africa, Brazil, India, Philippines, New Zealand, Venezuela, and Russia. Recently, the ‘CoRT’ program was implemented in some Arab countries such as Hashemite Kingdom of Jordan (Jordan), Palestine, UAE, and Kingdom of Saudi Arabia (Al Zyoudi, 2009; Jarwan, 2007).

This research conducted in Jordan as being the scope area to the research. Although the importance of revealing students’ creativity and developing their creative abilities which was indicated in the “General Framework for Curricula and Evaluation”, issued by the Jordanian Ministry of Education (MOE) in 2003 was not well designed, due to the fact that the Jordanian educational curriculum was only structured to meet the needs of students that are normal and excluding the gifted once and the teachers are not qualified to make changes and modifications that is needed in the curriculum to address the unique needs of gifted and talented students, this becomes a major challenge of the Jordanian educational system (El-Zraigat, 2012). The problem of developing students’ thinking has not been solved yet and there is still the need to utilize courses or programs that can teach and develop thinking skills and also the need to determine their usefulness and relevance as well as test their validity in the educational systems (Karsou, 2004).

According to Abu Jado and Nwfal (2007) a responsive educational system must be capable of training human-power needs of both present and for future economic and social development of the society. Similarly, a worthy education system with highly ethical teachers that support excellence and focuses on the needs of the learner enables equal access to educational opportunities as well as equalities in the provision of educational services. Concomitantly, Ismail, Hussin, Asmawi, and Siraj (2013), pointed to the use of modern tools like modern information and technology provides the best efforts in learning and teaching, promotes high levels of student success and stimulates the containment of the developmental challenges of a country, especially in the developing countries like Jordan.

Studies in educational and psychological aspects have pointed to the fact that traditional education methods have over time been inappropriate to facilitate the attainment of the much-desired changes that are capable comprehensively shaping learners' personality and capability to deal with the progress of modernization and development (Al-Edwan, 2011). In an attempt to achieve this, teaching of creative and critical thinking in schools is indeed a necessity due to the fact that students have to face challenges daily and in diverse situations, within and outside schools, where creative and critical thinking is important in achieving success (Al-Edwan, 2011). Utilizing various learning materials and different resources allows students with varying principal learning styles to understand information in the most effective way (Freeman, 2001).

Thus, the thinking programs have become familiar in education, in recent years many of research have been carried out into ways to develop students' thinking and learning skills (Gray, 2011). Due to the fact that the gifted students possess special

abilities therefore, there is the need for the implementation of several educational programs to suit their special abilities and ideas, as well as their eagerness for exploration of new things, including their mental capabilities (Al-Zoubi, 2011).

1.2 Jordanian Education System

The educational system in the Hashemite Kingdom of Jordan depends on the ambitions for justice, freedom, human and economic development to obtain a high level of modernity and productivity. The philosophy of education is depends on a Jordanian constitution, the Arab-Islamic civilization. In addition to the vision of the educational system in Jordan, it confirms the significance of providing lifelong learning experiences to all persons relevant to their steam and future needs that answer to and catalyze sustainable economic development (Ministry of Education, 2008).

The Jordanian education system includes kindergartens up to the twelfth grade, including basic schools (primary, intermediate) and secondary schools. The primary level consists of grades 1 through 10. Basic education is compulsory and free for all students. At last of Grade 10, the scores of each student are collected in the last three years (eighth, ninth, and tenth) to determine whether the students will follow the secondary track. Students' preferences are usually taken into account, but the final decision is left to the Ministry of Education (Al Jabery&Zumberg, 2008).

The Ministry of Education has given special awareness to private education to achieve general educational objectives in Jordan by expanding its patterns in educational institutions to contain special programs for gifted people, enabling them to serve their community better in line with the concept of equality and opportunities

supported by all democratic societies. In such educational systems, as well as in political systems, talented students need to be exposed to an appropriate environment and given equal opportunities to explore their full potential and to prove their true identity (Al Jabery & Zumberg, 2008).

Jordan, being one of the numerous countries which pays great attention for the gifted and supports the idea of creating a special program for the gifted, had established a specialized schools and centres to nurture the gifted and talented students. One such schools are the King Abdullah II Schools for excellence KASE, which was set up in ten governorates in the Kingdom. Other efforts include the setting up of 'Resource Rooms' in many ordinary schools. Also the Pioneer Centres (Alriyadiyah). Another example is the Noor Al Husein institution which services for talented students had been started through establishing the Jubilee School (Ismail et al., 2013).

1.3 Problem Statement

Throughout the world, education process faces many challenges, which might be social, personal, economic, and technological. Hence, there is a need for high degree of adaptability and flexibility of the education systems to face these challenges. Many researchers emphasize the need for a highest degree of encouragement of creativity in learning within the education system (Radovic-Markovic, 2012).

Education is the most important mode of human societies in the transfer of the society and directing the people energies and social adaptations (Birbeck, 2010). Traditional education does not go with this knowledge of momentum but stand helpless before the challenges of times. With successive and sequential changes in the modern era, any new information revolution in all fields has become more

difficult to provide the necessary knowledge needed by the human appreciation. Therefore, it becomes necessary with the emergence of contemporary educational trends, which recommends the adoption of modern learning strategies, that learners learn the appropriate thinking, which enables them to deal well with these developments (Mohamed & Ahmed, 2016).

Gifted and talented students are dire need of opportunities to develop their thinking skills and knowledge acquisition (Sternberg, 2005). Al-Zoubi (2011) advances that these students also need many thinking programs that can suit their abilities, and their possess a wealth of linguistic, as well as their love for deep investigation and exploration of new things, as well as activities which are at par with their mental abilities, especially in the high academic fields. This calls for specialists to design educational programs that are commensurate with the characteristics of these students and their features (Al-Zoubi, 2011).

Teachers of gifted and talented students are faces many difficulties to facilitate each student's learning and development because of the unavailability of suitable educational programs (Hallahan, Kauffman, & Pollen, 2012). There is the need for the gifted and talented students to enhance their creativity due to the existence of a gap between a child's giftedness and his creative ability, which is being caused by several factors such as environmental conditions and individual characteristics such as personality (Olszewski-Kubilius, 2000).

Cotton (1997) points out that the extent of the actual contribution to the development of thinking will depends on its different forms and the extent of adoption of strategies made by the teachers and the rate of working to support the growth and

development of thinking towards achieving the basic education goals. Based on the results of previous studies, in reality of the curriculum that has become plagued by overcrowding courses and inflated with vast amount of theoretical knowledge, seemingly constitutes a heavy burden on the educated individuals. In addition, teaching methods employed by teachers impacted students' learning as well as their trainings of thinking skills, which could lead to the general weaknesses in the levels of students' performance in achieving the learning targets. At times, there exists large gaps between the learners' actual performance and the set learning standards or targets. In spite of the efforts made in the field of teaching methods by introducing and designing various approaches, nevertheless there are still many educated teachers who still focused on the traditional methods rather than on activating the active participation of the learners in the learning process (Mohamed & Ahmed, 2016).

Jordan is considered a developing country which suffers from limited resources, and it is depending more on the development of the human resources than economic resources. Jordan's social and educational systems face a variety of barriers, just like other developing countries, that challenge equality in the access to education for all its students (El-Zraigat, 2012). According to El-Zraigat (2012), the Ministry of Education, through the directorate of special education, has established The KASE which are to cater for the needs of gifted and talented students, and provided educational programs to this group of students, but unfortunately these programs are only structured to focus on the ordinary academic needs.

In relation to this, the Ministry of Education in Jordan has very limited screening instruments to identify gifted and talented students and also there is also lack of thinking programs to respond to Jordan's gifted students' unique needs within

Jordan's education system. It should be noted that this group of gifted students needs a variety of educational and psychological services that suit their learning capabilities and development. It is however unfortunate the existing educational programs in Jordan do not include the special requirements needed and appropriate for such gifted and talented students (El-Zraigat, 2012).

Al-Rabadi (2011) pointed out that the gifted and talented students' discontentedness and unwillingness to join the schools which are interested in talented students, because of they perceived the ineffectiveness of these schools. Also these schools do not reflect the academic growth of the students. Hence, as a result the establishment of the schools seemingly has becomes inconsistent with the objectives of their establishment in Jordan.

Studies have showed that students in general vary in their abilities, which impact their learning skills and their way of processing information. For example, studies showed that students prefer different learning styles, and those students whose preferred style has been integrated with the applied teaching methods in schools; have proved to achieve best results than students who have not been taught with their preferred style. In this context, studies have also showed that the students' preferred learning style and their way of processing information significantly affect their level of creativity (Turki, 2014).

Noteworthy, a well-designed classroom is needed to encourage talented students' creativity. One way to support this is by providing the gifted and talented students an open ended tasks which will allow them to have the opportunities to think outside the boundary of what is been taught in the classroom. These students can as well be

given more time than normal, allowing them to express their thought (Wilson, 2009). However, very little literature has been written about gifted and talented students in Jordan and this may reflect the importance and necessity of targeting this group of students. A review of the published articles and proceedings of conferences focuses on gifted and talented had only found one study that was carried out by Dababnah (1998).

The researcher noted, through readings of past research on this issue that in reality, these talented students in Jordan, especially at KASE, has the immediate need of being exposed to thinking programs that will help in developing their talents, motivates them to perform their best and also to direct their potentials. Therefore, within Jordan's education system, this problem is deemed important to be addressed. There is limited number of research being done on the talented students as well as studies that addressed the use of 'SCAMPER' program, especially on talented students (Ozyaprak, 2016). Also there are a very limited number of studies which examined the level of creativity of the talented students in KASE.

The King Abdullah II Schools are chosen as place of study because research that focus on the process of learning among the gifted and talented students towards the development of their creativity among students in these schools are scarce. Hence, they arises a need for further research and verification at KASE with regards to the effect of using the thinking programs, and also exploring these gifted and talented students perceptions, acceptance and process of learning they experienced when being exposed to the SCAMPER and CoRT thinking programs. Moreover, considering the nature of the place, it is the venue for significant potentials to provide

stages of learning to support the thinking and the development of development of scientific tendencies among students.

Due to the lack of thinking programs offered at KASE in Jordan, this study intends to include two thinking programs, SCAMPER and CoRT, and verify their effectiveness. The SCAMPER program, which was developed by Eberle (1996), is considered relatively recent compare to the 'CoRT' program, which had proven its effectiveness in many studies and researches.

The SCAMPER program, according to Wilson (2009), is a good program for improving creativity in students. On a similar note, according to Al-Edwan (2011) numerous studies have shown support for the inclusion of CoRT program in the education system, especially in the Arab countries, due to the positive impact of CoRT on students in these countries that have successfully implemented it. Thus, this study intends to identify the effectiveness of the SCAMPER and CoRT program in the development of creativity among the students at KASE in Jordan.

1.4 Purpose of the Study

As discussed within the problem statement section above, and considering the scarcity of this kind of studies involving the teaching and learning for the gifted and talented students, there is a need of such study in Jordan. The primary purpose of the current study is to examine the effectiveness of each of SCAMPER and CoRT programs to developing creativity among gifted and talented students in KASE in Jordan. The second purpose of the study is to explore the gifted and talented students' opinions about their process of learning using thinking the two thinking programs, namely SCAMPER and CoRT. Additionally, this study sought to explore gifted and

talented students' views regarding the importance and effectiveness of thinking programs towards developing creativity among them.

1.5 Research Objectives

The study addresses new issues pertaining to the talented students in the KASE in Jordan, which very few studies had been carried out to address issues faced by the gifted and talented students as well as teaching strategies to enhance their creativity. This study intends to carry out a broad investigation on the students at the KASE to provide a perspective that illustrates the reality of teaching and learning among the students at the schools and highlights the process of their learning experience to enhance their creativity which is appropriate with their identification as gifted and talented students in the schools. Hence, the objectives of this study are as follows:

1. To examine the effectiveness of the SCAMPER program on creativity among the gifted and talented students at King Abdullah School for Excellence.
2. To examine the effectiveness of the CoRT program on creativity among the gifted and talented students at King Abdullah School for Excellence.
3. To examine the effectiveness of the Traditional method (Control Group) on creativity among the gifted and talented students at King Abdullah School for Excellence.
4. To examine the differences in the effectiveness of SCAMPER and CoRT programs on creativity among the gifted and talented students at King Abdullah School for Excellence.

5. To explore the King Abdullah School for Excellence's gifted and talented students perceptions about their learning experience using the SCAMPER and CoRT programs.

1.6 Research Questions

1. Is there a significant difference between the TTCT pre-test mean score and the TTCT post-test among the students in the SCAMPER group?
2. Is there a significant difference between SCAMPER group and control group's TTCT post-test mean scores?
3. Is there a significant difference between the TTCT pre-test mean score and the TTCT post-test among the students in the CoRT group?
4. Is there a significant difference between CoRT group and control group's TTCT post-test mean scores?
5. Is there any significant difference between SCAMPER group and CoRT group's TTCT post-test mean scores?
6. How do the King Abdullah School for Excellence's gifted and talented students perceive their learning experience using the SCAMPER and CoRT programs? ⁽¹⁾

⁽¹⁾ Qualitative research questions are listed in chapter 4 under the heading qualitative analysis.

1.7 Research Hypotheses

The hypotheses given in this study are based on the above research questions and on the literature review as well as previous studies. This study attempted to test the following null Hypothesis:

H₀1: There is no statistical significant difference between TTCT pre-test and post-test mean scores among the students in the SCAMPER group.

H₀2: There is no statistical significant difference between SCAMPER group and control group's TTCT post-test mean scores.

H₀3: There is no statistical significant difference between TTCT pre-test and post-test mean scores among the students in the CoRT group.

H₀4: There is no statistical significant difference between CoRT group and control group's TTCT post-test mean scores.

H₀5: There is no statistical significant difference between SCAMPER group and CoRT group's TTCT post-test mean scores.

1.8 Conceptual Framework

The current study focused on pedagogy for creativity. Craft (2005), Cropley (2001), and Csikszentmihalyi (1996) view that the conceptual framework for such studies should bring together the variables and elements that could contribute to understandings of creativity (Craft, 2005; Cropley, 2001; Csikszentmihalyi, 1996). The conceptual framework of this study is based on Edward de Bono's theory (1968), which is renowned for his criticism of logical, linear, and critical thinking

and for his range of thinking techniques to facilitate potential creative abilities that emphasize thinking as a learnable skill and deliberate act. De Bono has developed formal techniques for deliberate creative thinking.

Furthermore De Bono (2007), purports that thinking can be learned because thinking is considered as an attitude that simplifies things and does not work on complexity, and that will only be acquired through teaching thinking. The teaching of thinking would involve collections of methods (Jones, 1970; cited in VanGundy, 1988). Several experimental and empirical studies have shown the advantages of applying these different methods, in order to encourage creative thinking among learners (Bilda & Gero 2005).

The debate over whether or not creativity can be learned started way back in the 19th century (Baer & Kaufman, 2006) when the studies of human genius and creative achievement were the main concern. In the early 20th century, the concept of source of creativity gradually shifted from the inherited genius possessed by talented individuals to diverse human capacities. Because psychologists have tried to measure and enhance individuals' thinking abilities since the 1950s, and subsequent multidimensional intelligence theories, more attention has been given to the development of creativity in education (Esquivel, 1995). Educational researchers, for example, Fryer (1996: p.5) emphasize that creative skills can be taught through specific strategies: "Creative problem solving training can help people be skilled at finding the best solution quickly ...". Earlier, Esquivel (1995) also emphasized the role of teachers in enhancing the creative potential of each student. In contemporary research, creativity is adopted as a multidimensional and developmental construct.

Creativity is believed to be a developmental transformation and a lifelong process (Craft, 2001a; Esquivel, 1995; Feldman, 1999).

This study examined the effectiveness of SCAMPER and CoRT programs to develop creativity among gifted and talented students in Jordan. This study had used the method of mixing, quantitatively and qualitatively, through semi-experimental design before and after the quantitative phase test, and interviews for the qualitative phase to determine the nature and extent of the relationship between the programs (SCAMPER and CoRT) and creativity. Noteworthy, many researchers have studied the structure of creativity using the TTCT (e.g., Krumm et al., 2014; Clapham, 1998; Hocevar, 1979; Kim, 2006a; Kim et al., 2006; Heausler & Thompson, 1988). Many studies were also conducted using other tests of creative thinking or test batteries from different creative thinking tests (e.g., Bachelor, 1986-1987; Michael & Bachelor, 1990; Runco & Mraz, 1992).

The view presented by Kirton (1976) that creative thinking is a continuum from adaptation to innovation, and individuals can be categorized as transformative or creative in terms of preferred approaches to problem solving. The individual adjusts to the extent to which the individual prefers to better participate in activities. The individual is so innovative that the individual prefers to participate in activities differently. Kirton (1976) posits that "... the more the structure surrounding a problem is incorporated within and treated as part of the problem, the more any solution is likely to be radical and innovative (i.e., "doing things differently"). The less challenging the structure, the more likely a solution is to be adaptable adaptive (i.e., "doing things better")" (p. 622). Kirton (1976) had also developed an inventory to identify individuals on the transformer and continuous innovator. The Kirton's

Theory of Adaptation and Innovation (KAI) reported subsequent research on creative thinking (Krumm et al., 2014).

Overall, quite a number of studies highlight the need for investigating the factorial structure of the TTCT in new population groups as the populations are changing and thus earlier results may not apply to contemporary samples. Nevertheless, the major purpose of this study is to investigate creative thinking as measured by the TTCT.

1.9 Significance of the Study

From the fact that developing creativity is among of the educational goals that the humanitarian societies seek to achieve and if creativity is not encouraged at this stage, encouraging it later will be with weak probability. Developing the education and enhancing creativity of the students has become a topic of interest for many educators and researchers, and it is urgently required to develop creativity and equip the students with the creativity skills (Lai & Wong, 2009).

The importance of this study stems from monitoring the reality in the educational system in Jordan. As has been pointed out by researcher, there is actually a scarcity of viable programs that provide the students with strategies, instruments and ways that can motivate them as well as develop and promote their creativity. Hence the findings within this study would certainly shed some light for the educational policy makers and the curriculum developers to identify suitable educational program or curriculum to help in the development of creativity among the students in Jordan.

The findings of the study would also provide a basis of reference for future researchers, educators and theorist to better understanding the process of learning with regard to creativity development among gifted and talented students within

Jordan's culture, through the implementation of thinking programs on gifted and talented students.

1.10 Scope and Limitations of the Study

This study aimed at finding the level of creativity as well as revealing the effectiveness of the SCAMPER and CoRT programs in raising the level of creativity among gifted and talented students in KASE in Jordan. The study carried out using quasi-experimental research design and which have been followed up using a qualitative approach with the use of semi-structure interviews with the selected students. Hence, the findings this study so limited to other contexts that resemble the context of KASE in Jordan.

This research was limited to a sample of students from the KASE. The sample was chosen from only one School. In order to keep the match within sample, so the sample size reached only 63 male and female students. The researcher tried as much as possible to present a representative sample of the population of the study. Another limitation of the study is that the findings pertaining to the student's creativity level limited to one test, which is the TTCT that used as a pre-test as well as the post-test before and after applying the program on the gifted and talented students. Note that there are two versions of the TTCT, the first one is the verbal Thinking creatively with words, and the second one is the figural thinking creatively with pictures TTCT. The study limited to use the verbal (A) TTCT.

As for the interviews with the students, this limited to students in the experimental groups whereby the purpose is to get their opinions about the extent of using thinking programs in general, and SCAMPER and CoRT in particular. Through the interviews

with them, their opinions have been obtained on the importance and effective of these programs in the development of creativity among the gifted and talented students at KASE.

1.11 Operational Definition

The definitions and terms in this study stems from common language usage. Nevertheless, they have special meanings within this study and need to be indicated within the context in which have been used.

1.11.1 Effectiveness

Effectiveness is the extent to which an activity fulfils its intended purpose or function (Wojtczak, 2002).

In this study, effectiveness refers to the production of the desired result of teaching-learning through the use of selected methods, techniques and tools pertaining to SCAMPER and CoRT programs.

1.11.2 SCAMPER

SCAMPER is a practical, entertaining technique to stimulate creative thoughts. It is an acronym that is formed with the first letter of some thinking processes for Substitute, Combine, Adapt, Modify, Put to other uses, Eliminate and Reverse (Eberle, 2008).

SCAMPER can be defined as a kind of practical and fun brainstorming technique which is inherent in the discussion method, ensuring implementation of the method by putting it into practice, originated as a technique used to enhance creativity of students. (yagci, 2012).

SCAMPER is a method to utilize a check list in the brainstorming process and help those who use them come up with untypical solutions to problems. It was first designed by Osborn, Eberle later re-arranged it and named it “SCAMPER” (Kim, 2014).

The program contains 20 sessions at a rate of 3-7 activities per session for a one session 45 minutes (Eberle, 2008). Thus, in this study, one of the experimental groups in this study received 20 hours of training on SCAMPER program, which occurred over a period of 20 sessions during seven weeks (three hours each week).

1.11.3 CoRT

CoRT (Cognitive Research Trust) is one of the largest programs of teaching thinking as a separate subject. It contains tools and skills of thinking which the student is to put into practice in his daily life (De Bono 1998).

The program consists of sixty lessons which spread over six parts with each part containing ten lessons. Each part bears a name that includes the target that is supposed to be achieved upon completion of the section, as well as to every part of the six sections deals with one aspect from the aspects of thinking. This is so, in order for it to work on the expansion of the horizon of thinking, as well as to help in detecting the position of the different aspects which stimulates thinking (De Bono 1998).

In this study applied only two of CoRT sections, are CoRT 1 “Breadth” and CoRT 4 “Creativity”. Therefore one of the experimental groups in this study received 20 hours of CoRT creativity training lessons which occurred over a period of 20 sessions for seven weeks (three hours each week).

1.11.4 Creativity

Creativity is originality, uniqueness or the ability to make something useful novel or new (Daniels, 1997). It is an advanced thinking process that leads to coming up with a new and unique way of solving problems. According to Plucker and Runco (1998), originality, fluency, and elaboration are three important elements necessary to develop creative ideas. Another definition to Creativity; A social and functional learning process in which one critically reflects upon personal interests and experiences and reproduces something of social, aesthetic, or scientific value (Freedman, 2010).

In this study, the total score of creativity have been measured through the verbal test (A) (Thinking creatively with words) (See appendix (G)).

1.11.5 Gifted and Talented Students

The psychological and educational encyclopedias describe the gifted and talented student as "the child that performs any work with high competency and performs better than the performance of those of his age, and in a way that is promising high contributions and achievements in the future (Jarwan, 2008).

In this study, the gifted and talented students were the students who had satisfied the criteria of giftedness that was adopted by the Jordan's Ministry of Education. They had a grade point average higher than 90% in the basic materials in the sixth grade. These students had received recommendation letters from their teachers, advisors as well as their principals regarding their achievement. They also had to pass a test held by the board of school for gifted and talented Students.

1.11.6 King Abdullah II Schools for Excellence KASE

These are schools established by the ministry of Education in Jordan which aims to develop a program for the gifted and talented students. And meet their needs and develop their innate ability. Also provide programs and services for the purpose of meeting the needs of the students with special abilities, who have been selected according to specific standards and principles, these schools include from the seventh grade until the twelfth grade (MEO).

In this study, the King Abdullah II Schools for Excellence, only one school which established by the ministry of Education in Salt governorate in 2003/2004. That aims to develop a program for the gifted and talented students. And meet their needs and develop their innate ability. This located in salt city in Jordan.

1.12 Chapter Summary

Most gifted education programs have the promotion of creativity among learners as one of their goals, and several education programs include creativity in their screening process. However, a large, and often overlooked, gap remains between the way gifted education programs, the needs of these students and their learning towards enhancing their creativity.

The main objective of the study is to help students to learn how to think more effectively, communicate with others and manage their emotions. Teachers and educators experience the same dilemma wanting to incorporate creative learning activities in the classroom but feeling that by doing so comes the high cost for students' academic subject matter learning. The objective was to highlight ways that teachers may rethink and work towards resolving this dilemma by recognizing that

nurturing creative potential can also occur in the micro moments within their everyday classroom's teaching and learning activities. This study highlights the role of thinking programs in contributing to the development of creativity among gifted and talented students in Jordan.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Individuals can never be prepared for the present and in the future by pouring information onto them through traditional teaching methods, which depends mainly on the teachers. However, this can be overcome by guiding students towards achieving a better understanding of knowledge in relation with everyday problems. In this era of openness between communities (Al-daoud, 2004).

As noted by Gottfredson (2003), in order to fulfil a student's potential at its best, the student will require different services relatively than those being provided in regular schools. For example, it is of the belief that despite only a handful of them manage to apply what they have learnt in class when handling real-life situations, the rest only utilise what they have learnt help them score in the traditional examinations (Sternberg & Grigorenko, 2007). Even though a student is portrayed as gifted, an individual's mental, analytical, and creative abilities may not be enough as it depends on the individual's ability to manage and utilize such abilities when engaged in particular situations by applying these abilities on daily problem solving as they required.

This study is based on comprehensive reading from various books, journals, articles and many other publications. This chapter also clarifies and provide a definition related to the concept of gifted and talented students and their characteristics, and the services provided to them in Jordan as well as presenting comprehensive information about creativity. Apart from that, this chapter also looks to cover SCAMPER and CoRT programs in detail.

On that account, the main objective of this review is to come up with major leading theories and empirical findings related to the subject matter under review. The study starts with a critical discussion of various related theories. This was followed by a review of literatures on basic concepts and terms. The literatures for the study were identified and assessed from the Sultanah Bahiyah Library, Universiti Utara Malaysia (UUM). Resources from other libraries in Malaysia and Jordan were equally included in the literature review for this study.

2.2 Theoretical Framework

There are several theoretical connotations of talent of which the most prominent is by Francois Gagné and Joseph Renzulli. Other programs include Robert Sternberg's theory of successful intelligence and Howard Gardner's theory of multiple intelligences. According to Gagné (1985), the gifted model of talent and talent suggests a clear distinction between talent and talent. In this model, the term talent refers to the possession and use of natural, untrained and spontaneously declared abilities (called abilities or gifts) within a range of at least one capacity that places the child among the top 10% of peers of the same age. By contrast, the term "talent" defines the mastery of advanced abilities (or skills) and knowledge in at least one area of human activity to the extent that the achievements of the child are placed within the top 10% of the peers who are active in that domain or fields.

Renzulli (1997) points out that gifted behaviour occurs when there are interactions between three basic groups of human traits namely, general or above-average abilities, high levels of commitment to motivation, and high levels of creativity. Gifted and talented children are those who own or are able to develop this composite of attributes and apply them to any region of potential value in human performance.

Thus, gifted behaviours can be invention in certain people, at certain time and under certain circumstances.

There are different interpretations and theories of creativity. For example, some psychologists believe that creativity arises from unconscious disks, while some psychologists have identified creativity as a syndrome or complex (Runco & Sakamoto, 1999). Other researchers see creativity as thinking skills, creative thinking, or personal qualities (Sternberg, 1999). Different views and definitions of creativity involve a different research approach to creativity. Although it derives primarily from the theories of the field of creative studies, such as behavioural, cognitive, socio-psychological or human behaviour, the approach to creativity in education, as Craft indicated (2005), has its unique concerns, including the relationship between creativity and knowledge, and relevant educational strategies to enhance creativity in the classroom. Thus, the creative perceptions adopted by this approach are more relevant to educational values and settings. In general, there are two premises based on the approach of innovation in education: the first is the view that creativity can be developed (Fryer, 1996; Torrance, 1963; Torrance & Myers, 1970), second, is that all individuals have the ability to innovate (Feldman & Benjamin, 2006).

By introducing them to the assumptions and aspects of creativity nurtured in education, a 'Framework for Creative Education' is proposed that illustrates the relationship between creativity and educational practices. Creative education is developed to describe the practice that promotes creative development through three interrelated elements - creative teaching, teaching of creativity, and creative learning. Instead of the situation where teaching and learning are parallel processes that rarely

coincide (see figure 2.1), the three interrelated elements complement and produce each other, making them meaningful (see Figure 2.2). A supportive environment for capacity development and creative qualities is created through the interaction between creative and effective education (by the creative facilitator) and creative learning (by the active learner).

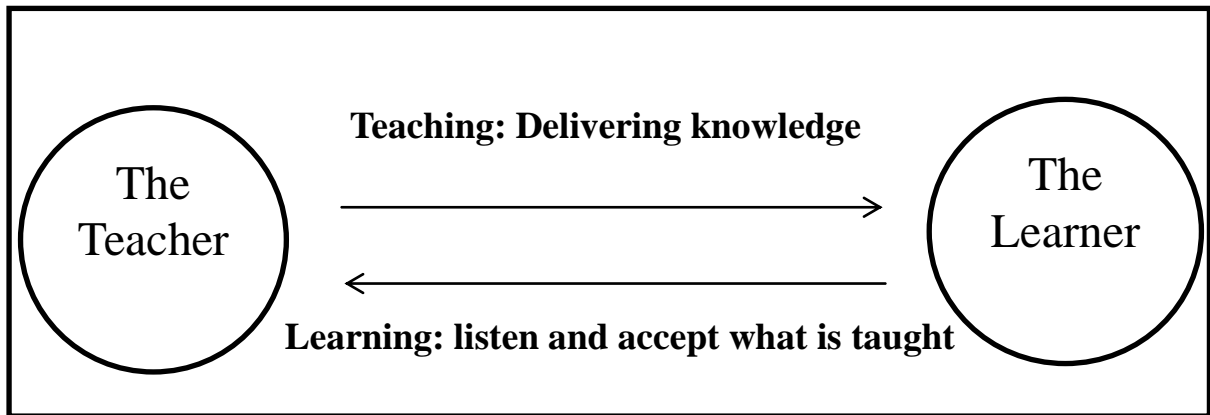


Figure 2.1 Conventional teaching and learning process (Lin, 2009)

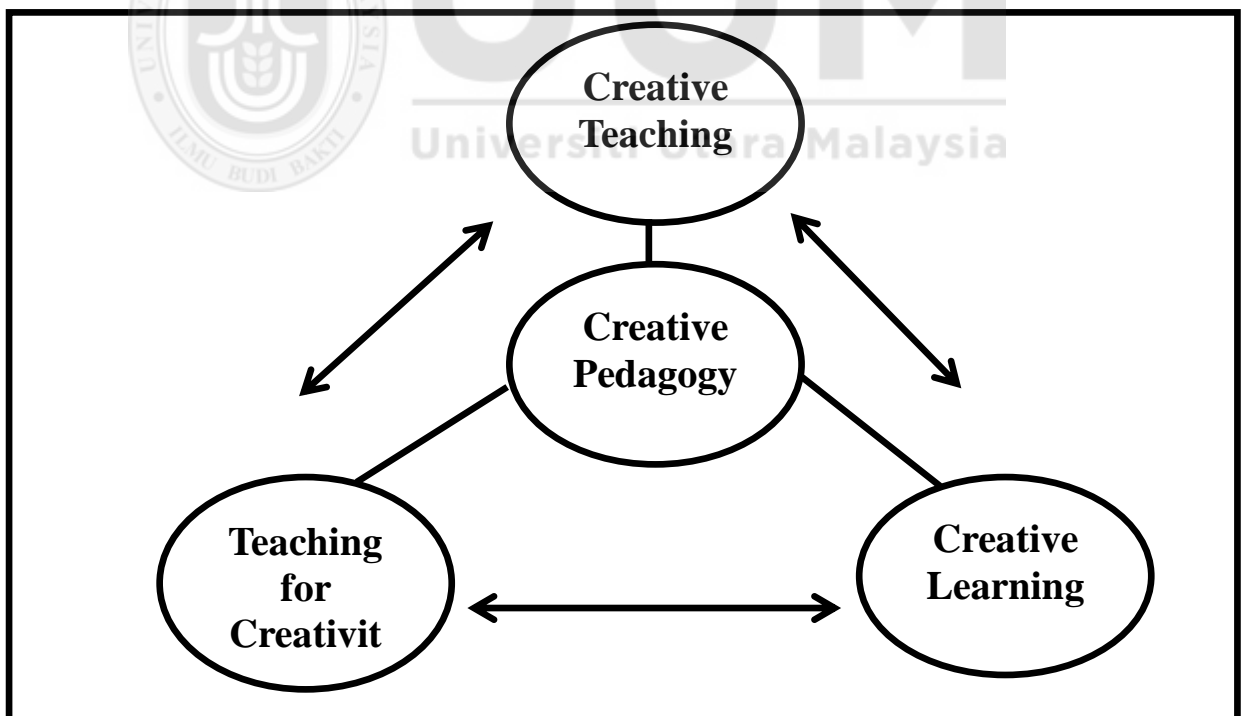


Figure 2.2 The three elements of creative pedagogy (Lin, 2009).

The theoretical framework was based on the creativity theory which is based on the notion that thinking can be improved just like any other skill (De bono, 1968). Figure 2.3 shows the theoretical framework underlying this study. The indicated model and theories have been discussed in the study.

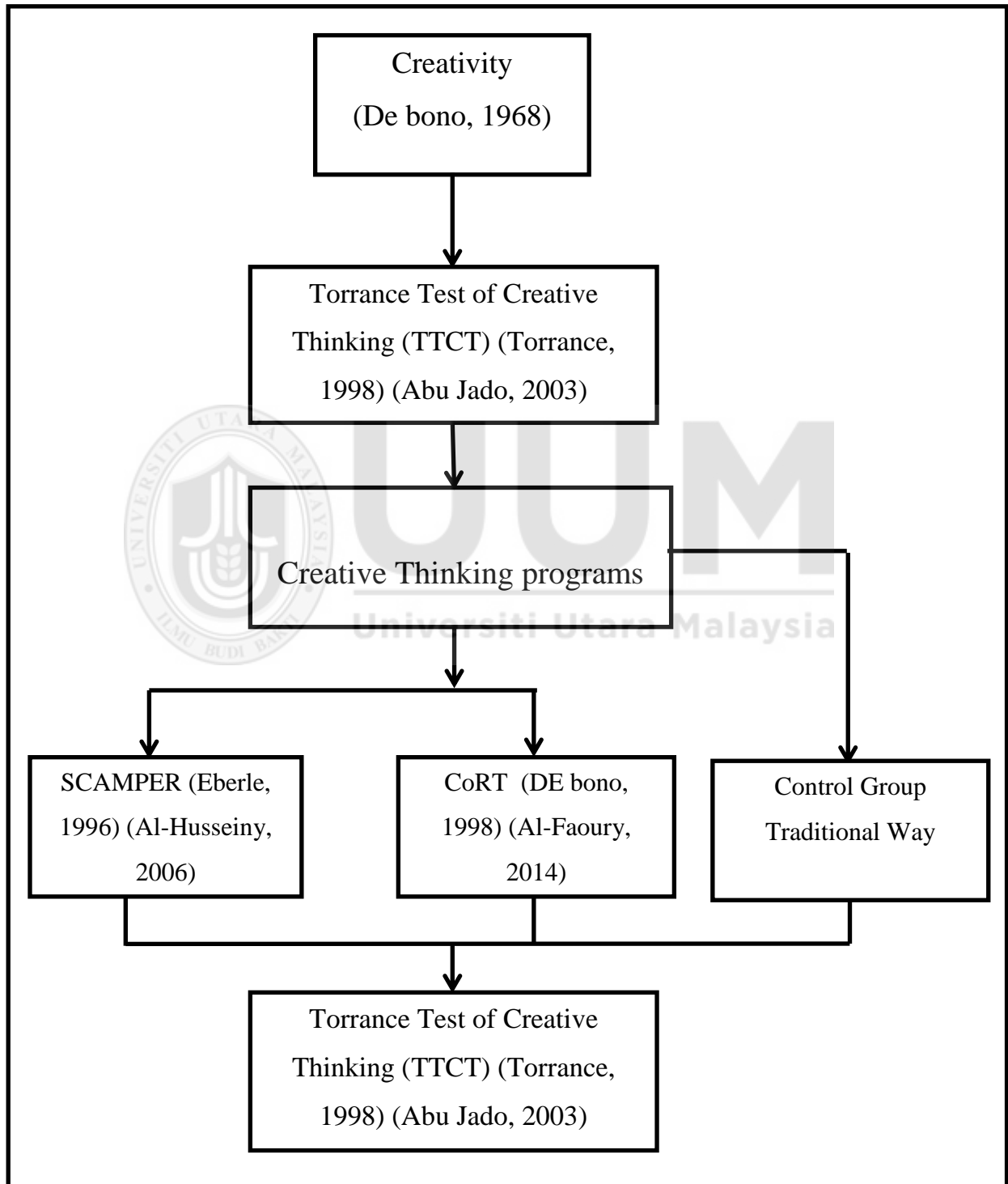


Figure 2.3 Shows the theoretical framework underlying this study

2.3 Gifted and Talented

2.3.1 Definition Gifted and Talented

For centuries, educational scholars from the educational background have tried to come up with a suitable definition, infer concepts and attempted to explain further regarding the words' giftedness'. As years progressed, it was seen that researchers have successfully built theories and empirical investigations on the earlier works. (Subotnik, Olszewski-Kubilius & Worrell, 2011).

In the early 1900's, the term giftedness was used to label students who show high level of potential or achievement in educational literatures. In 1921, Lewis Terman is credited with establishing the term as a part of educational vocabulary. After some time, the term was based mainly on the heritage of Terman and his associates which liken giftedness with high IQ scores (Renzulli & Delcourt, 1986).

According to Pfeiffer (2002), there are disagreements among many scholars in the field of talented and gifted education over the definition of giftedness. These clashes of compromise and conflicts over the definition of giftedness have resulted in the identification process of the gifted and talented students in becoming much more difficult. In addition, Pfeiffer asserted that most definitions of giftedness are in a way related to intelligence, goal-directed mental activities marked by an efficient critical thinking, problem solving, and effective reasoning. Therefore, it is a necessity for schools to identify beforehand those students deemed as gifted and talented in order to serve them well.

The specialists in the gifted education domains have made efforts to understand what it means to be gifted, though the main conflict seems to be due to them in agreeing on a

single definition (Cohen, 2004; Coleman, 2004). The interpretation of giftedness can either be dependent on the result of a high score from a standard test, or even judging from talents in participation of creative activities such as art or drama, or maybe in a particular subject area such as mathematics or science. If one is capable of the things previously mentioned, then that individual can be regarded as talented (Piiro, 1999).

Giftedness can be expressed using various terms; outstanding students are occasionally tagged with some other names like “talented”, “eminent”, “precocious”, “brilliant”, “genius”, “prodigy” etc. Based on these labels, it can be seen that giftedness is a form of a developmental process. Take for instance the case of the young children. They are rarely described as eminent just as the adults are being described as precocious. Put into simpler terms, to demonstrate a child's giftedness in children is much different from adults and the nature of performance in which a person is entitled to be tagged “gifted” varies between adulthood and childhood (Coleman, 2005; Coleman & Cross, 2005; Dai & Olszewski-Kubilius, 2000; Mayer, 2005).

Confusion seems to occur when both the terms talented and gifted are mutually used. Potentials have always been related with the term talents whereas giftedness has constantly been associated with achievement as reported by Feldman (as cited in Gagne, 2004). In an essay from the New South Wales gifted and talented newsletter, Gagne managed to explain his model for giftedness. Then it was described from the theory saying that with a theory implying giftedness is related to possession and the use of abilities one already has which were expressed spontaneously. Furthermore, Gagne stressed that talent is associated with the orderly developed abilities and knowledge that is mastered successfully. He also distinguished talent and giftedness, and views that giftedness is an essential and contained capacity which required both

intrapersonal and environmental influence in order to name it as a talent (Gagne, 2007; Arancibia, Lissi & Narea, 2008).

According to Gottfredson (2003) the letter 'g' is usually used for denoting talents, it is a important factor that reckon for a high cognitive skill. In another opinion, it is referred to as unique capabilities in specific fields which are not associated with general intelligence. Modern concepts call for combining the 'g' factor (hereditary elements), personal and environmental factors.

Conventionally, as indicated by a literature from Ahn (2008), giftedness is easier to understand as obtaining a high IQ score (Terman, 1925). When research in gifted education was earlier introduced in the early 1900's, intelligence was hardly noticed as the only ingredient of giftedness. Terman (1918, 1925) who is famous and better known as the "Father of Gifted Children" (Stanley, 1978) had an opinion which says gifted children are those who are in the top 1% of the Stanford-Binet intelligence test or similar intelligence tests. This is because he believed that giftedness in terms of a limited genetic concept is when a gifted child was able to achieve a set IQ score of over 140.

Lately, the definitions had altered slowly from the unitary IQ score viewpoint and widened its scope, as intellect is no longer the one and only factor for determining the identification of a gifted child. As an example, Delisle and Galbraith (2002) interpreted gifted students are not only those students who are intellectually or academically advanced, but also in terms of artistic ability, creativity, and leadership ability. Based on findings by Ahn (2008), giftedness is defined in numerous ways and this was made easier thanks to a classification system devised by Stankowski (1978). This system was able to categorize these many definitions of giftedness into

five classes. Among four of the five categories which had been used are in the process of identification of gifted children. Firstly, the definition highlights an excellent achievement in a specific field. In other words, a member of society who shows excellent achievements continuously in a valuable area is declared as 'gifted'. In spite of this, the application of this definition is limited due to the restrictions from the term 'gifted' to adults who have contributed effectively to a field that is still having problems to identifying those who are yet to develop their potentials, with those who are undergoing a development stage (Ahn, 2008).

According to Gross (2004), a high IQ might not be an essence of giftedness. Although one must remember that a significant element in determining student's academic excellence is in fact depends on a student's IQ. Equivalently, a student who has a very high IQ score, and shows a mediocre or a low performance in academics will also need to be attended as the cause of the problems must be examined.

The explanation from Abraham Tannenbaum (2003) can also be termed as an "omnibus" definition as he views that: Giftedness in children shows their true potential to be exceptionally renowned performers or commendable architect of concepts in areas of activity that complement the moral, physical, emotional, intellectual, social, or aesthetic life of humanity.

Gallagher and Gallagher (1994) however defined giftedness to be of one of two forms; either as including a child's potential or a child's production of bizarre work, while Clark (1997) and Piirto (1999) slipped environmental factors that lead to a genetic leaning for giftedness.

Clark (1997) classified giftedness in the field of neuroscience for her definition of giftedness. It is of her belief that in neuroscience, high levels of intelligence is basically due to the result of advancement and accelerated growth of major functions of the brain (Clark, 1997), or the way some people are able to develop their intelligence while some unlucky few failed due to some environmental influences. Statistically speaking, all children are born with the same number of brain cells, although the exposure to a range of stimuli (adequate love and care), helps the child in developing interests and at the same aids them to excel in what interests they have developed. That ability will wither according to reports by Clark (1997), who made that statement claiming predicting such an event will happen if a child is not given the opportunities to develop and expand those areas in which he portrays giftedness.

Moving on to another author, Sternberg (1995) claimed that giftedness can be one of these types; analytic, synthetic and practical and if any of these three are displayed by a child it is assumed that the child is showing giftedness. Furthermore, the teachers are responsible to come up with strategies or activities to support these kind of students. Students who displayed the analytical type are known to be very good in analyzing and understanding. The analytical type can be detected by giving normal intelligent tests like analogies, matrix, and synonyms. Those who displays the synthetic type of giftedness are recognized for invention, creativity, or discovering and this type might not be easily detected with normal intelligence testing. Then there are students who display the practical type are called practitioners due to their ability to carry out applications or implementations of what have been analyzed with the aid of external influence.

Sternberg and Grigorenko (2007) in their literature claimed that some students are able to apply what they have learnt in their daily life, while others can depend upon

their own knowledge to just succeed in their academics putting them to good use throughout day to day life. Giftedness is not limited to only analytical, mental, and creativity but also includes the ability to apply such abilities in other situations.

In defining giftedness, Renzulli (1997) describes gifted behaviours rather than gifted individuals; this is because he defines giftedness as the interaction and intersection among three basic groups of human traits, such as those who have an above average ability, those with high levels of task commitment and others with high levels of creativity. The individuals that can develop gifted behaviours are who possess or display the potentials of developing this composite set of traits and applying them to a valuable area of human performance. Additionally, he theorizes that human exhibits in gifted behaviours at certain times, in certain situations and under certain circumstances. Renzulli further claimed that talented and gifted children are those who possess or having the potentials of developing this blended set of traits and applying them to any possible beneficial area of human performance. His work is mainly based on children who show or are able to develop an interaction among the three groups he mentioned and stated they require various assorted range of educational opportunities and services that are not usually provided during in the normal school curriculum (Renzulli, 1997). Additionally, a theory that aims to illustrate the key idea of human potential for creative productivity is also known as The Three-Ring Conception of Giftedness. The name originates from the conceptual framework of the theory; three interacting groups of traits (Above Average Ability, Task Commitment, and Creativity) and their relation with specific and the ordinary world of human performance. Figure 2.4 represents the association between personality and the environmental factors that realize the three rings.

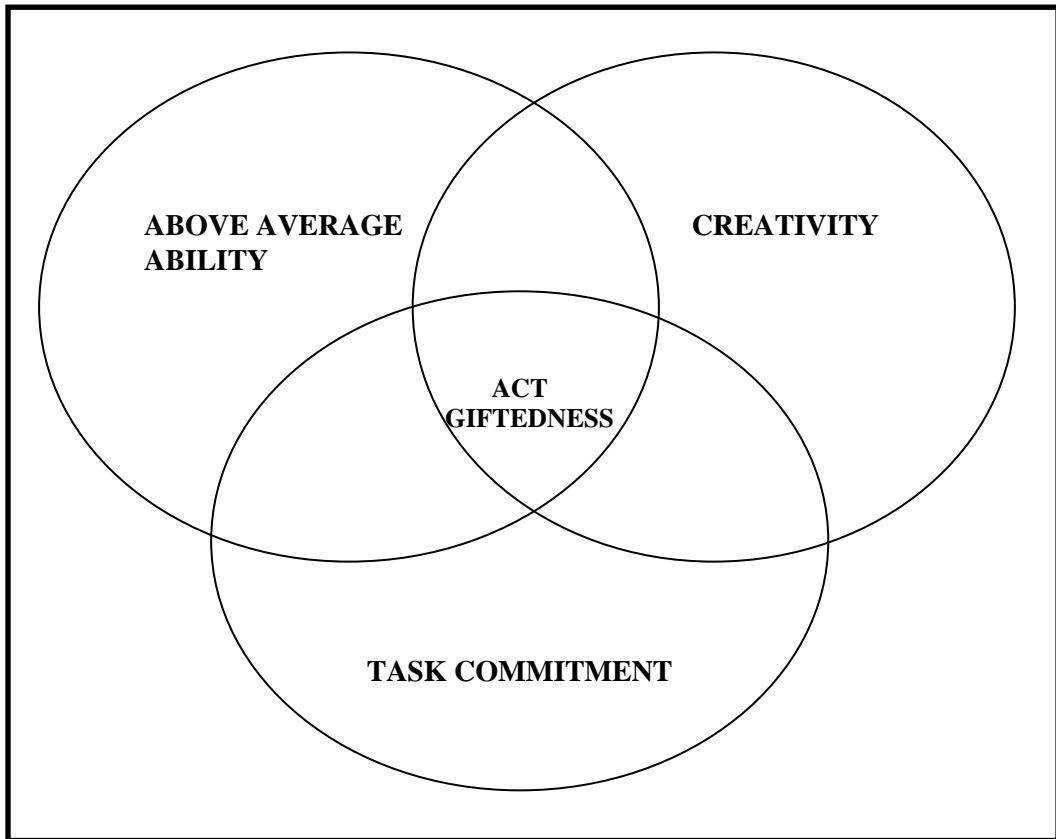


Figure 2.4 Three-Ring Model of Giftedness (Renzulli)

According to the above, gifted and talented children can be defined as those who have outstanding abilities and as well as having high performance and they require alternative educational programs and/or services beyond those that are normally provided by the regular school program in order for them to understand their real contribution to self and the society.

2.3.2 Characteristics of Gifted and Talented Students

The view that gifted and talented students have numerous characteristics in common that made them distinct from other students is been asserted based on the contributions of many educational scholars (Frasier & Passow, 1994). These characteristics may vary due to socio cultural group or gender, or they may manifest in various forms among gifted children with disabilities, different cultural or language practices, or underachievement (Reis & Small, 2005).

Gifted and talented students are those compared to others learn more swiftly and as well understand more complicated issues, with unique emotional needs. Students that exhibit exceptional traits are regarded as gifted. Factors which distinct gifted students from others include inquisitiveness, richer memory, reflectivity, and openness to experiences. The quality of educational counsellors, teachers and resources is an important factor in order to develop knowledge-rich schooling systems that can help students to learn better, teachers to teach better and schools to be more effective. A suitable school environment is also an important factor needed in implementing better educational programs and further enhancing capabilities of students' understanding (Said, Mazahreh, Hammad & Al-Shawabkeh, 2010).

There are some individual specific traits that are mostly unique to extra ordinary students and which are relevant to them, this includes cognitive, intelligence, social, and personal behaviours. There are a lot of researches that have been carried out to identify the characteristics of giftedness and they have successfully identified some gifted children characteristics (Christian, 2008). The findings from these studies show that identifying characteristics of giftedness would assist educators to be able to identify gifted students better.

Many studies have been conducted to identify the characteristics of giftedness. These studies have uniquely identified gifted children characteristics. The findings from these studies show that identifying characteristics of giftedness would assist educators to be able to identify gifted students better (Christian, 2008).

Song and Porath (2006) focused on cognitive behaviours and postulated hierarchical model of abilities which indicated that giftedness and intelligence are better when

association between them is investigated. The interrelationship of human intelligence and giftedness could be exhibited by children at an early age.

According to Dalzell (1998) gifted students show cognitive and physical characteristics at the early period of their life. He documented child's (from birth to age eight) responses to visual and auditory stimuli and noted that the child was more alert, communicative, and acted older than his or her age. Additionally, the child displayed some degree of precociousness beginning at birth and in response to sensory stimuli.

Tucker and Hafenstein (1997) focus their studies on physical characteristics. They identified several behaviours in gifted children which include overabundance of energy and edginess, intense and more rapid activity of the brain, heightened senses and sensory pleasures and wandering minds or daydreaming. In addition, those children that displayed three of the five traits related to "emotional sensitivity and emotional intensity" were often referred to as gifted, and there is as well an association between the number of traits exhibited by a gifted child and their IQ.

Studies done on the social, mental, and emotional characteristics of gifted children have been relatively expansive. Harrison (1999) not only noted the physical behaviours of gifted children, but as well claimed that gifted students love to ponder about the knowledge they have acquired and what they have yet to have knowledge about. He added that gifted students were preeminent naturally and they tend to be tenacious in task completion. Gifted students seek patterns during problem solving and query regulations that they think were not proper (Harrison, 1999).

Emotional nature of gifted people was studied by Silverman (1997). She claimed that “the heightened emotional sensitivity and responsiveness often documented in the gifted is directly related to their advanced cognitive development”. Harrison (1999) identified that gifted people find it difficult in harmonizing to the society and in making friends. Additionally, preschoolers and children often hide their giftedness whenever they are in their preschool or kindergarten classes. It is hard for them to make friends with others because they often had to search for friends apart from their peer group. Silverman referred to these difficulties as social-emotional asynchrony, which is distinctiveness between the student’s chronological age their maturity age.

The paradigms of social, emotional, and mental characteristics were distinct in gifted student’s development. Gifted children perceive sensitive periods and are inclined to experiencing emotional sensitivity and emotional intensity (Shavinina, 1999). These sensitive periods were a heightened time of development and growth within the child. Moreover, Shavinina claimed that sensitive periods support a gifted students’ ability for mental growth. Sensitive periods may be in situations like depression, guilt, and anxiety. Shavinina claimed that mental growth during sensitive periods could be absorbed when the child utilized it into an acquired skills or traits.

Gifted students are usually able to retain concentration for long period of time in interested topics. Many gifted students enjoy intellectual challenge and they set high standards for themselves. Gifted students mostly exhibit initiative, flexibility, and/or originality in their thoughts with the ability to look into problems from a number of viewpoints. Gifted and Talented students can be emotionally and/or socially more superior than others in their age group, this could leads to differences between them and others, making them to further seek friendship with other talented children.

Isolation, alienation, feelings of physical inferiority, social adjustment problems, and communication difficulties are some of the qualities that make relationships with their peers difficult (Janos, Marwood, & Robinson, 1985).

2.3.3 Models and Programs for Gifted and Talented Students

The fact that gifted children exhibit some characteristics that made them different from the other children made educators to design ways to serve gifted student's needs (Gagne, 2004). The field of gifted education is designed to cater for the needs of students whose superior abilities and skills are better served by providing special educational program for them other than the normal education curriculum (Bender, 2006). These special activities can be of varying modalities, depending on whether they are targeted to function within or outside the regular education system, whether they are for a short or long duration, or if they are aimed for acceleration or enrichment (Van Tassel-Baska, 2000).

It is difficult to define the term differentiation precisely. It is related to understanding individual differences and it demands designing educational strategies to cater for students' needs. For differentiation to prosper, suitable schemes must be systematically put in place in the school and in classrooms precisely (Robinson, 2002).

2.3.4 Nurturing Gifted and Talented Students in Jordan

Therefore Jordan's educational experts have many efforts to foster gifted and talented students. Education system in Jordan is derived from the Arabic Islamic civilization. These principles are implemented in the Jordanian Constitution. (Jabery & Zumberg, 2008).

In Jordan the Ministry of Education (MOE) has been providing services since the beginning of the eighties. Also the private sector as well provides services for the gifted.

2.3.4.1 Programs Offered by the Public Sector (MOE)

Jordan, as similar to other countries in the world, provide the care and services for gifted students, through centres and private schools affiliated to the Ministry of Education, which develop their talents (Awamleh, AlAssaf, Borini, & Abdul Rahman, 2013)..

2.3.4.1.1 King Abdullah II Schools of Excellence

The Hashemite Kingdom of Jordan is one of the leading countries to support the initiating/establishment/adoption of specific programs for its academically gifted and talented students and always pays attention and focuses on encouraging them. Following these objectives and the country's vision of creating culture of excellence, the establishment of KASE came to welcome outstanding students and achieve desired outcomes. These schools comprise specially-designed education programmes aiming at providing a practical education and developing a better school environment for gifted and talented students that assists its students to better refine their skills and push their creativity further through an environment of educational democracy and equal opportunities these schools enjoy.

The schools are public co-education institutions for academically gifted and talented students. The first school was set in Az-Zarqa city at the beginning of 2001 /2002 to be the onset of other schools in different governorates (Al- Shabatat, 2011).

Through its advanced programs, KASE focus on offering its students with a strong theatrical background in sciences, from the basics to the very advanced levels,

developing the upper skills of thinking and scientific research, enhancing these students' practical scientific and technological skills, and preparing them to take the lead in the different scopes of knowledge and be competing innovators. The schools also devote huge efforts and time to graduate confident students with excellent interpersonal skills who are able to best deploy their capabilities and talents and are capable of planning their future and facing occurring challenges to be future leaders with increased national sense and belonging (Almajali, 2012).

The students are selected based on four fundamental criteria, namely; the student's general average must be 95% or above, passing a test for the academic readiness, achieving an IQ test result of 135 or above, in addition to a personal interview. In parallel, the JMOE selects the top teachers who have advanced teaching skills and have the required competencies to be qualified to work in these schools (JMOE, 2014).

The targeted segment of students includes those who have completed the sixth grade. The criteria according to the Ministry of Education states that 5 % of the top achieving students in the sixth grade of each ministry school may be accepted in these schools providing that the student is nominated by the competent teachers and families besides having the required behavioural characteristics. (MoE, 2015). King Abdullah II Schools for Excellence are equipped with the needed educational facilities to fit the curricula offered to this targeted segment and achieve the desired results (Almajali, 2012).

2.3.4.1.2 Pioneer Centres

There are (19) pioneer centres distributed throughout the kingdom, serving about (2872) students in the seventh grade and above who were chosen according to standards defined by MOE.

These centres aimed at achieving many goals including developing students' personalities to become more adaptable and able to face challenges. Enhance student's capacities to reveal their talents by providing them with suitable teaching opportunities that focus on developing excellence, creativity and critical thinking (MOE, 2014).

According to MOE (2014), the centre organizes curriculum, provides enrichment programs, and other activities that meet the needs of students with special abilities enrolled at the centre as follows:

- Enrol maximum (80) students each academic year; (40) males and (40) females in each centre.
- The students receives (9) lectures per week; (6) enrichment topics in Arabic, English, mathematics, science, computer and creative activity, General, and (3) lectures for the activities of development creativity.
- During the final examinations, study stops at the centre.
- During the (5) weeks summer vacation (summer program), the centre provides various optional activities.

Students are selected from the sixth grade at the end of the month of May of each academic year, according to the following criteria:

- Academic achievement: Students whose grades are not less than 90% in basic materials in the sixth grade, grades allocated to the Academic achievement is 50%.
- Behavioural attributes: Depends on the observation by breeders' grade teachers and basic materials and educational counsellor and director of the school, grade allocated to behavioural attributes is 20%.
- Achievement test General collective: allocated to it is 20%.
- Outcomes of Special students and special abilities: allocates to it is 10%.
- Personal Interview: by a committee in the Pioneer Centre.

The teaching in the Pioneer Centre is between (2-5) pm, where male students are enrolled at the centres on Saturdays, Mondays, and Wednesdays. Female students are enrolled on Sundays, Tuesdays, and Thursdays. The students have (9) lectures per week over three days for each category.

2.3.4.1.3 Academic Acceleration

Acceleration is a strategy that allows a student to progress through school at a faster than usual rate and/or younger than typical age (Edgecombe, 2011).

Academic Acceleration Program: This program aims at providing academically excellent students with educational facilities to develop their abilities and help them pass an education stage so that they can acquire its basic knowledge and attitudes effectively. This can be accomplished through the provision of a safe environment that offers the best academic and vocational education opportunities. (521) students

benefited from the program in the targeted grades 2_8 (60-80 students annually) (JMOE, 2014).

2.3.4.1.4 Resources Room

Resources Rooms Program for gifted and talented students: It aims at providing students with high mental abilities in grades 3-10 with special educational services that develop their talents and creativity. The target group is the gifted students with high performance in comparison with their peers. This program began with the start of the academic year 2003/2002 in areas which do not have services for gifted students, and the number of rooms provided is (52) Room for (1805) students, and serving about 130 teachers according to figures from the year 2012 / 2011, also (18) Rooms are provided for gifted students during the year 2013/2012, in the various governorates of the Kingdom (MOE, 2014).

This program is to provide educational services to gifted and talented students during school hours and implement this program in the form of giving lectures fully or partially to include enrichment activities which are presented by teachers that are specialized for groups of outstanding students.

The room is used by students, according to specific timetable that shows the period of activities and agenda. The rooms are used for the following: writing scientific research and scientific experiments, preparing scientific projects and implementation, designing models, drawing and geometric designs, development of educational modules, prepare artistic plays or educational exhibitions, scientific and technical, cases of students and their performance for the purposes of developing their abilities. The Students study nine hours a week, during which the activities are prescribed by

the areas of excellence and the ability of the student and his interests and inclinations through the implementation of a range of enrichment programs and development. The students join the program during the official working hours of the school, according to the class schedule for each student enrolled in the sources room of gifted students (JMOE, 2014).

2.3.4.2 Programs Offered by Private Sector (Quasi-Government)

On the other hand, the private sector plays an important role in provide care for gifted students through schools and centres and quasi-governmental foundations.

2.3.4.2.1 Jubilee School

The Jubilee School was built in 1993 for Jordanian gifted and talented students of the secondary level (grades from 9-12). The school is a non-profit, independent, and co-educational institute that offers a comprehensive and specially-designed program by combining the two following curriculums: (www.jubilee.edu.jo)

- An advanced version of the Ministry of Education curriculum that meets the special capabilities of the students and is mandatory for students of 9-12 grades.
- The Jubilee specially-designed program which is mandatory for students of 9-11 grades only and aims at developing the students' skills. This program includes varied courses which 4 of them are compulsory and 2 are elective.

The four compulsory courses are: Leadership Education, Counselling, Communication Skills, and Community Service, with 3, 5, 3, and 120 hours credit respectively, while the school offers more than 60 different courses from which students may choose two subjects as elective courses each semester according to their field of interest.

Students are required to undertake an assessment test which evaluates their mathematical, verbal and logical capabilities in order to be accepted in the schools. Then, an interview is conducted for passing students to shortlist them. These accepted students are informed thereafter by phone that they got accepted and they have to start a summer program for two weeks preceding the year start that shall provide them with the needed training to further sharpen their interpersonal and scientific skills. Moreover, the students will take several tests during the summer course to evaluate their IQ and mental abilities (www.jubilee.edu.jo).

In order for students to graduate, they are required to complete successfully the enriched Ministry of Education curriculum and the Jubilee School special program. In addition, students must complete 120 hours of community service and submit a graduation project at the end of the three years.

2.3.4.2.2 Al Hussein Fund for Excellence (HFE)

Al Hussein Fund for Excellence considered one of quasi-government institutions that support the talent, was established in 1999 under the patronage of KASE. To be a centre for promoting excellence, encouraging innovation and endorsing sustainable development among individuals and groups in both the private and public sectors in Jordan. Aims to implement projects that are aims to enhance general and higher education, supporting institutional and individual applied research and innovation supports technology transfer projects and supports publications (www.husseinfund.jo).

2.4 Creativity

2.4.1 Introduction

Education is a process that starts from people's birth and continues all their lives. However, in the formal type of education, it is expected that people will be affected positively, leading them to be equipped with skills and abilities that might enable them to tackle problems, overcome challenges, comprehend concepts better, solve problems logically and organize the concepts internally. On the other hand, can be defined as the process of transmitting and receiving ideas, concepts and feelings by means of discussing others and negotiating with them (Demirci, 2007). It seems that supporting students has an effect on students' behaviour and performance since students who are not supported in their thinking and learning procedures will have a kind of fossilization to their mental processes, whereas those who are supported and get help and guide will have rapid mental processes and thinking improvement (Hancer, 2013).

According to Ruggerio (1984) as cited in Chaffee (2014) thinking can be defined as a mental activity which aids in addressing a problem, solving it, adopting a decision, getting better comprehension and getting answers for raised questions. Therefore, because these complex cognitive and mental activities, including organizing ideas, generating arguments and assessing them, presenting ideas and applying them, designing plans, examining issues from several aspects and implementing knowledge in new situations, are attributed to thinking, it seems that thinking as a process is active, purposeful, and organized.

Thinking is defined by Solso (2004) as the most peculiar feature of people since it represents the top point of the cognition area, where no other being on the surface

has such a distinguished ability. Additionally, thinking, as Beyer (1991) reports, requires specific skills and techniques due to its complexity as a mental activity. These thinking skills are represented mainly by three basic constituents, namely attitude, mental operation and certain knowledge. Additionally, several factors lead a person to think, solve a problem, understand judgement, form a concept and adopt a decision, However, the skill of solving a problem, which should be an advanced thinking skill, is an effort on the part of the person to get a solution for complicated cases by means of ideal strategies.

According to Clarke (1990), thinking skills have been classified by Bloom (1956) into six levels, namely knowledge, comprehension, application, analysis, synthesis, and evaluation. These six levels are grouped in two categories, which are higher-order thinking skills and lower-order thinking ones. Synthesis and evaluation are included in the former group, whereas knowledge, comprehension, application and analysis are included in the latter one. It seems that Bloom's model is more comprehensive and useful for educational purposes. Thinking skills are considered a personal trait that should be given importance, emphasized in the educational field and integrated in the teaching/learning process of each subject (Yaqoob, 2007).

As mentioned earlier, thinking skill is at the top of the cognition area; therefore, the higher the level of natural thinking capabilities is, the best chances given for the effective growth of the cognition skills, thus supporting the personal and social features can empower the individual to exploit these abilities effectively towards fulfilling the desired goals. However, developing one's own creativity can lead to the realization of true excellence (Aljughaiman & Ayoub, 2013).

Creative thinking, as mentioned by Lee (2005) implies involving in a distinguished thinking due to an inborn desire to find better solutions. Thus, the term ‘creativity’ or ‘creative thinking’ represents a kind of thinking which might result in getting novice insights, recent approaches and perspectives as well as new ways of comprehending and understanding matters (Eragamreddy, 2013).

2.4.2 Definition of Creativity

Based on the available literature and previous studies related to the creativity, over a hundred definitions of creativity with several overlapping elements are provided (Sternberg & Lubart, 1996).

The concept of creativity is often used interchangeably with other concepts, such as innovation and creative thinking ability, which is defined as the cognitive ability to generate novel and unique ideas (Torrance, 2002). However, distinguishing between the two concepts, creativity and creative thinking, is very essential. On the one hand, creativity implies identifying problems and producing new ideas (Brinkman, 2010). The term creativity used by the International Centre for Studies in Creativity (2011) means what is new and helpful or the producing of novel and purposeful ideas, whereas creative thinking means the procedure of creating new ideas and associating between unrelated ideas (Adams, 2013). According to Halpern (2002), creative thinking as a process consists of several stages, such as identifying the problem, determining which part of the problem is most important and getting the best way to solve or have a solution.

What is meant by creativity, as a dynamic activity in the subconscious, is the procedure of getting the information as input and reshaping, filtering and

reproducing this information to get new ideas and concepts in the form of output (Hancer, 2013). Thus, consider creativity as including the whole brain. Additionally, describes creativity as a feature of people, procedures, products, and environments (Lumsdaine, Lumsdaine & Hollander, 1995).

However, creative thinking can produce novelty if it is practiced in a manner that might produce continuous alteration, but the production of creativity is not always a tangible product. Obviously, creativity as a process involves different thinking procedures leading to the production of several original ideas that are combined to produce the solution or fixed concept(s) (Robinson, 2002).

When discussing the concept of creativity as integrated in the classroom, creativity might imply the procedure that enables the students to explore problems facing them in real life, analyze them, make an assessment of the content, and use their strengths to invent valuable and good work (Robinson, 2002). Additionally, according to Robinson (2002), the practical side of imagination is represented by creativity; which associates imagination with life by means of art, stories or a new point of view.

Johansson's (2004) discussion focuses on associating creativity with ideas, information, and practices that belong to a certain domain of study with those that belong to another one with the purpose of creating novel perspectives or views.

It can be said that creative thinking involves three concepts which are attitude, knowledge and skills. a) Attitude of research specifies the required general needs to enhance the skill of identifying the problem and supporting the information with evidence b) Getting correct results and findings by means of adopting varied evidence types that are rational and logical c) Putting the application skills, attitude

and information in, thus It is in need of looking for new ways to solve the challenging problems that requires creative thinking in presenting new products practice (Magnussen, Ishidia & Itano, 2000).

Creativity is defined by Fisher (2005) as several attitudes and capabilities which empower the individual to create effective thoughts, concepts or perspectives. Additionally, creativity, according to Craft (2003), is characterized by the possibility of thinking which, as Jeffrey and Craft (2004) argue, include identifying and presenting solutions for problems, looking for other alternative viewpoint, and raising critical inquiries.

It has been showed that the two elements of creativity are novelty and usefulness since only few people would not accept that the idea must be novel or original in order to be classified as a creative one (Joo, 2007). However, the novel idea is not enough alone to be classified as creative unless it is useful also (Amabile, 1988). Therefore, when the idea is only novel, but it is not useful in practice, it is classified as unusual but it cannot be called creative (Joo, 2007; George & Zhou, 2007).

As cited in Ochse (1990) when defining the concept of creativity within the context of the cognitive approach, the focus is on both thinking abilities and knowledge. As cited in (Tsuei, 1998) Torrance (1966) stated that creative behaviour is the ability to produce several ideas (Fluency), varied types of ideas (Flexibility), unusual ideas (Originality), and detailed ideas (Elaboration). Moreover, De Bono (1968) stated that creative thinking constitutes a significant part of lateral thinking, where it moves to sideways when challenged with a problem with the purpose of looking at the problem from different angles. Furthermore, creativity according to other cognitive

theorists is insight skills, a matter of problem-definition, and problem solving skills, with a main focus on creating similarities and assimilations, unusual connections or integrating several elements of knowledge.

This creativity, as Bergquist (1999) considers it, is very important to growth since when the person learns, he can adapt to both the surrounding environment and the value in his inner side. Thus, creativity is integrated in the whole life since there is a wholeness related to the procedure of creativity. Bergquist cites Maslow (1963) classifies creativity in three categories. Primary creativity proceeds from a primary procedure. Secondary creativity results from using higher thought procedures, and integrated creativity. Based on the conclusion of Bergquist, psychological branches look at human experience with different views that influence their creativity theories which are also interrelated. All These theories related to psychology consider creativity as an encounter which merges and integrates different sources of information, but the point of disagreement among these is the source of the information and the processing procedure though the majority of the creativity theories look at creativity as a process through which a person can find an association with the surrounding environment. However, the behaviourist theory is excluded from these theories.

In general, creativity definitions are grouped into one of the following categories: person, process, product, and environment therefore, scholars and researchers have examined creativity adopting several definitions, focusing mainly on the outcome. Some scholars view creativity as a personality feature or trait, whereas others look at creativity as a procedure that involves individuals with the purpose of creating a new and distinguished product (Amabile, 1996).

2.4.2.1 Creative Person

Creative Person: characteristics and features of creative persons have been examined by several studies conducted by many researchers, such as Daniels (1997), who views creativity as “constellation of traits and abilities”. These traits and features are hoped to be supported and strengthened by the majority of the programs. Additionally, Davis (1997) reports that people who have creative capabilities are generally aware of their own abilities related to creativity. Maslow’s (as cited in Piirto, 1995) definition of creative faculty is described as a general inclination for achieving things creatively. However, Sternberg’s (2005) belief towards creativity implied that this latter is a choice. Consequently, education must teach students to decide for creativity.

2.4.2.2 Creative Process

Koestler, in *The Three Domains of Creativity*, stated that creativity consists of combining previously unrelated structures (Koestler in Adams, 1986). Creativity requires the manipulation and reconfiguration of experiences. This combining aspect is often cited in definitions of creativity. Humanistic psychologists believe that creativity is a response to peoples’ basic inner needs and that people create to grow and fulfil themselves (Adams, 1986). Adams stated that creativity has sometimes been called the combining of seemingly disparate parts into a functioning and useful whole.

2.4.2.3 Creative Product

According to Daniels (1997), creativity in its general implication means novelty, distinctiveness or being able to create useful and novel things in a better way. Additionally, Csikszentmihalyi’s (1996) definition refers to creativity as a concept, action or product which can leads to alterations or transforming an existing aspect

into a modern one. Amabile (1989) insists that creativity must meet two criteria. First, creativity must differ significantly from anything. Second, creativity must not be only different, but it should be right, significant, interesting or valuable for fulfilling a goal.

According to Halpern (2002), a person is considered creative when his/her product or outcome is right, useful and distinguished; therefore, when discussing the aspect of creativity, the focus is on the consequences rather than the consequences' procedures. However, the idea that is unusual and right is not stable since it might vary based on the quantitative aspects or levels. Additionally, creativity is not one trait or characteristic which may be possessed by people and may not, but it is a group of novel procedures happening in a specific context and produces creative results. Regarding the outcome-based approach, it has not been adopted widely due to difficulty in measuring creativity while focusing only on one aspect that is either the process or personality. However, in measuring outcome-based creativity, personal features, environmental elements, and problem-solving procedures are examined in order to identify which one/s is/are associated with the creative outcomes (Amabile, 1988).

2.4.2.4 Environment

Although the role of the environment is significant, definitions and theories are not usually builds solely on environmental creativity (Amabile, 1989; Davis & Rimm, 1998). However, environmental factors might have a significant impact in the procedure of creative development (Baer & Kaufman, 2005).

Due to the association of several aspects with creativity, Torrance's (1988) definition of creativity involves all four aspects: person, process, product and environment. Additionally, Torrance (as cited in Treffinger Young, Selby & Shepardson 2002) asserted that creativity is "a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on" (p. 5).

2.4.3 History and Theories of Creativity

According to Craft (2001), Galton conducted in (1869) the first systematic study related to creativity, where the main focus was 'genius', followed by so many studies and the scope of examination remained prevalent till the 1920s. However, after this period, there occurred a shift in the psychology towards investigating intelligence. Though Binet's study involved examining the creative side of intelligence, the major study of creativity in psychology was conducted in the 1950s.

J. P. Guilford, in his 1950 presidential address to the American Psychological Association, called for investigating the area of creativity, where in his seminal study on the Structure of the Intellect Model (SOI), a theory to measure thinking capabilities involved in the creative process was presented (Davis & Rimm, 1998). Guilford's pioneering genius in the field of creativity hypothesizes that people with creative abilities have different thinking capabilities. Thus, Guilford hoped to improve creativity with the purpose of testing and putting limitations of IQ testing into perspective (Hee, 2005).

E. Paul Torrance: Since 1962, Torrance has been considered a principal educational psychologist, father of creativity and a scholar who dedicated his life and work to implement creativity in education; therefore, Torrance's research in this field has

extremely affected modern creativity area. Consequently, Torrance's Test of Creative Thinking TTCT has been adapted widely to measure creativity with validity and reliability, thus motivating lots of researchers of different genres in this area (Lee, 2006).

It seems that Torrance's definition of creativity is based on rational and logical association, focusing mainly on identifying the problem, hypothesizing, testing these hypotheses, and finally demonstrating the outcome (Davis, 1998). Additionally, based on Torrance's belief, the normal school curriculum ought to emphasize creative behaviours with the purpose of empowering students to identify the relationship between school knowledge and the outer world (Lee, 2006).

Graham Wallas' Model is probably the best known model of the stages associated with the creative process (Davis & Rimm, 1998). Four phases are involved in this model, including preparation, incubation, illumination, and verification (Frasier, 1997). In the preparation stage, describing or exploring the problem and collecting related information are involved in this stage. The incubation stage includes a mental pause to reflect on the problem itself rather than other problems and classify problems unconsciously. After such periods of reflection and relaxation, the illumination stage of "Aha!" and "Eureka!" appears with a sudden solution. The illumination stage is the light bulb moment when the sparks of inspiration ignite, and finally, the verification stage focuses on the feasibility and applicability of the illumination (Frasier, 1997).

Sternberg's Triarchic Model of Successful Intelligence by means of focusing on the creative individual contributed to creativity theory (Sternberg, 2005), which combines analytical giftedness (academic talent), synthetic giftedness (creativity),

and practical giftedness (applying analytical and synthetic capabilities to daily life). These three abilities must be coordinated, balanced, and knowing which one to use and at what time (Davis & Rimm, 1998). Thus, creativity, according to Sternberg, is a peculiar intersection involving three psychological attributes, which are intelligence, cognitive style and personality/motivation (Davis, 1998).

Gardner's Multiple Intelligences Theory (MI) has aided in shaping the modern creativity movement through separating both fields of creativity and intellectual giftedness. Intelligence has been described in this theory as seven separate and individual domains (Davis & Rimm, 1998). The following might highlight some brief points for each. Linguistic intelligence can be enhanced through both general learning and vocabulary. Deductive and inductive reasoning is within the interest of Logical-mathematical intelligence. For spatial intelligence, it is characterized by spatial relations and manipulating mental images. Musical intelligence focuses on sound, tone, and musical awareness. Bodily-kinesthetic intelligence includes movement control exercises. Working in groups and nonverbal communication are associated with interpersonal intelligence, while feeling awareness and metacognition aspects are associated with intrapersonal intelligence. However, only the first two intelligences, linguistic and logical-mathematical, seem to be essential competencies examined with the purpose of measurement by tests of traditional intelligence, that are approved by the traditional school settings (Ramos-Ford & Gardner, 1997).

Some models of intellectual giftedness consider creativity as a condition necessary for distinguished intellectual fulfilment, while others consider creativity as an own form of giftedness (Gagne, 1993). In the first view, it is implied that gifted individuals possess intellectual abilities and aptitudes which empower them as well

as equipped with both motivation and curiosity that drive them to pursue creative activities (Simonton, 2000).

Studies conducted on gifted individuals define creativity as a special skill or a feature possessed by these gifted people. As a result, it was found that these gifted people have a creative ability enabling them to perform well as well as having abilities in divergent thinking, problem finding and generative thinking more than non-gifted individuals (Winner, 2000). Thus, VanTassel-Baska (2001, p. 1) states that “creativity is an elusive factor in its relationship to giftedness”.

The correlation between child creativity test scores and adult creative achievement ranges from .51 to .63 (Torrance, 1984). Given the moderately high predictive validity of creativity scores, it may be worthwhile to supplement IQ with creativity in the identification process for giftedness.

As stated in (Hlasny, 2008) According to Getzels and Jackson (1962), it is through creativity that the academic achievement of a student can be anticipated and predicted at school, and May and Ripple, Shouksmith (1970) hypothesize that general intelligence is a condition for creativity. Based on this hypothesis, it seems that intelligence and creativity depend on each other. Thus, Torrance (1984) strongly argues that when identifying giftedness, it should be put into consideration that both creativity and intelligence are considered as criteria.

It seems that giftedness (the IQ measured 'definition') is a deficient forecaster of creative achievement. Although highly 'intelligent' students have got higher school marks and tertiary degrees and joined higher- paying professions than their school peers, they do not seem to be distinguished creative persons (Sternberg, 2009);

therefore, Sternberg (2009, p. 286) suggests that “precocious intellectual talent may be neither necessary nor sufficient for true creative achievement in adulthood”.

Additionally, since giftedness and creativity are interrelated multidimensional processes, identifying intelligent/creative people has become more complex. To give an example of this, Renzulli (1984) points out that students with good, above average (but not necessarily high), abilities and who are capable of carrying out creativity tasks can have gifted and talented behaviours. However, Petrowski’s (2000) suggestion implies that 'intelligence' is necessary, but it is not sufficient to trigger creativity (many IQ scales do not, and arguably cannot assess creativity). Nevertheless, this does not oppose the concept that comprehending 'intelligence' is essential to understand creativity and its association with 'intelligence'.

Urban (2005) reports that a specific score on an IQ test shows nothing about how creative an individual is. Additionally, IQ tests do frequently reveal students’ high academic (school) achievement (Neisser, Neisser, Boodoo, et al., 1996); however, results from Urban's (2005) Test for Creative Thinking – Drawing Production (TCTDP) suggest that individuals with low academic abilities and achievements are not necessarily possessing low creative capabilities, and people with high academic abilities are not necessarily having high creativity. Thus, it is reasonable to be highly 'intelligent', as measured by a narrow IQ test and school standardized achievement tests but not necessarily be creative and vice versa.

As stated in (Ronksley-Pavia, 2014) It seems that Ripple and May (1962) are cautious when comparing creativity and intelligence since they consider creativity and intelligence as positively correlated. Thus, academic achievement rather creativity can

be predicted by intelligence. In addition, some researches' suggestion indicate that a child's achievement at school can be predicted by means of intelligence; however, depending on intelligence to predict adults' success, achievement, strong leadership, abstract thinking and problem solving capability later in life is very limited (Sternberg & Lubart, 1996).

Due to some factors, such as environmental conditions, motivation and personality characteristics, there appears a gap between children's giftedness and creativity (Olszewski-Kubilius, 2000).

The possibility of the association between underachievement and creativity is a matter of questioning and doubt, according to Kim (2008), due to the similarities between the features of children with underachievement and children of high creativity. Additionally, creativity differs from intelligence, talent and genius since creativity implies novelty and valuables within a sociocultural context, whereas talent involves the "innate ability to do something very well" (Csikszentmihalyi, 1996, p. 27).

In brief, the findings of the studies conducted on the relationship between intelligence and creativity seem to opposing, inconsistent, and very old, and existing literature demonstrates disagreement in the true meaning of giftedness. However, it is clear that research does establish a link between creativity and giftedness.

2.4.4 Characteristics of Creative Individuals

2.4.4.1 Positive Characteristics

On the one hand, creative individuals, according to Davis' (1998) list, are characterized with features as follows: aware of creativeness, original, independent, risk-taking, curious, sense of humour, attracted to complexity, open-minded, needs

alone time, and intuitive. Additionally, independence is essential to creative proclivity. The creative individual often “marches to his own tune.” Also, creative people are often risk takers and like ventures (Tomlinson, 1999; Torrance in Cramond, 2001). The creative risk taker is ready to accept, reject and isolate for the sake of creativity since students who are creative are desired to explore beyond their limits (Tomlinson, 1999) as well as zealous, motivated, greatly committed to their task or work (Csikszentmihalyi, 1996), curious, having a tendency to play around with ideas and images, dealing with problems and conditions in a childlike manner and new (Daniels, 1997), attracted to complexity and disorder, open-minded (Sternberg & Lubart, 1996), receptive to others’ viewpoints (Sternberg, 2005), and preferring privacy, alone time, having the tendency to be original, fantasize, daydream, imagine and reflect on matters around them, perceptiveness, identifying patterns and having awareness and intuition (Daniels, 1997).

2.4.4.2 Negative Characteristics

On the other hand, creative people, according to Davis (1998), are also characterized with negative features, including being indifferent to conventions, challenging rules, rebellious, capricious, absent-minded, argumentative, sloppy with details, egocentric, temperamental, and overactive. However, students with creativity talent are usually overwhelmed with these negative characteristics, and the role of the teacher is to identify both sides of the characteristics though. Lee (2006) cited in Getzels and Jackson (1963) found out that teachers prefer intelligent students to creative students because these latter are less cooperative and rarely accept the teacher’s explanation of the subject or the topic.

However, not all creative people have all the characteristics of both types of creativity (Davis & Rimm, 1998), and the purpose of these lists is to aid in identifying creative students in the classroom, and encourage teachers to be patient in developing students' creative abilities.

2.4.5 Teaching Creativity

Davis (1998) reports that each person they can have a creative skill and a creative productivity. Gardner (2000) believes that education in the future should be different, emphasizing mainly the disciplinary forms that can empower students to tackle challenging problems and produce a new line of thoughts.

Adams (1986) declared that “for most of us, creativity is more of a dull glow than a divine spark. And the more fanning it receives, the brighter it will burn” (p. 10). Obviously, instructions of creativity should motivate students through pedagogical procedures, creative nurturing and practice in order to support creative abilities, attitudes and problem solving abilities as well as leading students to be self-actualized and having creative contributions to the society

According to Lee (2006) that future researches related to creativity should focus more on describing creativity, realizing what conditions or factors drive the person to show creative behaviours, identifying features of creative people, strategies to increase creative innovation through creativity instructions, and revealing advantages of creativity instruction.

Regarding creativity and teaching creative thinking, Lucas (2001) suggests four significant and basic conditions to teach creative thinking in the classrooms. These include having challenging activities in a supportive but demanding environment.

Another condition implies eliminating negative stress since students are in need of situations that negatively affect thinking process. Additionally, teachers' role is to provide students with feedback on their learning with the purpose of leading them to identify what elements make an extraordinary work. Finally, teachers should help students to accept the uncertainty caused by creativity.

Sternberg (1995) suggests that applying synthetic, analytic and practical capabilities can lead to creativity. Additionally, Sternberg confirms that all of those can be consciously improved and developed by educators through following the 12 strategies presented by Sternberg (1995), as follows: (1) Teachers should be a role model for creativity. (2) Teachers should motivate students to question long-held suppositions. (3) Students should be involved in risky situations and learn from mistakes (4) Tasks and evaluation should be creative in nature. (5) Teachers ought to having students identify and define the problems and challenges themselves. (6) Teachers should reward creative ideas and outcomes. (7) Students should be given enough time by teachers to think creatively (8) Teachers should motivate students to be comfortable and familiar with ambiguity. (9) Teachers should help students comprehend that creative thinkers face challenges and obstacles. (10) Teachers should teach students how to keep trying. (11) Teachers should have the tendency to be as creative thinkers. (12) Teachers should learn that creative thinkers need encouraging learning situations in order to succeed.

The guidelines that can be used for successful instructional strategies and techniques, including student-centred activities, adopting multimedia technology, connecting content to real-life experience, open-ended questioning, using specific materials,

adopting a variety of technology, such as software, online games, textbooks and manipulative (Horng, Hong, Chan Lin, Chang & Chu, 2005).

The role of school in enhancing students' creative thinking can be manifested through making time and space available for students' creative behaviours. For example, Knodt (2010) describes a school library that is structured as an open-inquiry lab that presents the opportunity for both hands-on and self-directed projects. Also, using the lab can strengthen open-inquiry and hands-on learning, where both are essential for building creative thinking abilities, skills and behaviours.

According to Jeffrey and Craft (2004), in spite of the close relationship between the two concepts, "creative teaching" and "teaching for creativity" are different from each other since the former, that is inherent and directly leads to the latter, implies involving instructional strategies, whereas the latter aims at motivating students to think creatively. This distinction between the two concepts, "creative teaching" and teaching for creativity, might have dichotomized a kind of integrated practice because teachers involved in teaching creatively frequently encourage students' creative learning. Consequently, creative teaching can lead to creative thinking (Jeffrey & Craft, 2004).

However, since its occurrence around 1953, the concept teaching for creativity seemed to be relatively intimidating to some teachers (Cropley, 2001) since many teachers are not familiar with the meaning of creativity, its importance and significance and way of teaching it though the main purpose of teaching for creativity does not necessarily mean leading to creative geniuses or initiating another

age but rather it aims at assisting all students to fulfil their academic and personal abilities (Cropley, 2001).

2.4.6 Methods for Enhancing Creativity

According to Sternberg and Lubart (1996), the majority of researchers in the field of creativity believe that the ability of creative thinking can be strengthened and supported by means of intervention. Thus, several creativity training programs have been developed, followed by many studies that investigated and examined the impact of these programs (Nickerson, 1999). In order to develop creativity and promote creative thinking, research in this field suggests that these two are essential for good teaching (Tomlinson, 2001). Obviously, instructions can be easily incorporated and integrated into any curriculum and offer the required creativity to lead to productive ideas (Daniels, 1997).

2.4.6.1 Brainstorming

Brainstorming, as a tool that combines both fun and exciting and motivates students to learn and participate in instruction, was introduced first by Alex Osborn (1963) to present a receptive and creative conditions that can lead to novel and unusual ideas and intellectual risk with overdue judgment. For example, in a brainstorming session about benefits of fruit peels, students can list as much as they can regardless of their true connection to the main topic or idea that is raised (Daniels, 1997). It seems that the aim of a brainstorming session is not only to produce a long list of possible solutions that are related to problem solving solutions, but also to find a possible solution that is creative. For example, hitch-hike is brainstorming that encourages students to actively participate. In hitchhiking, one student's idea entails another,

where all ideas are accepted without criticizing or rejecting until a new idea is generated with a creative solution (Davis, 1998).

Davis and Rimm (1998) listed brainstorming rules as follows: criticism is ruled out, freewheeling is welcomed, quantity is wanted, and combination and improvement are sought. It can be said that a twist to brainstorming is reverse brainstorming. This reverse brainstorming involves an example, as such "What could educators do to stifle students' creativity?" It seems that those students who are involved in a reverse brainstorming session can rapidly find out the implicitly incorrect suggested creative resolution. Another form of brainstorming involves stop-and-go brainstorming, which is a repetitive brainstorming session with frequent intermingled assessments.

In brief, it can be said that brainstorming is a thinking strategy that is effective and creative as well as able to enhance creative stance and capabilities. Because it is simple, funny, therapeutic and effective, brainstorming has gained this popularity (Davis, 1998).

2.4.6.2 Open-ended Activities

Open-ended activities can also enhance creativity since these activities have no right or wrong answers (Runco, 1990), and used to make modification to the curriculum through providing distinguished and challenging instruction to the learner. Thus, it is through the multiple possibilities and risk initiating, creativity related to content, procedure, and outcome is resulted (Hertzog, 1997). Education always emphasizes the ever-elusive "one" right answer of convergent thinking, but it neglects thinking skills that are different. In programming students to find the correct answer, teachers and educators devalue the creative learning process instead of building the basics.

This is not real life learning. Life's trials, and for that matter, life's blessings, do not come with answers. Practicing creative abilities and using creative talents are necessary for students in order to associate or comprehend the surrounding conditions and the outer world (Lee, 2006).

It can be argued that open-ended activities reduces fear of failure that accompanies giving only the right answer and gives instruction away to situate in the student's zone of proximal development (Hertzog, 1997).

2.4.6.3 Questioning Techniques

Curiosity is a distinguished creative feature of creative children or students, who inquire a lot and ask frequently and this is usually noticed by their parents (Frasier, 1997). The aim of open-ended questioning techniques is to motivate independent thinking and creativity; therefore, techniques of questioning in the classroom are significant for both intellectual and creative curiosity (Frasier, 1997).

Available literature in this regard reports that questions have a large portion of the classroom "talk time," with as many as 400 questions a day; however, these questions are frequently raised by teachers, requesting recall and information (Frasier, 1997). It can be said that when questioning techniques are developed through cooperation of both teachers and students, creative thinking will be resulted from (Healy, 1990). Students' role to develop creative thinking is based on generating analytical, evaluative and imaginative questions (Frasier, 1997). Thus, the aim of education, according to Gardner (2000), is not only to present students with the right answer but also to give them the chance to have a kind of comprehension of the surrounding environment.

2.4.6.4 Drawing

Drawing as a physical symbol of the mental images and constructs in the mind can be effective as a creative thinking technique through assisting students in the process of analysis and modification of the creative visions (Frasier, 1997). Additionally, drawing can serve for recording, communication, manipulation, and storing visual and mental images (Adams, 1986). Consequently, Tate (2003) reports that memory can be strengthened and supported by drawing based on both the learning styles and brain theories

What is meant by visual thinking is the ability of the student to comprehend and visualize the world around him/her mentally (Tate, 2003), and this can be supported in the classroom by providing students with materials and having the opportunity to interact visually and mentally with abstract ideas (Frasier, 1997). Moreover, thinking while drawing can trigger thinking in other areas of the curriculum. However, based on the standards established in the curriculum, drawing has often been neglected in the educational procedure, leading to “visual illiterates” (Adams, 1986). As a recommendation, creative educators should include artistic imagery and multimedia approaches in the instructions and curriculum (Daniels, 1997).

2.4.7 Measuring Creativity

It can be argued that measuring creativity has been a complicated issue (Davis & Rimm, 1998). Davis (1998) provided many dimensions of creativity that mystify the measurement procedure because he asserted that people’s creativity can vary based on the personal, educational, and professional level. Additionally, this creativity can include both cognitive and metacognitive features (Davis, 1997). Davis’ (1997, 1998) conclusion implies that creativity is an integration of many capabilities that should converge together in order to lead to creative behaviours, such as intellectual

and information processing, attitude, personality characteristics, background experiences, opportunities, and motivation. All these mentioned behaviours have their role in displaying the creative talents.

When measuring creativity, multiple approaches should be integrated. Thus, the two widely adopted methods for evaluating creative talent are divergent thinking tests and biographical Characteristics (Clapham, 2004).

2.4.7.1 Divergent Thinking

Divergent thinking means the “ability to produce many and diverse ideas (Runco, 1990), and divergent thinking tests have been historically adopted to measure creative thinking (Runco, 1990). These kinds of tests present an insight into the field of a person’s creative talent and make an assessment of cognitive abilities, but these tests neglect features of the personality. Due to this ignorance, it is recommended that tests of divergent thinking should be adopted together with personality inventories (Davis & Rimm, 1998).

Regarding TTCT, Torrance (as cited in Cramond, 2001, p.117) states that, “I put the testing first because any science has to have some kind of measurement. The development of methods would come second”. The TTCT is adopted widely as a divergent thinking test (Baer, 1994), which has been developed over a ten-year span with the purpose of evaluating the ability of the student that can exceeds the traditional forms (Davis, 1998). Additionally, TTCT has been translated into thirty-four languages, longitudinally validated, and administered yearly to over 150,000 participants (Davis, 1998; Torrance as cited in Cramond, (2001) The TTCT is scored for four fields of creativity: originality, flexibility, fluency and elaboration. Fluency

is the number of figures completed. It is the number of responses or ideas. Originality is scored on a scale ranging from zero to five based on the statistical uniqueness of the drawing. A score of zero is not original and occurs on five percent or more in the 500 records analysed in the initial study (Torrance in Cramond, 2001). Flexibility is the number of various categories of ideas into which the responses fall. Both the drawing and the title are used in determining the flexibility score. Elaboration includes all of the added detail in the extension of the basic image. The tests conclude that detail is a function of creative ability and should be labelled, elaboration. Elaboration includes adding detail to a simple idea to make it more interesting or complex (Torrance in Cramond, 2001).

Based on this conceptualisation creative individuals think in a differently manner from others to initiate unique ideas and bring different perspective on matters. Similarly, the capacity to produce unusual and rare ideas or associations on a certain subject constitutes originality. Elaboration as a concept involves accumulating details, filling in the gaps, embellishing, and bringing to fruition ideas generated by creative. Karakelle (2009) expatiate elaboration as the easiest creativity stage. Elaboration reveals the ideas of collaborators in a team, carries them idea to fruition and solicits contextual detail necessary to make something real, understandable and pleasing. Thus elaboration facilitates others to see the full potential of a creative stimulation (Karakelle, 2009).

2.4.7.2 Biographical Characteristics

Rating scales can measure the affective characteristics of creative individuals. These scales rate personality dispositions and biographical information to predict future creative expression. Most of the creativity scales, or inventories, are relatively easy

to complete and rate by a parents or educational professional. Once scored by the educational professional, the inventory becomes a part of the compilation of other data for measuring creative potential. Commonly used personality rating scales for assessing creativity are 'How Do You Think' – this scale includes a ten-item creativity rating in which its Part III subscale is comprised of 'Creativity Characteristics'. This subscale assesses the affective field of a student's creative ability. It rates such characteristics as curiosity, intellectual fantasizing, propensity to question, risk spiritedness, taking, playfulness, and sense of humour (Renzulli & Hartmans, 1991).

Csikszentmihalyi (1990) mentioned that creativity is a product of a larger and more mysterious process. The complexity of the creativity and the intrinsic and extrinsic factors surrounding creative efforts make the development of a highly reliable and valid Creativity Quotient (CQ) test implausible for predicting future creative achievement (Davis, 1997). The researchers cautioned educators about relying too heavily on creativity testing, as no single measure can truly assess all that is encompassed in the complex phenomenon of creativity. Because creativity encompasses a variety of affective and cognitive domains, multiple assessments in measuring creativity must be utilized (Davis, 1998).

2.4.8 Benefits of Creativity Development

The two goals of creativity instructions are aiding students to be more self-actualized, creative individuals and present creative contributions to the society (Davis & Rimm, 1998). It can be argued that cultivating creativity in the classroom can result in the advancement of the society by means of guiding students to solve open-ended problems creatively and in a new manner (Davis & Rimm, 1998). Additionally, it is through conscious endeavours and attempts, creativity enhancement might

support students' self-esteem, confidence, and enthusiasm for life. Torrance in Davis and Rimm, 1998 summarized the following benefits, which are related to creativity teaching and learning, including improved motivation, concentration, achievement, and curiosity. According to Torrance, creativity instruction can produce an exciting atmosphere that increases self-confidence, creative growth and expression, and communicating ideas.

2.4.8.1 Motivation

Motivation constitutes only one field that can affect creativity instruction (Ritchhart, 2004) since creativity training drives students to think deeply and engage actively in the process of learning, thus they focus more on the task at hand (Davis & Rimm, 1998). Both creativity encouragement and practicing can help students to be internally motivated and encouraged. This latter aspect can enhance in the process of developing students creativity. Creativity instructions can support both the affective and cognitive fields of thought and assist students to enjoy learning that lasts long (Frasier, 1997).

2.4.8.2 Efficacy

Efficacy can also be strengthened by means of developing creativity (Ritchhart, 2004), and this latter aspect when it is trained to students, it will help them to build self-confidence (Puccio in Kay & Rogers, 1998). Additionally, metacognition can have an effective role in creativity improvement and helping to build and develop students' self-efficacy. Moreover, this efficacy aids students to be more competent, independent learners, and paves the way for them to be creative thinkers in problem solving (Davis & Rimm, 1998).

2.4.8.3 Socialization

When practicing creativity training, social skill development will also get benefits (Ritchhart, 2004). For example, in creative tasks, such as brainstorming that is specified for a group activity, creativity training exercises can motivate students to work cooperatively together, reduce competition, spread respect and enhance their social and interpersonal skills (Richhart, 2004).

2.4.8.4 Achievement

Creativity instructions can also produce benefits to academic performance through increasing academic performances, including understanding, retention of material, and the capability of transferring knowledge and information from one field to another (Ritchhart, 2004). Triarchical studies conducted by Sternberg (2003) showed that adopting analytical, practical, and creative thinking methods when teaching students enhanced their performance in analytical, practical, and creative thinking assessments and the multiple choice assessments that emphasized rote memory learning. Consequently, the findings of the studies mentioned here demonstrate that teaching creative thinking can develop and express students' creativity as well as lead them to learn better.

2.5 Thinking Programs

Researchers urge that the habit of associating creativity with fields only where it is easily observed must be disregarded; as the concept of creativity is rather engaged with all different scopes and disciplines (Feldhusen& Goh, 1995). Creativity has been always viewed as a complex ability reflecting an individual's cognitive skills, motivation and personal characteristics, and, thus; it is hard to assess and develop. However; researches indicate that an individual's creativity can be enhanced by

developing specific skills and following a number of strategies (Csikszentmihalyi & Epstein, 1999; Feldhusen, 1993).

As the traditionally used strategies have failed to achieve the desired outcome of helping the learners to develop their personalities and cope with today's modern and developed world, the focus have been shifted to a more modernized methods of using thinking programs. These thinking programs must be engaged with the schools' teaching methodology and programs to achieve the Jubilee schools' goal of preparing students who are able to deal with different daily situations. Students generally face many issues, whether inside or outside the school, for which they need great creative and critical thinking skills. Therefore, teachers are encouraged to teach their students thinking strategies to widen their opportunities and not minimize their success rates in life (Ritchhart & Perkins, 2004).

This need for teaching thinking has led to a rapid increase in efforts to teach thinking over the recently thirty years. During this time, a few well-established thinking programs have taken hold in schools and sustained their development, while a many of new programs, often small interventions based on current cognitive theory, have flourished. As well as, an increasing array of subject based programs and designed learning environments which aimed at developing students' thinking also have emerged. These programs deal with much different aspects of thinking, including creative and critical thinking, metacognitive and reflective thinking, decision-making, self-regulation and problem solving, in addition disciplinary forms of thinking (Al-Edwan, 2011).

According to Ritchhart and Perkins (2004) Programs designed to teach thinking come in variety styles. For instance, some programs are designed to develop discrete skills and processes such as sequencing and classification, as means of developing the building blocks for thinking. Also he refers to these programs as “micrological” in nature. They often use contextualized and abstract materials similar to those one might find on standardized psychometric tests, and they often find their theoretical justification in theories of intelligence.

Thus, should be done by guiding individuals to investigating knowledge understand the connection with daily problems where this era is a openness between societies that require to recruit information and investing it to solve problems in the environment which lead to the evolution of the possibility of thinking and developing innovation and creativity (Abu Jado & Nwfal, 2007). Thinking programs have become popular in secondary and elementary education. These programs, which do not share a set of central and unifying themes, focus on a assortment of skills (Cotton, 1991).

In contemporary research, teaching thinking in students through various educational programs is not new as many studies have been carried out toward developing students’ learning and thinking skills. Term of thinking skills indicates capacities to get involved in thinking and learning. A number of longitudinal researches focusing on highly-gifted youth suggest no need for special programs or enrichment. However, others propose that accelerated instruction should be promoted to achieve high-level, creative achievement (Freeman, 2001).

Fisher (2005) study revealed that in recent past there has been increasing interest in developing and improving learning and thinking skills, thinking-skill-acquisition

programs to improve the three highest levels of thinking. In addition a literature review of relevant previous studies accentuate the importance of teaching thinking skills and the need to instil in students strategies to facilitate their understanding of academic subjects and still be able to face challenges in their daily lives (Lerner, 2003). Activities and enrichment programs for the gifted and talented students contribute to developing motivation and shaping skills of the students; as well as to their positive effect on developing self-organization and self-efficacy (Neber & Heller, 2002).

Traditionally, programs for talented students can be classified as either acceleration programs or enrichment programs, and these programs provide different goals. In an acceleration program, for example, a student who is identified as gifted in mathematics in Grade 3, is placed in a higher grade for mathematics instruction (Grade 4, 5 or 6) depending on the nature of the student's giftedness. Instead, although a student may not be ready for acceleration by whole grade or a school may not have the capacity to have a program or to accelerate a student, the teacher in that student's current placement may allow him or her to work several concepts or grade levels ahead of the peers in his or her classroom (Erwin & Worrell, 2012).

The second and more frequently used alternative in public schools is enrichment that aims to allowing students to examine concepts in a domain in greater depth or at an earlier age than they might in a typical classroom. For example, students who are gifted and talented in reading can have additional reading assignments in the program, where they get to discuss character and plot and deepen their knowledge of reading and language arts, although they may be at the same place in the curriculum sequence like their classmates in the regular reading curriculum (Erwin & Worrell, 2012).

According to Nisbet (1990) there are two main approaches of designing thinking enhancing programs. One of them is through specifically designed programs while the other is by infusion throughout the curriculum. While agreeing with this categorisation between specific programs and infusion, McGuinness (1999) further categorises infusion design into whether the program of teaching thinking can be embedded in particular subjects such as mathematics, science, geography and history, or more generally across the whole curriculum.

2.5.1 Programs and Strategies

There are many well-known design methods for stimulating creativity in the earlier phases of the design process (Six Hats, Brainstorming, SCAMPER, Lateral Thinking, Functional Analysis, Analogies, etc.), as can be seen in the collections of methods by Jones (1970) As stated in the VanGundy (1988), and others. Several experimental and empirical studies have shown the advantages of applying these methods, usually in combination with sketches and other stimuli, in order to encourage creative thinking (Bilda & Gero 2005).

There are many of these programs but in this study will be explained in detail about two of these programs: Cognitive Research Trust 'CoRT' and SCAMPER.

2.5.1.1 The Six Thinking Hats Concept

The Six Thinking Hats concept is a widely-known method created by De Bono to teach how to think. This method is a very practical technique that aims at teaching thinking skills in a meaningful way (De Bono, 2000).

According to Toraman and Altun (2013), the Six Thinking Hats technique is used to present thoughts and suggestions in a specific and systemized order and it relies on

the concept of “Role playing”. The defensive nature of human beings may act as a primary obstacle for the process of thinking and the expressing of ideas, thus; the used “Role playing” technique allows consideration and expression of ideas which would otherwise not be expressed and stated.

According to De Bono (1999), In the Six-hats method, the thinking ways are represented by six different colours hats to help learners visualize each type of thinking as each colour conveys a meaning related to its associated way of thinking, Table 2.1 De Bono’s Six Hats. Shows how the activity works. Each activity is designed to provoke different types of thinking in individuals and groups.

Table 2.1
De Bono’s Six Hats

Hat	Function	Example
White	Information	Asking for information from Others
Black	Judgment	Playing devil’s advocate. Explaining why something won’t work.
Green	Creativity	Offering possibilities, ideas
Red	Intuition	Explaining hunches, feelings, gut senses
Yellow	Optimism	Being positive, enthusiastic, Supportive
Blue	Thinking	Using rationalism, logic, intellect

2.5.1.2 Good Bad Interesting (GBI)

Creative thinking using the GBI technique regarding a central theme, a challenge, or an idea includes thinking about what’s good in it, what is bad about it, and what is interesting about it. Examples can be generated for each category as long as ideas are elaborating while it’s important to keep the number of ideas fairly equal between

these three categories. A lot of other explanation bias in thinking. This technique does not revolve around finding the “right” answer, but rather around elaborating all of potential explanations to the tackled notion. As many individuals usually react to a new notion by either expressing like or dislike, the Good Bad Interesting (GBI) exercise leads to creative thinking by helping to generate multiple perspectives for an idea. It shows that notions can be seen as bad, good, or interesting, depending on the particular frame of mind starting from. Design engineers for example, learn that any idea may be thought of in different ways by reframing it. The idea changes in the mind of a person depending on their perspective regarding it. The concept of different perspectives and views must be kept in mind in all negotiations conducted between individuals with opposing viewpoints, as well as when connecting with an audience as a speaker. The GBI creative thinking exercise helps one to better understand other people and be more flexible as a thinker, which in result, makes a more effective presenter (Reisman, 2014).

2.5.1.3 Mind Mapping

Mind mapping is a graphical method for taking notes and generating ideas which can be implemented using any of the above-explained activities for generating ideas. The visual structure used in this method enhances a broader understanding the meaning of generated ideas or words, often using symbols and colours. The generated thoughts and ideas generally take a hierarchical or a tree branch structure as each main ideas or issue may branch into several subsections and ideas. Mind maps allow for greater creativity space due to the recording of ideas and information. It also helps the writer in associating words with their visual representations. The “Laws of Mind Mapping” was originally devised by Tony Buzan and Buzan when he codified

the use of colour, imagery and association and coined the term “Mind Mapping (Buzan & Buzan, 1993).

2.5.1.4 Thinking outside the Box

Thinking outside the box (which is sometimes erroneously called "thinking outside the square" or "thinking out of the box") is to think differently, untraditionally or from a new perspective which is sometimes referred to as a process of lateral thought. The concept is often associated with novels or creative thinking; however, it the cliché, has become extensively used in business environments as well, especially by management consultants and executive coaches, and hugely used in advertising slogans. In short, to think outside the box is to look deeper and think beyond the obvious thing (Reisman, 2014).

2.5.1.5 TRIZ

TRIZ is a problem-solving, prediction and analysis tool derived from the study of the inventions patterns in the global patent literature. It was developed by the Soviet inventor and science fiction author, Genrich Altshuller', and his colleagues in the beginning of 1946. The term is known as "the Theory of Inventive Problem Solving" in the English language and referred to by the acronym TIPS. (Hipple, 2005).

A significant part of the theory focused on investigating and observing patterns of evolution as many of the theory practitioners devoted their efforts to develop an algorithmic approach to invent new systems and refine existing ones. The theory is based on a practical implementation, a knowledge base, sets of tools, and model-based technology for generating new ideas and solutions for problem solving. TRIZ

is useful for application in problem formulation, failure analysis, system analysis and patterns of system evolution (Hipple, 2005).

2.5.1.6 SCAMPER Program (Technique)

There are a number of newly developed ideation methods and techniques are emerging with supporting cognitive studies. These involved intuitive and directed methods (Shah, Smith, & Vargas-Hernandez, 2003). The SCAMPER technique is classified by Shah, et al. (2003) as intuitive, and is argued to be intermediate techniques because it enables both, problem analysis and idea generation (Chulvi, Mulet, Chakrabarti, Mesa & Gonzalez-Cruz, 2012).

2.5.1.6.1 SCAMPER Acronym

SCAMPER, an acronym representing techniques for revising or generating ideas (Eberle, 1997). Idea checklists are designed specifically for creative problem solving and imaginative thought.

The S in SCAMPER stands for substitute, where a person or thing serves or acts in the place of another (Eberle, 1971; Gladding, 2011). Substituting might spark ideas or bring a new perspective into awareness. An example of substituting can be the use of applesauce for butter or one actor substituting for another. The question is, “What can you put in place of what has been?” examples abound, such as a client can learn to substitute the word “and” for “but” saying “crunch” instead of using profanity. In counselling, (e.g., “yes, and” instead of “yes, but”) and thereby have more open and fulfilling conversations (Gladding, 2011).

The C in SCAMPER means to combine, (Gladding, 2011). Combining enhance economy of time and effort. It may also lead to something different or better, for

example, jazz or a symphony where there is a combination of sounds. An example of a combination exercise in counselling is known as “Adverbs,” where an adverb is defined as any word ending in “ly.” In this exercise, clients combine the elements of an adverb, a movement, and a pencil. They pass the pencil back and forth using adverbs and an action that represents the adverb; for example, clients may choose adverbs such as “quickly,” “slowly,” “gracefully,” “joyfully,” or and “awkwardly,” mimic the action as they pass the pencil (Gladding, 2011).

The A in SCAMPER is mean adopt (Gladding, 2011). To adopt is to make something one’s own, like a song, a child or a pet. To adapt is to adjust for the purpose of suiting a condition or purpose such as the temperature in a room, a car, or clothing. Adaptation is an important part of healing and helping and can assist clients in becoming more productive. Adapting to a new environment, an altered work schedule, or a different way of responding to others can give clients more constructive ways of operating in the world.

The M in SCAMPER stands for modifies (Gladding, 2011). To modify is to change or to alter the form or quality of something. This can be done in one of two ways. The first is to magnify or to enlarge and make greater in quality or form. The second is to minify, that is, to make smaller, lighter, slower, or less frequent. For example, people can magnify their height by wearing heels or increase their chances of being noticed by wearing bright colours. Creative individuals often minify a response through reframing such as saying one is annoyed instead of being angry. They can also enlarge a feeling such as going from being tepid to being furious.

The P in SCAMPER is to put something to other uses than the purpose for that it was originally intended Pennebaker (2012). Time, talent, and people's feelings can fall into this category. For example, anger can be put to work in cleaning a house or planting a garden. The energy in worrying can also be put into planning. Writing can be put to use, demonstrated, to help clients become more mentally and physically healthy; individuals across the lifespan may find it beneficial to write 20 minutes a day 4 days a week about anything they find stressful.

The E in SCAMPER is for eliminating, mean is to omit, remove, or of a quality (Gladding, 2011). The question in eliminating is, "What are you doing that you could give up and not miss?" In life, eliminating can revolve around privileges, media such as radio, or unhealthy foods or habits such as candy or shouting. In counselling, eliminating closed questions, interrupting rumination through thought stopping, or removing labels on clients is often a helpful thing to do. A creative exercise known as "Lines of Feeling" is a way of eliminating words while still being able to find out how a client is feeling. Counsellors can do this activity at the beginning and at the end of a session. To implement this intervention, simply have the client draw lines representing his or her feelings rather than having the client verbalize these feelings. Ideally, clients can complete this activity with coloured markers. Through engaging in this exercise, clients may begin to open up and discuss their feelings (Gladding, 2011).

The last letter R is for reverse or rearranges (Gladding, 2011). To reverse is to turn around. To rearrange is to change order of a plan, a scheme or a layout. For example, think of the ways flowers can be sorted. There is more than one way to arrange or rearrange them to make a bouquet. Letters are also rearranged to make words. In counselling, the rearranging of chairs may get clients to view a situation from a

different perspective as they see a room or others in a session from a new angle. Rearranging what is highlighted in a client's life may mean accentuating some negative situations that ultimately had positive results or taught the client something about life. So, sometimes it is important to reshuffle events in a client's life, exactly as one would rearrange words, for client to make changes. Reversing can take numerous forms too, such as who talks first.

Buser et al. (2011) found the SCAMPER model useful in achieving goals and discovered that students tended to be more rigid in their use of the model as they tried to identify the exact correct way to implement the acronym. As the study progressed, the students became more flexible and comfortable with the model.

2.5.1.7 CoRT (Cognitive Research Trust)

One of the most widely-spread thinking programs is the Cognitive Research Trust's (CoRT) program. The Trust was initially set by Edward De Bono to focus on cognitive research and develop different courses that help students enhance their abilities and skills in dealing with all situations; inside and outside schools. CoRT program was founded by De Bono in 1973 and has been since engaged in different teaching methodologies around the worlds including Australia, USA, Malaysia, Singapore, South Africa, Ireland, UK, Italy, Brazil, Canada, France, Japan, India, New Zealand, Malta, Russia, Philippines, and Venezuela. The program has proven its efficiency in helping students from around the world that it reached several Arab countries such as; Jordan, Palestine, Kingdom of Saudi Arabia, and United Arab Emirates, (Al Zyoudi, 2009; Jarwan, 2007).

It was also pointed out that CoRT program teaches a series of thinking “processes” which focus critical and creative thinking. Creative thinking processes target the in-depth knowledge, organising thinking and addressing them with proper knowledge (Moseley, Baumfield, Elliott, et al., 2005). In line with this, CoRT has been recommended by Dingli (2011) at the elementary level of education curriculum. Dingli (2001) further observed that learning of CoRT skills assists students with varying abilities to gain appropriate principles for longer term education needed to deal with speedy changes which characterises the twenty-first century. Besides, CoRT program facilitate students’ ability for collection, selection and evaluation of information. Numerous studies have supported that the theoretical framework of the CoRT program through lead to positive results that appeared in the individuals who have trained on the program (Jarwan, 2007).

Moreover, Nickerson, Perkins, and Smith (1985) have examined the CoRT program and praised it as an asset extra-curricular program. They consider the program highly functional as a guide providing practical and easily-followed methods in addition to a variety of cognitive tasks that help students to widen their scope of thinking and find sensible solutions. The program’s strategy aims at changing the students’ view of themselves to believe they are good thinkers who are able to look at technical and non-technical issues from different perspectives and to solve arising issues effectively. CoRT seems more beneficial for contexts of decision making and informal reasoning in humanistic, social, and design contexts.

CoRT program is viewed as the most effective methods of direct teaching of thinking as a skill. It consists of six units which De Bono considers to define the thinking process: breadth, organization, interaction, creativity, information and feeling and

action (De Bono, 1986). Each unit consist often 10 lessons. Edward tries through his researches and program to translate the thinking process which he views as “a pretty nebulous subject and needs anchoring with some focus of attention” (De Bono, 1991).

The first section of the program; CoRT (1) is entitled Breadth and encourages learners to view a particular situation from different perspectives and ways which are usually neglected by other individuals in ordinary contexts. CoRT (2) entitled Organization, helps learners to focus and direct their attention systematically without being distracted through “ten” lessons. In CoRT (3) Interaction, the focus is on arguments and providing sufficient evidence (De Bono, 2000). While in CoRT (4) the Creativity section, learners are offered a space to generate creative ideas after being provided with few strategies to help them do so. In this stage; an amount of editing and evaluation of ideas is allowed. CoRT (5) of Information and Feeling is considered with increasing awareness of surrounding factors that might affect the thinking, in addition; some practicing of previously addressed themes occurs at this stage. Lastly, the Action unit, CoRT (6) will lead to eventually finding a framework to solve the addressed problem, as well as relating the strategies introduced in the previous lessons together.

The comprehensive program by De Bono has proven to be successful for many factors. CoRT is simple and practical and can be easily applied by teachers and learners. The program doesn't require previous knowledge or training to master it, as it is designed to benefit students who only have the will to enhance their abilities and believe that thinking skills can be trained and developed. CoRT has proven its effectiveness in guiding learners from varied levels, abilities, and different classes, ages, regions, and races.

The advantages of this program have been supported by Chance (1986) who urges that students who have been subject to CoRT lessons have become more flexible and have broadened their scope of thinking in terms that they view an issue from different ways and are able to suggest many distinct solutions. Moreover, Dingli (2001) was able to prove the effectiveness of CoRT lessons in enhancing the thinking skills by reviewing 26 published papers and studies that focused on the impact of the program. All of the twenty-six studies supported the positive impact of the lessons on learners' skills although some participants of the studies have only completed 10 lessons of the CoRT program.

De Bono (1986) and Ritchie and Edwards (1996) have addressed many advantages and distinctive features of the program:

- CoRT program is aimed at helping learners to conclude a framework for thinking and solving problems. The main focus is dropped on the thinking process as participants are given credits for their thinking.
- The program methodology allows for interaction between individuals and exchange of ideas as participants are set in groups.
- The program introduces learners to a set of particular and deliberate thinking skills.
- The program relies on viewing thinking as a skill in terms it can be trained, practiced, and developed.
- The program's methodology help participants to focus and control their thinking and eliminates distraction and confusion

- They also emphasize that focus, confidence, and practice are the keys to improvement.

Meanwhile, some drawbacks were addressed regarding the implementation of CoRT program in terms of the nature of the lessons' structure, labelling of tools, and obviousness of tools for some students (Ritchie & Edwards, 1996).

De Bono admitted that the lessons follow relatively the same plan which results in monotony and boredom. In addition, he noticed that students' attention was directed towards the program tools instead of focusing on addressing the problem and finding solutions; which he attributed to the tight lesson structure where around 2-4 minutes are only provided for discussion, individual work, or practice on a particular tool (Ritchie & Edwards, 1996).

As for the second point of labelling tools using acronyms; such as PMI for “Minus, Plus, Interesting” tool, it was suggested that the use of these acronyms makes them harder to remember and more difficult to use. However, De Bono states that the simplicity of these labels helps learners to easily remember the tools and thus facilitates concentration and focus. Meanwhile, he added that the lessons could be successfully taught without using these labels (Ritchie & Edwards, 1996).

In addition to helping in generating more and diverse ideas, De Bono stated that applying CoRT thinking strategy also increases the learner's ability to set goals, communicate ideas to others and interact with theirs, and define his/her priorities, as well as recognizing affecting feeling towards particular thinking (Alkahtani, 2009).

2.6 Empirical Studies Review

2.6.1 Introduction

A psychological based research has looked into certain areas of creativity that can be used to motivate and assist the creativity process of students. Extant authors have however argued that this process should be handled with care by the teachers so as not to 'kill the creativity' especially through the overuse/misuse of extrinsic motivation that can disrupt that process (Wynder, 2008).

Furthermore, educators have asserted that favourable conditions have significant effect and can help to enhance creative potential of students while several other related literatures has equally suggested other strategies through which art of creativity can be induced in the educational environment. The general believe that creativity is naturally endowed in some individuals has been recently challenged through expansion and introduction of many creative training programs with the intent of enhancing the creative abilities (Renzulli, 2005; Fleith, 2000; Sternberg, 2005). Importantly, psychologists and educators have come up diverse instructional materials and strategies through which creativity expression can be facilitated. In view of this, Rose and Lin (1994) maintained that creativity that is inherent in individual can be manifested through training, practice and motivation.

In line with this, several studies have equally agreed that training is an important ingredient that can help to foster creativity (Al Zyoudi 2007; Barha, 2000; De Bono, 2004; Dalah, 2002; Staboha, 2001). In addition, Torrance (2003) also argued that approaches that can make creativity to be enhanced may essentially involve emotional and cognitive functioning with adequate motivation and structure being provided through practice, involvement and interaction with teachers and other students.

Evidently, all these outcomes have corroborate the idea or principle that support that training on creativity, problem solving skills and abilities should be embedded in the curriculum of schools (Davis & Rimm, 2004).

In view of the above, several studies within the last one decade are reviewed in this area of research in order to highlight the roadmap that used for general background and modalities of the study and for the purpose of data collection and analysis. A large amount of empirical studies on creativity has been conducted and an attempt made to synthesize them in this study.

The section that follows provides an overview of empirical studies that were conducted on creativity development among gifted and normal students. The section also explained those studies that support the impact of SCAMPER and CoRT programs in the development of creative thinking among gifted and normal students.

2.6.2 Studies Related to Development Creativity

Lee (2006) having the objective of examining the influence of developing creativity among language students conducted a study by using gender based and inclusion of group of special students in order to improve seventh grade students' creative ability and to determine their perceptions about how to nurture creativity. This study employed a quasi-experimental, pre-test and post-test design based on two samples that are categorized into treatment and control group. Both groups which represent the total school population, contained students from various background and abilities while the treatment group contains special education cluster that is specially identified. The quantitative data of the study include the treatment group's rubric scores and control groups product scores while the grouping was the outcome of 50

students who gained on post-tests after the treatment was carried out. The result of the study reveals significant differences between treatment and control group. The group that was treated displayed statistical higher post-test scores than control group after the intervention. Summarily, the result of the study indicates that creativity can be improved through creative and deliberate efforts that can help both female and male students in creative exercises.

In a similar study, Al-abadi (2008) carried out a study with the purpose of exploring the influence of educational program in the development of creative thinking skills among disable students who are gifted. The study had 28 females and males students who are suffering from learning disabilities in private and public schools in Amman City. The participants in the study were equally divided into control and experimental group with 11 students in each group. The outcomes of the study reveals a significant difference between the average scores of both group in creative thinking test especially in favour of experimental group and this was attributed to the educational program. In addition, the result further reveals that no important differences in the interaction between rate of intelligence and the program while creative thinking skills are being developed among those students.

The study of Kampilis, Berki, and Saariluoma (2009) provided answer to 3 prevalent questions that often border the minds of educators when it comes to creativity. Such questions include: Are teachers well prepared to help the students develop their creative potentials? What are the conceptions and theories of teachers with regards to creativity in general? What schools of thoughts do primary schools teachers belong? In answering these questions, a sample of one hundred thirty-two pre-service teachers completed the Teachers' Conceptions of Creativity Questionnaire (TCCQ),

a self-report questionnaire. The outcomes of the study indicates that the study's participants regard creativity as an important factor that can smooth personal and social progress, as well as help people in developing creativity. It was also discovered that teachers do believe that creativity can be expressed in different domains by the students but experience has however shown that majority of the subjects that are being taken in schools do not provide room for the development of creativity. With respect to the 3rd research question, the respondents reported that they had no enough training on types of creativity and the theories that underlie it. The study also sheds light on the general perspectives of teachers' about creativity and provided evidence on the level of preparedness of the teachers towards the creativity of their students.

Al Zyoudi (2009) conducted a study with the purpose of knowing the influence of training program in creativity on the creative thinking skills among 32 students attending fifth grade in Al Ain District. The students were randomly and equally divided into experimental and control group. The creative training program was applied to the experimental group while the two groups as pre and post tests were exposed to Torrance Figural test. The study used SPSS for the purpose of initial screening of data and data analysis. In order to answer the research questions, the researcher used descriptive hierarchical discriminate function analysis. The outcomes of the research indicate that the levels of fluency, elaboration and flexibility of the experimental group were significantly influenced by the training program.

Furthermore, in his study Tateishi (2011) examined the effect of group cooperation on the level of improvement of creative thinking capacity of individual. This study that was carried out during 2009–2010 academic year made use of 120 undergraduate engineering and technology students who participated in a creativity

training program at the Innovation Boot Camp (IBC). In order to achieve the purpose of this study, the students were formed into a team with other people from other fields in order to come up with an innovative solution to a problem. The participants' level of creativity was gauged before and after the program TTCT. The outcome of the study reveals that TTCT score improvement was only applicable to few among the whole groups. This study made use of qualitative technique to analyze the interactions of the team that significantly got an improvement in creativity scores and other groups that did not improve performance. The outcome of the study reveals that there are six major differences between the two groups of the study reveal six major differences between the two groups. These differences were (1) prototype design, (2) idea and information exchange, (3) idea improvement, (4) critique, (5) level of engagement, (6) challenging solution. Based on these differences, a theory that explains how group collaboration can be a platform for the improvement of individual level of creativity was presented. The implications of the study findings for future research were also discussed.

Furthermore, Al-Ogayil (2011) conducted a research with the purpose of investigating the impact of using the proposed scientific-enriching activities on the promotion of creative thinking and integrated science process among gifted students in grade six. The study made use of qualitative design/method to investigate 50 students that were carefully chosen from the sixth grade while the study took place in Riyadh center for gifted children during night program. Tools used for the program were designed according to scholastic program for gifted care and were certified by the ministry of education. This program requires the teacher to apply the model based on the scientific content and the curriculum for elementary grade six using Aurora Battery. This experiment lasted for 8 weeks and the outcomes of the experiment indicate that the

mean of the experimental group is statistically significant from that of the of the control group. Importantly, Students emphasis was placed on the impact of the proposed enriching activities in order to gain necessary scientific process skills, mental and performance skills, and creative thinking skills that can be achieved through direct practical application.

The study of Alsenaidi (2012) used electronic brainstorming to ascertain the level of creativity among primary schools students in Saudi Arabia. The study involved students and teachers who are using computers in Islamic education lessons. The primary purpose of the study was to ascertain what makes the students to be interested in Islamic education at the primary schools level and their creative skills are improved through electronic brainstorming. The study was also interested in investigating the impact of the electronic brainstorming pedagogical affordances on the classroom activities. In this view, the study compared 3 groups which include verbal brainstorming, electronic brainstorming and traditional brainstorming in different classes and among different teachers. In collecting and analyze the data of the study, triangulation method was adopted. Using this method, data were collected through online forum observations and classroom, interview of teachers and students and pre-test and post-tests. The sample used in the study comprises 61 primary school students that are within the age of 11 and 12 and 3 Islamic Education teachers. The study which lasted for 3 months was conducted in a classroom and among primary schools students in Saudi Arabia. The result of the study indicates greater students' motivation, creativity and participation in the electronic Brainstorming Method. Furthermore, both the interview and observations findings indicate positive differences between verbal and traditional brainstorming in one hand and electronic brainstorming on the other in Islamic education. Importantly, the

study further demonstrated the significance of pedagogical affordance in the development and enhancement of creativity skills.

In a study with the objective of assessing the impacts of enrichment programs using Oasis Enrichment Model (OEM) on multi-dimensions of gifted education which was conducted in Saudi Arabia by Aljughaiman & Ayoub (2013). The study was conducted based on review of 35 studies over the period of 2009 and 2011. The study used experimental design of summer enrichment programme for 1719 males' and 329 females' gifted students in primary, intermediate and secondary grades who were segregated into three groups, Based on the results, it was revealed that OEM programs had significant statistically effect on analytical abilities, creative abilities, attitude to learning, critical thinking skills, future problem solving, content knowledge, decision making, motivation, personal performance, personal and social traits, and classroom performance, However, that OEM has no significant effect on the variable of integrated science processes of the that OEM. The studies reported effect sizes show further proved the data provides evidence allowing the validity of the study in Saudi Arabia.

Furthermore, the study of Alhaddabi, Ghalioun and Aqlan, (2013) was conducted with the purpose of investigating the influence of implementing enrichment programs on 9th grade gifted students' science achievement and creative thinking at Sana'a schools – Yemen Republic. In order to collect the data of the study, the researcher used semi-experimental methodology. The sample of the study which was intentionally selected comprised of 20 students from the school and the study was conducted during the year of 2009 / 2010. The instruments used in the study were TTCT and multiple choice science achievement test as adopted and used by Yemeni

students. The students were taught two units of science curriculum which were enriched by science activities. Several statistics methods such as standard deviations, means, and test were employed to analyze the data and answer research questions. The results that were obtained from the study reveal that there is a statistical significant difference between the pre and post TTCT means of the study group. Furthermore, the results also indicate a statistical significant difference between the level of pre and post achievement test means of the study group, in favour of the post achievement test mean. However, there is no statistically significant relationship between the means of the test of creative thinking and achievement test.

Chan and Yuen (2013) aim at exploring the beliefs of sub-set of teachers with respect to creativity and those activities that can foster creativity practices. Since the study was exploratory, the researcher conducted in-depth individual interviews among 10 primary school teachers. The findings of the study revealed the beliefs of teachers about gifted education and creativity, personal and cognitive aspects with respect to their creativity-fostering practices. The findings of the study were classified into 'beliefs' and 'practices'.

The study of Al-Qararah (2014) was conducted among grade seven students of Tafila schools, south of Jordan with the purpose of investigating the impact of brainstorming method in science teaching in developing creative thinking. The study sampled 76 students which were eventually divided into two groups. The researcher used modified version A of TTCT for Jordanian environment. The validity and reliability of the study was carried out and the results of the study showed significant differences ($\alpha=0.05$) of brain storming in developing creative thinking of students of

seventh grade. Finally, the researcher recommended the use of brain storming strategies while teaching science subjects.

The study of Albuainain, Jassim and Alnbhan (2015) aimed at investigating the effectiveness of the enrichment program in the development of creative leadership skills of talented students enrolled in the program of mental superiority and talent in the primary stage of the Kingdom of Bahrain. The study sample consisted of (60) sixth gifted students, and then the experimental and the control groups were formed equally at random. Creative Leadership Skills scales were utilized after assessing the validity and reliability indices, the results were as follows: there were statistically significant differences in creative leadership skills in favour of experimental group.)

Politis and Houtz (2015) conducted a study on the evaluative and generative thinking skills of individuals in accordance with their current mood. They aimed at observing the impact of the positive mood in specific. For this study, they gathered a total of 89 students from middle school and they watched a video program that conveyed either a neutral or a positive mood. The students' mood was estimated then using the Positive and Negative Affect Schedule (PANAS) scale, and they were distributed accordingly into three groups. Each group was handed with a divergent thinking task. Group A was requested to suggest possible solutions to a particular problem to assess their generative thinking. While the study evaluated the generative thinking of the other two groups where group B was requested to provide advantages of one solution that was suggested by peers of previous studies, and group C was asked to give the disadvantages of the given solution. Results showed a higher fluency by students with positive mood than students who watched the neutral impact video. Also, students of neutral mood were able to provide more disadvantages than advantages by a relatively

small percentage of $p < .10$. Later, the implications and limitations of these results were discussed.

Previous empirical literatures demonstrate disagreement in the true meaning of giftedness. However, it is clear that research does establish a link between creativity and giftedness. Therefore, creativity and talent are not synonymous terms since a person, who is talented in a specific field, such as mathematics, is not necessarily creative. The challenge for the development of pedagogical and educational curricula is that it needs to provide programs on teaching thinking processes to all students and individuals.

2.6.3 Studies Related to SCAMPER Program

Majid, Tan and Soh (2003) conducted their study with the purpose of examining the effect of using the SCAMPER and Internet in enhancing creative writing. 60 primary school students participated in the creative writing program. The study spanned over one month and enable the children that were divided into group to learn how to use SCAMPER and internet for the purpose of enhancing their creative writing. The results of the study reveal that students who had access to the internet showed a significant improvement in creative writing with respect to their fluency and elaboration. On the other hand, the students who made use of SCAMPER did not show any significant improvement in creative writing. The researchers highlighted the limitations of the study and made recommendations for future research.

In addition the study of Ablahad and Fataah (2003) aimed to measure the impact of SCAMBER Program on creative thinking development. The study used sample of 50 students at fourth grade and they were equally and randomly distributed into

experimental and control group. SCAMBER test was administered to the 2 groups before and after the implementation of SCAMBER. The experimental group was subjected to one weekly session of treatment of 35 minutes throughout ten weeks continuously. Analysis of ANOVA showed differences of statistical significance in the total grade of SCAMBER test and its sub dimensions flexibility, originality and fluency.

Buser, et, al. (2011) critically examined counseling students learning experience and their application of SCAMPER for the purpose of enhancing creative thinking. In conducting the study, the researcher gathered 54 counselling students from 4 universities that are located in the Northeastern and Southern region of the United States. The students groups were allowed to participate in the intervention training using SCAMPER model throughout the eight weeks exercises. Every participant filled their journals in the course of the training and the information there in was analyzed with qualitative methods. At the end of the program, three important results emerged (1) SCAMPER model has the power to help the participant to stretch their thinking (2) It helps in structuring of creativity (3) It helps in shifting from “right or wrong” application to flexibility and “flow.” Implications for the training of counseling students in creative methods are discussed.

The study of Alrowethy (2012) was conducted with the purpose of investigating the efficiency of SCAMPER Strategy on the teaching of sciences in order to develop creative thinking skills of gifted students in AL- Madinah ALMunowarah Primary School. In order to achieve this objective, the researcher used creative thinking skills scale to collect from 54 gifted students in the field of science. The participants were distributed into experimental group of 27 studied through SCAMPER strategy and

control group studied through Traditional method. The two groups were subjected to examination and the data of the study was analyzed with independent Sample-T test. The findings of the study reveals a significant difference ($\alpha=0.05$) between the average scores of control group and experimental with respect to creative skills acquisition especially in favor of the experimental group. The result further reveals that SCAMPER has important effect on flexibility, fluency and originality.

Chulvi, et al. (2012) conducted their study in order to examine the impact of several design methods on the level of creativity of the design outcome. In this study, a design experiment was executed and the participants were divided into 4 groups of 3 members each and each team was asked to apply different design methods. The methods that were selected include Functional Analysis, SCAMPER and Brainstorming methods. Questionnaire was used to determine the level of creativity of each design outcome through experts' opinion using different metrics of Moss, Sarkar, and Chakrabarti, and the evaluation of innovative potential. The 3 metrics have the capacity of measuring creativity based on their level of usefulness and novelty. The final outcomes of the study reveal that Brainstorming has more power to enhance creativity than SCAMPER and Functional Analysis.

Al-Hashash (2013) this study aimed to constructing of an instructional program based on the idea-generating strategy (SCAMPER) and measuring its effect on developing creative thinking skills and achievement motivation and cognitive achievement among Students with learning disabilities. The study sample was consisting of 31 girl students with learning difficulties as they are suffering of Arabic language disabilities. They were chosen of Om Al-Monther Primary Girls School affiliated to Al- Farwaniya Educational Directorate. As well, they were randomly

selected and they were divided into two groups; experimental group consists of 16 girl student and controlling group consists of 15 girl students. To examine the study assumption, the study applies Formal Torrance Scale (A) for Creative Thinking as well as it is developed achievement motivation scale and examining knowledge collection for measuring writing skills in Arabic Language. Also, an instructional program based on idea – generating strategies (SCAMPER) is designed and honesty and confirmatory evidences are extracted for these tools. In addition, the means and deviations are used for analyzing the common difference with the affiliated various variables (MANCOVA) for examining the first and second assumptions of the study and to analyze the common differences for the affiliated mono-variable (ANCOVA) for examining the third assumption of the study.

Celikler and Harman (2015) the experiment was conducted on a total of 65 science students to measure the effectiveness of SCAMPER technique in increasing the realization on the collection and utilization of solid waste. The sampled students indicated that they relied on school teaching and visual media as their essential source for inquiries and knowledge. However, the experiment provided positive results as students became more aware of the importance of recycling indicating that all solid waste will be recycled, except for organic waste. In addition, they suggested placing different containers for the different types of wastes.

Ozyaprak (2016) aimed at studying the degree to which SCAMPER method helps in enhancing creative thinking skills. The study focused on sophomores and how this technique affects their Test for Creative Thinking - Drawing Production (TCT-DP) scores. A pre-test and post-test design was applied through this study on a sample of 14 selected students, with a specially-designed program to meet the needs of this

experiment. As a result, SCAMPER has proved to be an effective method in enhancing creative thinking skills as the experiment resulted in higher TCT-DP scores.

2.6.4 Related Studies to CoRT Program

Al-Jallad (2006) designed the study for the purpose of exploring the efficiency of using CoRT Thinking Program (Breadth and Interaction units) on developing creative thinking for Arabic Language and Islamic Studies Students in Ajman University of Science and Technology Network. The study used 111 female students who enrolled in Bachelors program for teaching of Arabic language and Islamic Studies as sample. In conducting the study, the sample of the study was divided into experimental and control groups. The experimental group made use of CoRT program while the control group adopted the usual way of teaching. The verbal aspect of TTCT was used to measure creative thinking skills of the students. The result of the study reveals a statistical difference on the development of creative thinking skill of the experimental group with respect to fluency, flexibility and originality than control group.

The study of Al-Makhatra (2007) conducted this study to investigate the effectiveness of using Cort perception elaboration program on decision making process among the upper basic stage students in Ajman Emirate, U.A.E. The study had 120 students as sample during the academic year (2006-2007). The outcomes of the study indicate a significant difference between control and experimental group in favor of the experimental group.

Alkhozy, Al shayaa and Aladwani (2010) also conducted their study with the purpose of evaluating the efficiency of teaching CoRT on creative thinking skills of 100 female students at the college of education in Kuwait University. The groups of students were

divided into experimental and control group and creative thinking aptitude test was administered to the two groups. The result of the study using ANCOVA reveals that the experimental group was majorly influenced than control group.

Blewee (2011) carried out a study in Tabuk Area of Saudi Arabia with objective of investigating the influence of Debono (CORT) in creative thinking on the development of flow of idea among the fifth grade of government primary school students. In order to achieve the purpose of the study, the researcher developed two tools where the first was meant to measure the impact of Debono in creative thinking while the second was to measure how the idea flows. The tools were applied to a set of students that were divided into experimental and control group. The outcome of the study indicates a significant difference between average marks of experimental and control group on the scale of flow of ideas as a whole and on the dimensions of flexibility, originality and fluency.

Furthermore, the study of Melhem and Isa (2013) was also conducted with the purpose of enhancing critical thinking skills among grade six students of First Amman Directorate schools that have mathematics learning difficulties. The study made use of CORT program while the design of the study was based on the pre-test-post-test control-group. The dependent variable of the study was critical thinking skill level of students. The results of the experimental reveals that the training program had a significant impact on the critical thinking level of the participants.

The study of Kumari and Gupta (2014) aimed at examining the impact of De Bono's CoRT Thinking Program on the Concept Map Performance of Senior Secondary School students of grade 9 and 10 with respect to their rate of intelligence. There

were two groups with similar identity and they comprised of 51 respondents each which were further categorized into experimental and control group. The group was drawn with the aid of multi-cluster and random testing techniques. While under treatment, the experimental groups were trained with CoRT thinking program while the control were trained with conventional method in a monitored conditioned as required in the experimental method. The outcomes of the experiment indicate that CoRT Thinking Program significantly influenced concept map performance. In addition, level of intelligence was found to have significant influence on some part of concept map performance.

It was revealed by Al-Faoury (2014) that the mean score for the experimental group more significantly higher when compare to the mean score of the control group based on fluency, originality and flexibility. Which this signifies that the CoRT Program No.4 labelled “Creativity” possess the influence to help talented learners to formulate creative skills in English writing short stories. In line with the study result, it is further recommended by the researcher that the CoRT No.4 labelled “Creativity” must be used for the talented students since it possess the potential to induce their originality, flexibility and fluency to compose short stories imaginatively.

Hmeadat (2016) investigated the strength of training program using CoRT on the Jordanian English language learner’s creativity. It was figured out from the study that there were significant differences when compare the mean score of experimental groups subjects with the control groups and preference to the experimental groups.

Overall, recent empirical literature supported the role of certain variables in the development of student's thinking both creative and critical thinking. Accordingly,

the impact and the influence of thinking programs, coupled with the educational institution's efforts to motivate the student, will lead to their creativity. In other words, thinking programs like SCAMPER and CoRT may offer hope to develop students' creativity.

As students became encouraged to tackling detail-oriented issues which require discovery and search, these two programs have contributed to changing the students' attitudes towards learning positively, which has been asserted by many studies on the impact of thinking programs on students' attitudes (e.g., Davis & Rimm, 2004; Jarwan, 2002). Moreover, studies by Tekian and Hruska (2004), and Aljughaiman and Ayoub (2013) focused on the effect of these programs on students' creativity and they not only concluded positive results but additionally they reported that students were able to show a more creative thinking of the scientific topics. As for the analytical abilities, studies indicated that students have showed advanced creative thinking, comparison and contrast abilities, evaluation and interpretation processing, as well as a better perception of self-learning strategies.

Thinking programs addresses the creative cognitive as well. Reis et al. (2008) has statistically proven the significant effectiveness of these programs towards increasing learners' abilities. This finding is supported by Aljughaiman et al. (2009), who attributed the results to the lessons content and methodology, asserting on the importance of offering the learners an adequate space to practice the associated activities to achieve the desired result of developing their creative ability.

2.7 Chapter Summary

Educational institutions which interest in gifted and talented students; should aim to encourage students to be effective by improving their cognitive developments as well as , and the services provided to them to keep pace with their cognitive abilities, to provide adequate care and the programs of thinking that contribute to the development of cognitive abilities and creative. Most researches have already verified the cognitive factors that affect student's adjustment and this research attempts to reinforce the understanding of cognitive and non-cognitive factors that have not been given much attention in the student's adjustment.

In addition this study is based on the principle of construct and it reveals that support should be provided by educational institutions, in the shape of creating teaching-learning environment, which might encourage the students to be creative.

Due to some factors, such as environmental conditions, motivation and personality characteristics, there appears a gap between children's giftedness and creativity (Olszewski-Kubilius, 2000). Although models of intellectual giftedness consider creativity as a condition necessary for distinguished intellectual fulfilment, while others consider creativity as an own form of giftedness (Gagne, 1993). Additionally, since giftedness and creativity are interrelated multidimensional processes, identifying intelligent/creative people has become more complex.

Through findings of the previous studies conducted on the relationship between intelligence and creativity seem to opposing, inconsistent, and very old, and existing literature demonstrates disagreement in the true meaning of giftedness. However, it is clear that research does establish a link between creativity and giftedness. Therefore, creativity and talent are not synonymous terms since a person, who is talented in a

specific field, such as mathematics, is not necessarily creative. The challenge for the development of pedagogical and educational curricula is that it needs to provide programs on teaching thinking processes to all students and individuals (Larsen, 2002).



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

In the social sciences, particular in the sector of education, most research can be classified as fitting into one of the three research paradigms, namely qualitative, quantitative and mixed methods research (Johnson & Onwuegbuzie, 2004).

In order to achieve the objectives of this study, the mixed method approach, qualitative and quantitative, have been used. This mixed approach has been called by some as a pluralistic or eclectic paradigm (Johnson & Onwuegbuzie, 2004). According to Creswell, (2009) the main reasons why the researchers applied the mixed model approach are due to the following:

- When dual approaches were used to view the same phenomenon and they provided the same result, then the researcher have what is known as “corroboration”. This means that there were more superior evidences about the result over the others that adopted only a one sided qualitative or a quantitative approach.
- The use of dual methods or approaches in research, whether quantitative or qualitative, works the same way.
- Research literatures involving educational research reported means and procedures of data collection might be mixed, and in either quantitative or qualitative single method even if not a mixed method research was used.

The data in this study were collected sequentially whereby the researcher had first collected the quantitative data prior collecting the qualitative data. This sort of data collection followed what Creswell (2012) describes as explanatory sequential mixed methods design. Creswell and Clark (2011) also called this a two-phase model of data collection procedure which within this study had consisted of first collecting quantitative data, using quasi experiment approach, and then followed by collecting qualitative data. The purpose of collecting qualitative data was to help in the further explanation of the research results obtained after the quantitative data analysis. In a sense, the results of qualitative data analysis were used to refine, extend or explain the general picture (Creswell, 2012). The next section discussed the quantitative phase of the study using quantitative approach.

3.1.1 Quantitative Approach

The quantitative study is an inquiry into an identified problem, based on testing a theory with hypothesis, (Creswell & Plano 2007) which measured with numbers, and the analysis of data by employing statistical techniques (Onwuegbuzie & Johnson, 2006). The main goal of quantitative methods is to determine whether the predictive generalizations of a theory hold true (Shadish, Cook, & Campbell, 2002).

This study used the quantitative approach, through quasi-experimental design, that is involving the use experimental and control groups. In this type of design, collection of the data will be made through the manipulation of one or more independent variables and the measurement of dependent variables that can influence the researcher's ability to pinpoint any differences between groups (Creswell, 2009). According to Gall, Borg and Gall (1996), experimental research is considered an effective quantitative method that investigates the cause-and-effect relationship

between two or more variables, and studies the impact resulting from these variables under certain conditions (Johnson & Christensen, 2008).

As previously mentioned, this study attempted to examine the effectiveness of the SCAMPER and CoRT programs in the development of creativity among gifted and talented students in Jordan's the KASE. Quasi-experimental method have applied in this study whereby the research participants have divided into three groups in which the SCAMPER program applied on the first group, the CoRT program have applied on the second group, and the third one was the control group.

The extent of effectiveness of the programs have measured through the implementation of the pre-test, whereby the (Torrance test) on groups sample of the study. This design is often represented as: O1 X O2 with O1 representing the pre-test, X representing the treatment implemented, and O2 representing the post-test (Cohen et al., 2007).

Heiman (1999) has emphasized that the researchers should not interpret the study results by simply studying differences in post-test scores of the control and treatment groups since such differences could be attributed to differences in participants' characteristics and/or differences in participants' experiences during the experiment. Instead, results should be interpreted by comparing differences between each group's pre-test and post-test scores, measuring the difference between the differences in the post-test and pre-test scores of the two groups would give the net effects of the treatment (Sekaran, 2003).

Table 3.1
Non-equivalent Control Group Design

Group	Pre-test	Treatment	Post-test
Experimental group	O1	X	O2
Control group	O3		O4

Treatment effect = [(O2 - O1) - (O4 - O3)]

Adapted From (Sekaran, 2003)

As mentioned earlier, this study included three groups: two experimental groups (for the SCAMPER program and the CoRT program) and one control group which be studied in the traditional way and the appropriate sampling technique for the current research would be taking into consideration. The following table 3.2 reflects the design that has been used in this study during the quantitative phase of the study.

Table 3.2
Quantitative Phase Design Of Study

Group	Pre-test	Treatment	Post-test
The first experimental group	O1	X1	O2
The Second experimental group	O3	X2	O4
The third Control group	O5	-	O6

X1: (SCAMPER program). X2: (CoRT program). - : (Traditional method). O: (Torrance Test the verbal A)

3.1.2 Qualitative Paradigms

In contrary to the quantitative paradigm, the qualitative approach aims at investigating the different perspectives of a social phenomenon or a human-related issue, for which it is also called a multi angular process. The qualitative approach is similar the quantitative one in terms that it deals with data. Moreover, the two

approaches bring distinctive qualities to the research process (Johnson 2004). In this regard, researchers prefer to combine both approaches if they desire to reach a more comprehensive and expansive result that considers both quantitative and qualitative perspectives (Johnson & Onwuegbuzie 2004).

According to Briggs and Coleman (2007), interviewing is a data collection technique by means of verbal communication. According to Bloom and Crabtree (2006) usually this type of interview takes between 30 minutes to several hours to complete.

The researcher prepared the interview schedule or questions in the form of interview cards. These interview cards were prepared after reviewing previous studies and the educational literature, as well as after soliciting the views of experienced arbitrators. Thus, in this study, qualitative approach was used with the experimental groups' students to obtain their answers to questions which aimed to generally determine the effectiveness of the two thinking programs used in this study. The researcher had used card interviews when interviewing the gifted students to ensure that the focus and purpose of the interview sessions were maintained. Face-to-face interviews carried out with each individual research participants (students), for a period of about 30 minutes. Prior the interview sessions, the researcher sought to obtain consent of the students' parents or caretakers and the teachers.

Table 3.3 shows the general research approach that used in this study in terms of both the quantitative and qualitative phases.

Table 3.3
The General Research Approach

Group	Pre-test	Method of teaching	Post-test	Interview
First Experimental Group	√	SCAMPER	√	√
Second Experimental Group	√	CoRT	√	√
Control Group	√	Traditional Method	√	

3.2 Population

The term population may refer to all components of the phenomenon that the researcher is interested to study, or all individuals and groups who are the subjects of the research problem (Obydat, 2003). The population validity is the ability to generalize on a larger population from the result of the sample (Ahmad, 2011). Gall, Gall, Joyce and Borg (2009) argued that one of the criteria for judging research is the population validity. According to Sekaran (2003), population refers to the entire group of people, events, or things of interest that the researcher wishes to investigate. The population of this study comprised of the gifted and talented students at The KASE in Jordan. The total number of the KASE in Jordan is ten (10), which are distributed to number of governorates in Jordan. According to the 2015-2016 academic school year estimate, the population consists of a total number of 2612 students, of which 1282 are male and 1330 female. From the Jordanian ministry of education statistical report (2015), these 2612 students are distributed in the ten schools (Irbid First, Ajloun, Zarqa, Salt, Aqaba, Tafilah, Ma'an, Karak, Madaba, and Mafraq) in ten (10) governorates as shown in Table 3.4.

Table 3.4
Population of the Study

schools/Grade	7 th		8 th		9 th		10 th		11 th		Total	
	M	F	M	F	M	F	M	F	M	F	M	F
Irbid First	34	37	36	36	29	32	31	28	28	30	158	163
Madaba	29	29	30	28	24	25	18	20	21	23	122	125
Zarqa	30	36	35	34	32	33	32	30	30	34	159	167
Aqaba	23	20	19	23	18	21	26	25	19	22	105	111
Tafilah	23	25	21	24	25	23	28	26	23	26	120	124
Ma'an	22	20	19	21	19	22	23	23	21	20	104	106
Mafrag	18	21	18	16	17	19	22	20	19	21	94	97
Salt	33	37	35	33	34	35	30	33	32	38	164	176
Ajloun	22	22	23	24	23	25	22	23	25	24	115	118
Karak	26	27	31	29	31	28	27	29	26	30	141	143
Total											1282	1330

* M = male; F = female

The study population selected from the KASE in Jordan because it includes the largest numbers of students which fulfil characteristics of this study. They also have a number of common characteristics in terms of the environment. In addition, there are little studies found in the KASE (Jdaitawi, 2012).

3.3 Sample Selection

Sample selection is a statistical process or choosing section the “integral” part of the subject or total population from which the researcher is to study and make inference about the whole population (Gay, Mills & Airasian, 2009). A sample can also be said to be subset of a given population which possesses some characteristics or features

for the purpose of inferring about the whole population (Gay, Mills & Airasian, 2009).

In educational studies, especially for gifted and talented studies, making generalizations is difficult and not always sufficient due to the small size of used samples (Aljughaiman & Ayoub, 2013). In this regard, meta-analysis provides the most accurate estimations by gathering the collective results of conducted experiments and in unbiased manner, for which educators may find its outcomes useful in deciding on the right programs, or measuring the validation of implementing some of these programs, such as ability grouping, homogeneous classrooms, and enrichment programs.

In this study, the sample have been selected by using purposive sampling technique, whereby the tenth grade male and female students of the KASE, from (Salt School), were chosen. These students have been selected because the school provided an appropriate setting for the purposes of this study and they were the largest number of students enrolled there, that is there were 63 students in the tenth grade at KASE. Moreover, the students at this school also have a number of common characteristics – they are from the same city and same environment, which would contribute towards obtaining a homogeneous sample within this study. In addition, the applications of the programs cannot be executed in more than one school at the same time in order to maintain homogeneity of the sample. Since matching, for practical reasons, is often impossible in quasi-experiment research, researchers using non-equivalent groups should select samples from the same population, as well as select samples that are as similar as possible (Cohen et al., 2007). Therefore the reason for selecting the tenth grade male students was towards achieving the selection of a fairly homogeneous sample. Another reason for selecting these students was the fact

that they have been enrolled at the school for the past four (4) years. Hence, the results of the study, in a sense, were based on what they have received and on the experience they have gained in these schools. The tenth grade students were following the same subjects and courses at the school and they were not streamed according to any specialties.

3.3.1 Sampling

After determining the sample and the sample size, there is a need to distribute the sample to the study groups correctly. For this purpose, the stratified sampling techniques have been used in this study. According to Sekaran (2003), stratified random sampling, involves a process of stratification or segregation, followed by random selection of subjects from each stratum. Stratification is the process of grouping members of the population into relatively homogeneous subgroups before sampling.

In this study, based on the results of the pre-test TTCT, through stratified random manner, 63 students (research participants) were distributed into three students levels, namely the high level (21 students), the middle level (21 students), and the low level (21 students). They were then distributed into the experimental and the control groups, as shown in the table 3.5.

Table 3.5
Sample of Study

Groups	High level	Middle level	low level	Total
Sample on level (by pre-test)	21	21	21	63
Sample on SCAMPER group	7	7	7	21
Sample on CoRT group	7	7	7	21
Sample on Control group	7	7	7	21

With regards to sample size, the researcher noted that "there are no rules for sample size in qualitative inquiry. Sample size depends on what you want to know, the purpose of the inquiry, what's at stake, what will be useful, what will have credibility, and what can be done with available time and resources" (Patton, 2002, p. 242). In the view of Marshall, Cardon, Poddar and Fontenot (2013), there is considerable overlap in the various recommended ranges. e.g., in Morse (2000) recommends 20 to 30 interviewees with 2 to 3 interviews per person. Denzin and Lincoln (2005) recommend 30 to 50 interviews. With regard to the interview sample, for the purpose of this study, the interviews were conducted with (42) students taken from the two experimental groups SCAMPER and CoRT).

3.4 Research Programs and Instruments

For the purpose of achieving the research objectives the following programs and instruments have been used:

3.4.1 Programs

As mentioned earlier, this study is based on the implementation of the SCAMPER and CoRT programs, and evaluation of their effective on the level of creativity among the students at the KASE, Jordan.

3.4.1.1 The SCAMPER Program

Robert Eberle developed a technique called "SCAMPER" for alternate idea generation based on Alex Osborn's idea in his book entitled "Applied Imagination". "Scamper" is an acronym for a list of active verbs that can be used to stimulate new ideas or to think differently about a subject. (Appendix (A) shows how to introduce and present the SCAMPER as stated in Eberle (2008)).

This study has been relied on the original SCAMPER program in Eberle (2008). That contained in the study of Al-Husseiny (2006) in Arabic language. Thereafter have been presented to arbitrators and took their views and suggestions for the necessary adjustments that need to be made before using the program. Alex Osborn's idea-spurring questions and Robert Eberle's SCAMPER games were used in this study. SCAMPER requires the students to ask him or herself a checklist of questions based on a series of action verbs designed to stimulate imaginative and creative responses. The checklists required the individual to think about a certain subject or problem in a new way and it involved the processes of substituting, combining, adapting, modifying, put to other uses, reversing, and eliminating (Eberle, 2008).

3.4.1.1.1 SCAMPER Program Content

The program contains 20 sessions (games) at a rate of (3-7) activities per session, each session it took about 45 minutes (Eberle, 2008). The program has been implemented within seven weeks, with three sessions per week. One of the experimental groups received 20 hours of SCAMPER creativity training which occurred over a period of 20 sessions during the seven weeks (three hours each week) duration. Appendix (B) shows the contents (sessions and activities) of the SCAMPER program in English as stated in Eberle (2008). Appendix (C) shows example of the contents (first session and activities) of the program in Arabic as stated in Al-Husseiny (2006)).

3.4.1.2 CoRT Program

The CoRT program is a global program for teaching thinking that was developed by Edward de Bono in 1970. The frame of programs was made by De Bono from University of Cambridge (De Bono, 1998). The CoRT thinking lessons are designed

for the direct teaching of thinking as basic skills. Once the CoRT thinking skills were learned by the students, it can be infused through school curriculum (De Bono, 1998). This study used the direct teaching of thinking skills method as proposed by De Bono.

3.4.1.2.1 CoRT Program Content

As mentioned earlier, the CoRT program consists of sixty lessons spread over six parts, and each of these parts contains ten lessons that bears a name that indicates the target which is supposed to be achieved by the students upon completion of this section. Every part of the six sections deals with one aspect of thinking that works to expand the horizon of thinking, and helps to detect the position of the different aspects (De Bono, 1998). According to Chance (1986), the CoRT program can be used with different ages and abilities. (Appendix (D) shows a brief description of the entire CoRT thinking lessons).

De Bono (1998) indicated that the first part is the most essential component of the CoRT program, which starts with its application. The remaining five parts allow the researcher to choose the most suitable component for the students. It is possible to just one of the remaining five parts, or chooses to use several of them or all of them.

The first part, which is the expansion of the CoRT 1: BREADTH part in the program, have been applied in this study because it includes training skills compared to the rest of the parts. As noted by De Bono, when teaching students using the CoRT program, the teacher must begin with the initial part, known as "BREADTH" , and then followed by the rest of the parts which can be used in any order but consistent with the activities in the chapters. The CoRT 4: CREATIVITY part also

be applied because of their potential to enhance creativity and the positive results among students, where CoRT 4 covers the basic creative techniques, procedures and attitudes.

The lessons of CoRT 1 “BREATH” teaches, students some creative thinking skills. For example, the first lesson in “Breadth” which is “Plus, Minus, Interesting” teaches students not to neglect any idea, to look at the positive and the negative sides of the ideas, to produce new ideas and to think well before judging any idea. The second lesson “Consider All Factors” teaches students not to forget any ideas and to think about all of the things about an idea and to be close to the correct answer about an idea. The third lesson” Rules” teaches students that law is obvious for all of the people and it should be suitable for most of the people and should be investigated from time to time. The fourth lesson “Consequence and Sequel” teaches students thinking about the future because “what is available now may not be valid for the future”. It teaches students not to look for their future only but to look for other people’s future too. It teaches them to think about the consequences in order to avoid troubles. The fifth lesson “Aims, Goals and Objectives “teaches students that recognizing aims, goals and objectives facilitates the process of achieving them. It teaches them that different people have different aims; it teaches them that goals must be clear and suitable and teaches them to achieve small objectives in order to achieve bigger goals. The sixth lesson “Planning” teach students how to prepare for plans. It emphasizes the importance of preparing simple plans, taking all factors into consideration, organizing things and identifying the exact objectives. The seventh lesson “First Important Priorities” teaches students the importance of getting a lot of ideas and then choosing the most important ones. It emphasizes the fact that people differ in choosing their first important priorities but choosing the first important

priorities help people in choosing the best solution for any problem. The eighth lesson “Alternatives, Possibilities, Choices” teaches students to find more than one explanation for any phenomena and to look for alternatives in order to recognize the best explanation. The ninth lesson “Decisions” teaches students to pay attention for all of the factors, aims and alternatives before taking any decision. It also teaches them to recognize the real reason for taking any decision and to abandon other things when taking a certain decision. The tenth lesson “Other People View” teaches students to understand other people’s views because different people have different views. It also emphasizes the importance of acknowledging other people’s views and teaches students that their views are not considered as correct views from other people’s views (De Bono, 1998).

The lessons of CoRT 4 “CREATIVITY” teach students other creative thinking skills. The first lesson “Yes/ No/ Po” teaches students to apply Po by using the two-step operation: “Do I want to judge this?” or “Do I want to treat it creatively?” The second lesson “Stepping Stone” teaches students that an outrageous idea can be used not for its own sake but as a stepping stone in order to reach to new ideas. The third lesson “Random Input” teaches students to trigger new ideas that a person may have to bring in something that is not connected with the subject but is random. The fourth lesson “Concept Challenge” teaches students to challenge common concepts. The fifth lesson “Dominant Idea” teaches students that there is a dominant idea in most situations. In order to find new ideas, he/she may have to detect the dominant idea and then escape from it. The sixth lesson “Define the Problem” teaches the students that a problem may not be what it appears to be at first. An effort to define a problem exactly may make it easier to solve. The seventh lesson “Remove Faults” teaches students that the one way to get an improvement is to pick out all the faults in the

existing idea and then try to remove them. The eighth lesson “Combination” teaches students that it is often possible to get something new by combining together two or more old things. Sometimes these are just added together. The ninth lesson “Requirements” teaches students that an idea that does not meet the requirements of the situation is not of much use in that situation. It is useful to be aware of the requirements and to allow them to shape the idea. The tenth lesson “Evaluation” teaches students that evaluation means judging an idea to see whether it is going to work. This means looking at the requirements it has to fit and also looking at the advantages and disadvantages of it (De Bono, 1998).

In terms of the implementation of lessons, it was according to specific steps: first description Thinking to be rehearsed, and explain it with an example of the use of them, and then students performs two or three training in the skills and are usually employed in the form of a collective made up of a few individuals in a group. At the end of the lesson time have been allocated for discussion and feedback, and then students are given homework for further training and to accustom the students. Each lesson needs 45 minutes (the length of the class is usually, in most schools, 45 minutes), making it easy to be applied. De Bono (1998) also asserted that a tight lesson structure of 2-4 minutes are to be allocated for discussion, individual work, or practice on a particular tool and this helps students to focus their attention on the tools in each lesson rather than the problem or associated content. Therefore, one of the experimental groups received 20 hours of CoRT creativity training lessons which occurred over a period of 20 sessions for seven weeks (three hours each week). (Appendix (E) shows the CoRT1 and CoRT4 in Arabic (Al-Faoury, 2014)).

Formal training is not a requirement to teach the CoRT and SCAMPER programs (De Bono, 1998; Ebrel, 2008). According to De Bono, many teachers have succeeded without special training because the materials themselves are highly structured and the teacher's manuals are very detail, and thus the success depends on the quality of the teacher. However, in the current study the researcher and two selected teachers joined together and attended the Training Course on the implementation of the CoRT and SCAMPER programs to ensure that they be more efficient when implementing the programs during the experimental phases of study.

3.4.2 Research Instruments

3.4.2.1 The Torrance Test of Creative Thinking (TTCT)

Torrance Tests have become the frequently used tests in measuring creativity levels following the assumptions made by Cropley (2009) that creativity requires creating diversity in thoughts and way of thinking. The TTCT were developed by Torrance (1966; 1990; 1998) and uses written and drawn answers, subject scores assigned for each creative characteristic, or an accumulated creativity score for each individual. Besides providing quantity and diverse information, these instruments are featured with providing easy and quick to administer results for, for both educational and research purposes (Swartz, 1988). In addition, Davis (1998), indicated that these instruments can be relied on in proven the relevant longitudinal validation. While Wechsler (2006) indicated that they are practical in providing accurate information on the quantity and quality of the creative outputs. In general, these instruments have been investigated and used in predicting creativity more than other instruments.

Torrance has studied for nine year with his colleagues the behaviour of creativity and how to asses it and founded the TTCT that were designed to elect gifted and creative

students. Furthermore, a research paper was published in this regard in 1966 that measures measure creative competencies (Alkahtani, 2009). This test has been the most common measurement and has been supported by many studies to work as a tool for assessment of creative production (Hall, 2009; Frasier, 1997), for both children and adults.

Torrance has first initiated this program from his believe that individuals vary in their creativity extents, arguing that having the required abilities and skills for creativity doesn't necessarily imply being creative, but one must have certain thinking skills, such as; critical thinking, and creative abilities, as fluency, flexibility, originality, and elaboration, as well as being motivated (Torrance, 1998).

The TTCT Norms-Technical Manual Torrance refers to the generalized mental ability as “creative thinking ability” that is commonly applied to achieve creativity. (Torrance, (1998) adds that several educators and psychologists prefer to refer to these abilities as divergent thinking, productive thinking, inventive thinking, or imagination.

There are two versions of the TTCT. The first one is the verbal TTCT (Thinking creatively with words), and the second is the figural TTCT (Thinking creatively with pictures). Both are available in two equivalent forms, A and B (Torrance, 1998). The verbal TTCT (Thinking creatively with words) is appropriate for subjects from first grade through graduate school and can be administered in 45 minutes. This test provides subjects with the opportunity to release creativity through six word-based exercises and the assessor to assess the following mental characteristics: fluency, flexibility and originality (Torrance 1998).

The TTCT – Verbal include Seven of activities Words based following; “Asking” list all the questions the participant can think of about a given picture (e.g. an elf-like form observing his reflection in the water), “Guessing Causes” State as many causes as possible causes of the occurrence in the picture given in the Asking task. “Guessing Consequences” mention possible consequences of the situation pictured in the Asking task. “Product Improvement” list possible improvements for a product (e.g. a stuffed toy elephant). “Unusual Uses” list unusual uses for common objects (e.g. cardboard boxes). “Unusual Questions” suggest unusual questions about the objects mentioned in the Unusual Uses task. “Just suppose” describe all the things that might happen if an improbable situation (clouds having strings attached that hang down to the earth) should occur (Cramond, Matthews-Morgan & Bandalos 2005).

Subtests are scored on the basis of fluency, flexibility, and originality (with a score on elaboration as optional), and these scores are accumulated across all subtests. The totals may be converted to standard T scores if normative reference is desired (Cramond et al., 2005).

The verbal (A) TTCT used in this study because of its usefulness in research and evaluation applications and more importantly because the TTCT is one of the better tests for assessing creativity as stated by its reviewers (Cramond et al., 2005; Kim, 2006; Plucker, 1999) (See appendix (F) Example of the TTCT verbal).

The Torrance Test (Verbal A) implemented on sample of study. It has used measure the changes in the experimental groups that followed the CoRT and SCAMPER programs and in the Control Groups, in order to compare students’ output. Torrance test for creative thinking – verbal test (A) (modified Version for Jordanian

environment) used in this study which was tested for validity and reliability By Abu Jado (2003) (See appendix (G)).

Noteworthy, one of the aims of this research is to carry out a comparative study by means of a pre-test and a post-test on the participants, this implied that each activity selected from the Torrance Verbal Test has been applied twice: before and after the program. Thus, in a sense, during this study standardised testing used collect data. Standardised testing provides uniform procedures for administering and scoring. Furthermore the same questions asked each time the test has been used.

In order to evaluate four aspects of creative thinking: fluency (number of valid responses), flexibility (number of different categories of responses), elaboration (details in the composition of the response), and originality (statistical rarity of the responses).The scoring of the verbal tests was simplified to include only fluency, flexibility, and originality because of the difficulty in achieving inter-rater reliability for untrained scorers on elaboration (Cramond et al., 2005).

Test scores of the verbal form are provided on scales of fluency, flexibility, and originality. Fluency is the ability to produce numerous possible solutions to problems. Flexibility is the ability to use a variety of approaches, and originality is the ability to produce uncommon responses (Torrance, Ball & Safter, 1992). (See appendix (H) Torrance scoring guide).

3.4.2.2 Interview

As mentioned earlier on, interviews represent the qualitative aspect of this study. A total of 42 students were interviewed. The main purpose of carrying out the interviews was to investigate the effectiveness of SCAMPER and CoRT programs in

developing creative thinking from the perspectives of among talented students at KASE in Jordan. As have been widely acknowledged within the domain of qualitative research, interviews are considered as one of the most common strategies for collecting qualitative data. The use of interviews in this study was intended to support the results of quasi-experimental phase. Johnson and Christensen (2008) define interview as a method of data collection in which the interviewer asks the questions of the interviewees.

For this research, the researcher chose the semi-structured interview method. This type of interview gives interviewees a degree of flexibility and freedom to speak without any influence from the interviewee to lead the person they meet to say what they want to hear (Drever, 2003). The semi-structured interview responses were then sorted out and analysed following the steps of analysis according to Braun and Clarke (2006), whereby the responses that were recorded, were then verbatim transcribed, familiarized, coded, stored and later converted to themes. The researcher had identified the initial emerging themes, which were then reviewed and mapped with the verbatim or interview excerpts before finalising the 'names' for the themes. These finalised named themes and its descriptions were next evaluated through a peer review method so that biasness was appropriately avoided. In other words, a neutral expert was sought to review the content of the interpretations made by the researcher. The thematic analysis mainly focused on the identifiable themes and patterns of respondents' behaviours, feelings and dispositions.

For the collection of the interview data, the researcher used a mobile phone with memory chip to record the respondents' voices. The data transcribed into text form from which the conversations from which some of the patterns of experiences and

feelings have been identified, coded, categorized and recorded as themes and sub themes.

The interview included three axes; the first axis is about general information, second axis is about the instructional and enrichments programs provided for gifted and talented students in their school. The third axis is regarding the students' personal feelings (feedback) about the SCAMPER and CoRT programs which they had been exposed to during the experimentation phase in the study. (See appendix (I)).

As far as the current research is concerned, a number of questions have been asked by the interviewer; meanwhile the interviewees were encouraged to express their opinions to some length and in their own way, which also allow the researcher to explore their responses in more depth. For this purpose, the researcher first prepared an interview schedule before presenting it a group of arbitrators, which identified and formally appointed, also got their opinions and comments with regards to the relevancy of the questions with the research objectives and research questions, as well they checked the wording of the questions and the appropriateness of the language. See appendix (J) shows the arbitrators list.

The researcher considered the following measures before conducting the interview as these may impact the results:

- Location of the interview: the location where the interview is conducted may impact the outcomes, therefore; the researcher sought a location with privacy and easy access a suitable to conclude the best results (Briggs & Coleman, 2007).

- Time of the interview: the suitable time must be determined in accordance with the interviewee's choice. As choosing bad timing for the interviewee may make him/her uncooperative or lead to bias results (Briggs & Coleman, 2007).
- Establishing a connection with the interviewee: a researcher shall initiate a good relation by discussing the eyed objectives and outcomes of the interview, asserting on the importance of these objectives and outcomes, explaining the interviewee contribution to this research, and providing confirmation on the confidentiality of provided information and that it would not be used for any purpose other than the intended purposes of this research (Briggs & Coleman, 2007).
- Informed consent: the interviewees on must be aware of the followed procedure to document their responses, whether in writing or tape records, or both; and the each interviewee's consent must be obtained by the researcher (Al-Asaf, 2000).

3.5 Data Collection Procedures

In the first phase of the study, the researcher got a written consent from Universiti Utara Malaysia to get the required facilities for conducting the study. Then the researcher got approval from Jordan's Education Ministry and the Directorate of Education and explained to them about the nature of the current study, including a comprehensive description about variables of the study and the planned procedures to collect data and the focus of conclusions that could possibly be drawn from the findings of the study. The researcher also met the respective teachers and the headmaster of the students and explained to them the purpose of the study. See Appendix (K) official letter from ministry of education.

Following the actions taken above, the researcher then worked on the selection of the sample, and divided the students into the appropriate study groups, namely the SCAMPER, CoRT and control group. After selected the sample, the pre-test TTCT then have been administered to these selected participants. Thereafter, each experimental group taught according to the method that has been chosen; thus for the first group have been applied to them the SCAMPER training program; the CoRT training program have been applied to the second group, third group the control group they studied through traditional approach. the implementation of the training programs took seven weeks. After the completion of the implementation the training programs, the researcher applied the TTCT again, that constituted the post-test. The results from the pre-test and the post-test have been used to compare the students' performance on the test before and after the implementation of the training programs and also to detected the extent of the impact on the level of creativity among the study sample.

With regards to the interview sample, the interviewees have been selected randomly from the experimental groups in this study. Their responses during the interview sessions have been recorded on a memory card (digital microchip) and by using mobile phone facilities. This was easier for the researcher to upload the items on the computer for the purpose of transcribing.

The researcher and two teachers worked together by attending the relevant training course before implementing the CoRT and SCAMPER programs in this study. The training included the implementation and the scoring of the Torrance test to ensure the efficiency of the implementation of the programs. The training course at the De Bono Centre in Amman, Jordan also involved activities that relay the overview of the

program's theoretical foundations in implementing the program activities, training in the use of discussion and role play. See appendix (L) training certificates.

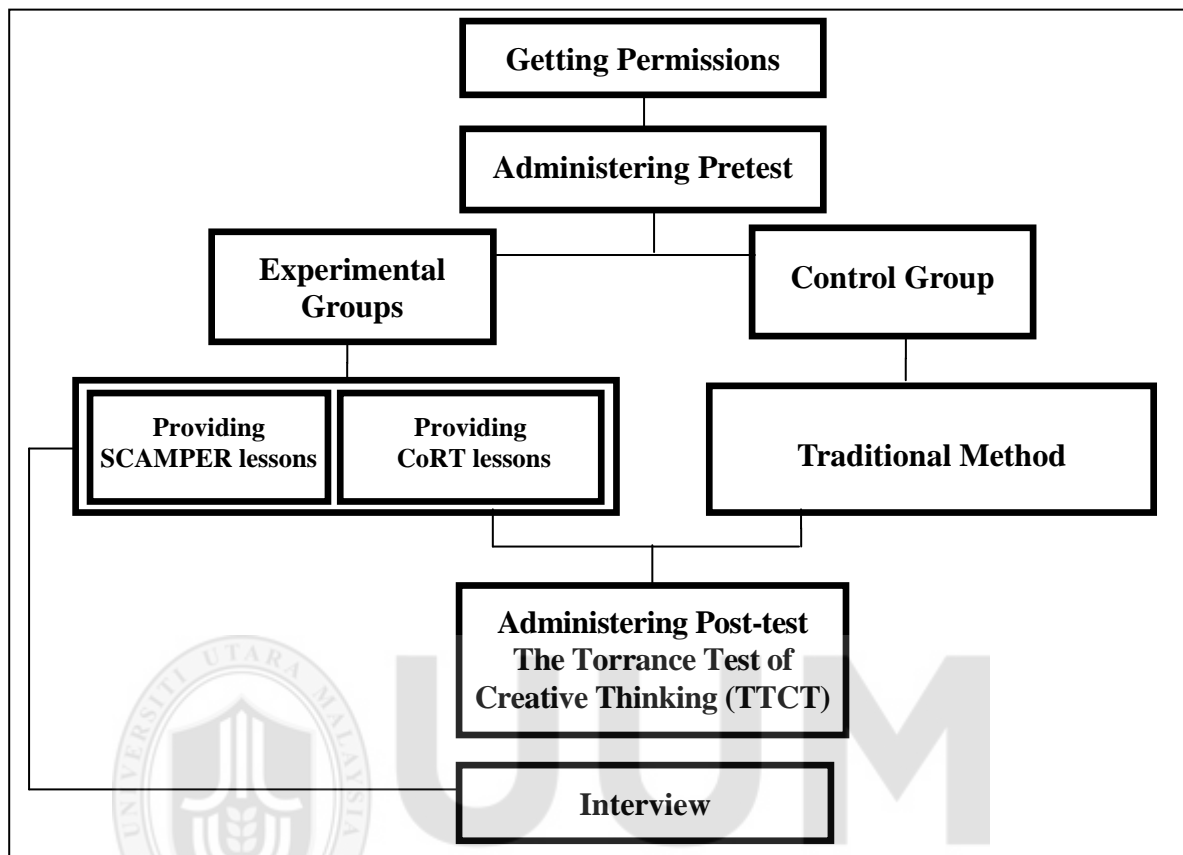


Figure 3.1 Procedure for data collection

3.6 Validity and Reliability

According to Golafshani (2003), validity and reliability are two aspects that any researcher should be concerned about when designing a study, analysing the results and judging the quality of the study. In order to understand the meaning of reliability and validity, the researcher feels that it is necessary to present the various definitions of reliability and validity given by many researchers from different perspectives.

3.6.1 Validity

Validity is one of the conditions for research instruments. Validity of an instrument is the extent to which an instrument measures what it is supposed to measure (Bell, 1999). Content validity, one kind of validity, is concerned with whether the items

measure the full domain implied by their label (Hair, Black, Babin, & Anderson, 2010).

Hence, in ensuring the validity of the instruments (tests and interview schedule), the researcher had taken steps to discuss the initial drafts with experts in the field. These drafts were refined after meeting with the experts. Following this, the researcher discussed the instruments with a chosen group of specialists, which comprised of PhD holders, an educational supervisor, a psychologist and teachers in KASE. The researcher sought to get their comments regarding the relevant aspects, the appropriateness of the scale statements, the clarity of the scale statements, measurements of items, programs content and the activities involved in the training programs and suggestions of other suitable statements. The feedback given by them helped the researcher in making corrections on typographical errors and ambiguous items and questions. The TTCT was a valid and reliable scale to be used within the context of Jordan. For this study, it has a 100% consensus of the experts.

3.6.2 Reliability and Pilot Study

Creswell (2008) defines an instrument as reliable if it provides stable and consistent scores, as he clarifies: “Scores should be nearly the same when researchers administer the instrument multiple times at different times. Also, scores need to be consistent. “When an individual answer certain questions one way, the individual should consistently answer closely related question in the same way” (p. 169). Hair et al. (2010) emphasize this definition as they explain that the degree to which the results are consistent through varied times reflects reliability, adding that it is also referred by the accurate representation of the total population under the study.

Accordingly, an instrument is said to be reliable if the outcomes can be re-produced providing similar conditions.

As for the pilot test, according to Gall, Gall, and Borg (2003), it should include a sample of individuals from the populations from which the researcher plans to draw your respondents. When carrying out the pilot test, the researcher also provided adequate spaces within the questionnaire for respondents to make criticisms and recommendations for improving the questionnaire. In accordance with the recommendations made by Gall et al. (2003), the researcher had applied the test to a sample of 30 students at another school, and involving students who had similar characteristics as the students within the target population of the study.

Noteworthy, the purpose of a pilot study is to find out if the questionnaire works, and to make sure that the collected data can be analysed in the way the researchers wish to analyse (Zikmund, 2003). Hence, the researcher carried out a pilot study to test the questionnaire to be used in the study. Pilot study acts as an experimental study in achieving improvement within particular research instrumentations (Zikmund, 2003). By using its ability to identify weaknesses and even failure of the instruments it increase the accuracy and consistency of measurements. The students who were involved in the pilot study were not selected to participate in the main study. The tool of the study was applied on the exploratory sample, consisting of two divisions – that is 30 samples of gifted and talented students, and was re-test two weeks later on the same sample – to find the correlation coefficient between the scores in the first test and the second test using Pearson's equation. The result showed that the test has stability and has the reliability to be used in the study, table 3.6 shows the results:

Table 3.6
Correlations (pilot sample)

		G1ACTIVITY1	G1ACTIVITY2	G1ACTIVITY3	G1ACTIVITY4	G1ACTIVITY5	G1ACTIVITY6
ACTIVITY1	Pearson Correlation	.668*	-.192-	-.274-	.128	-.108-	-.140-
	Sig. (2-tailed)	.035	.595	.444	.724	.767	.699
ACTIVITY2	Pearson Correlation	.277	.775**	-.331-	.443	.224	.062
	Sig. (2-tailed)	.438	.008	.349	.200	.534	.866
ACTIVITY3	Pearson Correlation	.415	-.325-	.695*	-.027-	-.425-	-.129-
	Sig. (2-tailed)	.233	.360	.026	.942	.221	.722
ACTIVITY4	Pearson Correlation	.106	.286	-.420-	.796**	.361	.185
	Sig. (2-tailed)	.770	.424	.227	.006	.305	.609
ACTIVITY5	Pearson Correlation	-.237-	.053	.028	.469	.753*	.707*
	Sig. (2-tailed)	.510	.884	.938	.171	.012	.022
ACTIVITY6	Pearson Correlation	-.342-	.258	.061	.361	.663*	.845**
	Sig. (2-tailed)	.333	.472	.866	.306	.037	.002

3.7 Data Analysis Techniques

Data analysis is the process of systematically arranging the collected data. Analysis involves working with data, organising it into manageable units, discovering what is important and what is to be learnt, and deciding how the report for analysing and summarizing the data will be written (Creswell, 2009). In this study, there was two different types of data collection: quantitative (pre and post-test) and qualitative (interviews) methods. In this section, analyses of both quantitative and qualitative data are discussed.

3.7.1 Quantitative Data Analysis Techniques

This study used the quantitative data collection method; that of pre-test and post-test (TTCT test) to determine the effectiveness of SCAMPER and CoRT programs for the development of creativity among the gifted and talented students at the KASE. To analyse the data from this test, first the researcher used the TTCT Test Guide (1990) to score the tests, as explained earlier, and second, further analysis through a suitable software application, namely SPSS (Statistical Package for the Social Science).

The improvements in creativity skills between the three groups have been assessed by comparing pre-test and post-test scores. The following statistical techniques have been used to analyse the test; Correlations, the Means and Std. Deviation, dependent Independent -Sample Statistics t-test , Paired Samples Statistics t-test and ANCOVA test. The mean is the arithmetical average of a set of scores. Furthermore, the mean is the most frequently used measure of central tendency because every score is used in computing it.

In order to calculate the standard deviation, the mean has to firstly be calculated. A dependant sample t-Test to calculate the probability of rejecting the null hypothesis (McMillan & Schumacher 2014). The null hypothesis states that there is no difference between the population means of two groups (McMillan & Schumacher 2014). In this instance the null hypothesis is defined as: the effect of a creative intervention program has the same effect as traditional school programs. According to McMillan and Schumacher (2014) the reason why the null hypothesis is used with inferential statistics is that one can never prove something to be true, one only fails to disprove it.

3.7.2 Qualitative Data Techniques

Qualitative data analysis is the process employed to “reduce” data from intensive interviews or holistic observations in such a way that they becomes distilled to their essentials, rather than simply being diminished in volume (Charmaz, 2003).

3.7.2.1 Interviews

In this study, for the qualitative data collection method, interviews were carried out and this provided the basis for answering the relevant research questions. The constant comparative method is a technique for analysing qualitative data. This method of analysis is inductive, whereby the researcher begins to look into the data critically with the intention to extract new meaning from data; a total contrast to deductive approach when the meanings are known at the beginning of the data analysis (Glaser & Strauss, 1967; Glaser, 1965) as cited in (Kumar, 2007). In a sense, the researcher had also adapted the constant comparison analysis procedure when analysing the qualitative data. This method relies on taking one piece of data such as one interview, and compares it with all the others that may be similar or different. This was done to develop the conceptualisations of the possible relationships

between different parts of the data. The researcher had also chosen to perform such procedure because constant comparison analysis is suited to explain factors of human behaviour as the researcher assumes human phenomena are fundamental social processes (Thorne, 2000). Accordingly, this study is based on exploring opinion and experience of the participants about programs in general and SCAMPER and CoRT programs in particular.

Qualitative data must depend on the interpretations of the researchers. In the analysis of qualitative data, researchers collect data from what they see or hear from the participants and then they interpret them (Denscombe, 1998). It is described as "iterative" which means data collection and the analysis are interrelated (Bryman, 2001). The consequences of the analysis could lead to gathering further data. Therefore, qualitative data analysis can also be considered as part of the data collection process (Bryman, 2001). In addition, the qualitative data analysis is based on researchers' interpretations. Hence, the researcher in this study had analysed and interpreted the qualitative data, and most of the times had always re-interpreted the data to ensure that meaningful and truthful interpretations were unbiasedly made. Within the framework of grounded theory, five phases of data analysis are usually identified, namely coding data, writing notes or memos, sampling of theory, integration of literature, theoretical planning and sorting. This procedure is similar to other principles provided by Attride-Stirling (2001), Charmaz (2003) and Flick (2008). The researcher had usually resorted to these phases throughout the duration of processing and analysing the qualitative data.

3.8 Chapter Summary

This study aims to examine the effectiveness of SCAMPER and CoRT programs to developing creativity among gifted and talented students. This study used mixed method, quantitative and qualitative, through quasi-experimental a pre-test and post-test design for the quantitative phase, and the interviews for the qualitative phase to determine the nature and extent of the relationship between the programs (SCAMPER and CoRT) and creativity. Thus, chapter three has described the research methods and processes which were implemented in this study, and which included a description of research design, setting, population sample of the study, study procedure, and the description of programs SCAMPER and CoRT, the instruments and the techniques of data analysis.



CHAPTER FOUR

FINDINGS

Chapter four presents the findings of applying the Scamper and CoRT Programs to developing creativity among gifted and talented students at KASE. Firstly, it presents the descriptive summary of perception of the respondents captured by the research instrument. Also Data analysis and accompanying results from the investigation are presented in this chapter. In order to summarize data findings, results are detailed via tables and graphs as visual representations of the analyzed data.

4.1 Quantitative Analyses

4.1.1 Equality of study Sample Groups

To ensure sample groups were equal in creativity and suitable to conduct the study means and standard deviation were measured for the two groups experimental and the control group, also (Correlations) has been tested to make sure of the three equal groups (Control, CoRT, SCAMPER). The results are as shown in Table 4.1.

From Table 4.1, it can be seen that the means of the control group is 1.64128 and standard deviation is 0.63350 on the pre-test. The mean of the experimental group (CoRT) is (1.64656) and the standard deviation on the pre-test is 0.30689. Table 4.1 also shows that all variance, as measured by SD, are closed in value (0.3-0.6), indicating that all three groups are equivalent.

The mean of the experimental group (SCAMPER) is 1.63176, standard deviation is 0.41035 on the pre-test, and the mean of gifted and talented students in three groups

in the pre-test were close and therefore, the groups were equal in creativity according to descriptive statistics.

Table 4.1
Means and Std. Deviation in the Differences between Gifted and talented Students in pre-test

Groups	Means	St. Deviation
Control	1.64128	.63350
CoRT	1.64656	.30689
SCAMPER	1.63176	.41035

Variance between groups is not significant since Levene's test showed no significant differences between the three groups in the pre-test or post-test (refer Table 4.2).

Table 4.2
Levene's test of Homogeneity of Variance between Groups in pre and post-Tests

	Levene's Test for Equality of Variances			t-test for Equality of Means				
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	
Pre	Equal variances assumed	1.328	.256	1.136	40	.263	.12698	.11182
	Equal variances not assumed			1.136	37.041	.263	.12698	.11182
Post	Equal variances assumed	.009	.924	-.064	40	.949	-.00794	.12308
	Equal variances not assumed			-.064	39.978	.949	-.00794	.12308

After assuring of the equality of experimental and control groups, the researcher executed SCAMPER Program and CoRT Program on the two experimental groups. Moreover, after the completion of Programs, the researcher measured and observed the effect of treatment on creativity earned on post-test, where means and standard deviations were determined for the gifted and talented students of the control group and two experimental groups. The results of the post-tests were compared with the pre-test results, as shown in Table 4.3.

Table 4.3 indicates that mean of control group of gifted and talented students in the pre-test is 1.64128, standard deviation is 0.63350, while the mean of control group of gifted and talented students in the post-test is 1.65013, standard deviation is 0.50132. Hence, indicating that that there were no differences between pre and post-test performance among the groups in the level of creativity.

Table 4.3 shows that the mean of CoRT experimental group of gifted and talented students in the pre-test is 1.64656 and standard deviation is 0.30689. The mean of CoRT experimental group of gifted and talented students in the post-test is 1.89209, and standard deviation is 0.39407, which infers that there were differences between pre and post-test scores of CoRT experimental group of gifted and talented students in the level of creativity. The differences show that the level of creativity had increased the CoRT program was applied.

Table 4.3 indicates that the mean for SCAMPER experimental group of gifted and talented students in the pre-test is 1.63176 and the standard deviation is 0.41035. While the mean for SCAMPER experimental group of gifted and talented students in the post-test is 1.95501 and standard deviation is 0.40352, which infers that there were differences between pre and post-test scores of SCAMPER experimental group of gifted and talented students in the level of creativity. These differences show that the level of creativity had increase after SCAMPER program was implemented. Table 4.3 also indicates that, based on results of TTCT, the SCAMPER experimental group of gifted and talented students sample were more creative.

Table 4.3
Means and Std. Deviation on the Differences between Gifted and Talented Students in pre and post- test

Group	Pre		Post	
	Mean	Std. Deviation	Mean	Std. Deviation
Control	1.64128	.63350	1.65013	.50132
CoRT	1.64656	.30689	1.89209	.39407
SCAMPER	1.63176	.41035	1.95501	.40352

4.1.2 Means and standard Deviations Executed for Control Group and Each Experimental Groups

4.1.2.1 Control Group

Table 4.4 shows the means and standard deviation for gifted and talented students in the Control Group in the post-test. The table shows that ACTIVITY1 has the most activities for creativity, whereby the mean is 1.65716 and standard deviation is 0.441424. ACTIVITY3 and ACTIVITY4 has the second most activities in creativity. It has a mean of 1.63808. ACTIVITY5 and ACTIVITY6 are in the fourth place for activities in creativity with the mean equals 1.61904. ACTIVITY2 has the least activities in creativity with the mean equals 1.50476 and standard deviation equals 0.349952.

Table 4.4
Means and Std. Deviation of Gifted and Talented Students in Control Group in post-test Descriptive Statistics Control Group

	N	Minimum	Maximum	Mean	Std. Deviation
Post_ACTIVITY1	21	0.8	2	1.65716	0.441424
Post_ACTIVITY2	21	1.2	2	1.50476	0.349952
Post_ACTIVITY3	21	1.2	2	1.63808	0.507368
Post_ACTIVITY4	21	1.2	2	1.63808	0.43238
Post_ACTIVITY5	21	0.8	2	1.61904	0.396004
Post_ACTIVITY6	21	1.2	2	1.61904	0.416004

4.1.2.2 CoRT Experimental Group

Table 4.5 shows the means and standard deviations of gifted and talented students for the CoRT experimental group in the post-test. The table shows that ACTIVITY2 and ACTIVITY3 has the most activities for creativity with mean equals 1.7619. ACTIVITY1 has the second most activities for creativity and the mean is 1.730167 and standard deviation .67964. ACTIVITY4 has the third most activities for creativity, mean is 1.6984 and standard deviation .53896. ACTIVITY5 and ACTIVITY6 are in the fourth place with activities for creativity and the means are 1.29123 and 1.19986 respectively.

Table 4.5
Means and Std. Deviation of Gifted and Talented Students in CoRT Experimental Group in post-test Descriptive Statistics Control Group

	N	Minimum	Maximum	Mean	Std. Deviation
Post_G1ACTIVITY1	21	1.730167	.67964	21	1.730167
Post_G1ACTIVITY2	21	1.7619	.84515	21	1.7619
Post_G1ACTIVITY3	21	1.7619	.56061	21	1.7619
Post_G1ACTIVITY4	21	1.6984	.53896	21	1.6984
Post_G1ACTIVITY5	21	1.29123	.58959	21	1.29123
Post_G1ACTIVITY6	21	1.19986	.74001	21	1.19986

4.1.2.3 SCAMPER Experimental Group

Table 4.6 shows the means and standard deviations for gifted and talented students in SCAMPER experimental group in the post-test. The table shows that ACTIVITY6 has the most activities for creativity with mean equals 1.777767 and standard deviation 0.48305. ACTIVITY2 has the second most activities for creativity, with mean 1.730167 and standard deviation 0.67964. As far as amount of activities for creativity is concerned, ACTIVITY5 is in the third place with mean equals 1.6984 and ACTIVITY1 is in the fourth place with mean equals 1.682533 and standard

deviation 0.38421. ACTIVITY3 is in the fifth place with regards to the amount of activities for creativity and the mean is 1.4341 and standard deviation 0.65465. ACTIVITY4 has the lease amount of activities for creativity and the mean is 1.14 and standard deviation is .54772.

Table 4.6
Means and Std. Deviation of Gifted and Talented in SCAMPER Experimental group in post-test Descriptive Statistics Control Group

	N	Minimum	Maximum	Mean	Std. Deviation
Post_G2ACTIVITY1	21	1.682533	.38421	21	1.682533
Post_G2ACTIVITY2	21	1.730167	.67964	21	1.730167
SCAMPER experimental group Post_G2ACTIVITY3	21	1.4341	.65465	21	1.4341
Post_G2ACTIVITY4	21	1.41	.54772	21	1.41
Post_G2ACTIVITY5	21	1.6984	.83095	21	1.6984
Post_G2ACTIVITY6	21	1.777767	.48305	21	1.777767

4.1.3 Hypothesis Testing

The following sections present the results with regards to the null hypotheses established for this study. The null hypotheses are based on and a direct reflection of the research questions. Therefore, findings are arranged in the order of research questions pertaining to the null hypotheses. The outcomes are reported with statements of results and tables

4.1.3.1 First Hypothesis

There is no statistical significant difference between TTCT pre-test and post-test mean scores among the students in the SCAMPER group.

Table 4.7 shows that there is a significant difference between TTCT pre-test and post-test mean scores among the students in the SCAMPER group. The mean of the post TTCT test is higher than pre TTCT test (1.63176) post TTCT test (1.95501).

Paired samples T-test was used and the results revealed significant differences between the pre-test and post-test of the TTCT.

Table 4.7
Paired t-test for SCAMPER Program

		Paired Samples Statistics			
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	SCAMPERpre	1.63176	21	.41035	.08955
	SCAMPERpost	1.95501	21	.40352	.08806

		Paired Samples Test					
		Paired Differences			T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	SCAMPERpre – SCAMPERpost	-1.05556	.20638	.04504	-23.438	20	.000

4.1.3.2 Second Hypothesis

There is no statistical significant difference between SCAMPER group and control group's TTCT post-test mean scores.

Table 4.8 indicates that the mean for the control group in the post-test is 1.65013 and standard deviation is 0.45832. On the other hand, the mean for the SCAMPER experimental group of gifted and talented students in the post-test is 1.95501 and standard deviation is 0.40352. The table also indicates that the mean score of TTCT test of creativity of SCAMPER experimental group is higher and thus indicating that the students in this group have more creativity than the students in the control group.

Results of descriptive analysis pointed to the existence of differences in the mean score of TTCT test of creativity, Table 4.8 shows that experimental groups are more creative

than control group. To indicate whether those differences are relevant and statistically significant ANCOVA test was conducted and Tables 4.9 shows the results.

Table 4.8

Means and Std. Deviation in the Differences between Gifted and Talented Students of control and SCAMPER in post Groups

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Post	Control	21	1.65013	.45832	.10001
	Scamper	21	1.95501	.40352	.08806

Table 4.9

ANCOVA test

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	18.850 ^a	2	9.425	265.179	.000	.932
Intercept	1.708	1	1.708	48.056	.000	.552
pre_SCAMPER	6.072	1	6.072	170.827	.000	.814
Group	13.177	1	13.177	370.755	.000	.905
Error	1.386	39	.036			
Total	902.528	42				
Corrected Total	20.236	41				

a. R Squared = .932 (Adjusted R Squared = .928)

Group

Dependent Variable: Pre_SCAMPER

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
experiment	1.955	.041	1.328	2.00
Control	1.650	.041	0.980	1.33

a. Covariates appearing in the model are evaluated at the following values: pre_SCAMPER = 1.63176.

Table 4.9 shows the extent if there were statistically significant differences between Post and Pre SCAMPER test as well as control group, and SCAMPER experimental group. The table shows that ($F=170.827$ sig= 0.000) reflects there is a significant difference between Post and Pre SCAMPER test with $\text{Eta} = 0.814$, whereas ($F=370.755$ sig= 0.000) reflects that there is a significant difference between control group, and SCAMPER experimental group with $\text{Eta} = 0.905$.

In conclusion, there is statistical significant difference in the mean score of TTCT test of creativity of the gifted and talented students at KASE in Jordan, between the two groups, the experimental and the control group attributed to the SCAMPER program in favor of the experimental group. This reflects the effectiveness of the Scamper program on creativity.

4.1.3.3 Third Hypothesis

There is no statistical significant difference between TTCT pre-test and post-test mean scores among the students in the CoRT group.

Table 4.10 shows that there is a significant difference between the pre and post scores of TTCT test attributed to the impact of the CoRT program. The mean of the post TTCT test is higher than pre TTCT test (1.64656) the post-test mean is 1.89209 and significant at significance level 0.05. T-test for parried samples was used and revealed significant differences between the pre-test and post-test of the TTCT, which shows a significant difference between the two groups. ($t= -20.673$; sig= 0.000).

Table 4.10
Paired t-test for CoRT Program

		Paired Samples Statistics			
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	CoRTpre	1.64656	21	.30689	.06697
	CoRTpost	1.89209	21	.39407	.08599

		Paired Samples Test					
		Paired Differences			T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	CoRTpre – CoRTpost	-0.9207	.21785	.03791	-20.673	20	.000

4.1.3.4 Forth Hypothesis

There is no statistical significant difference between CoRT group and control group's TTCT post-test mean scores.

To indicate whether the differences are relevant and statistically significant ANCOVA test was conducted and the results are as shown in Tables 4.11.

Table 4.11 shows the extent if there were statistically significant differences between Post and Pre Cort test as well as control group and CoRT experimental group. The table shows that ($F=91.979$ sig= 0.000) reflects that there is a significant difference between Post and Pre Cort test with $\text{Eta} = 0.702$, whereas ($F=194.016$ sig= 0.000) reflects that there is a significant difference between control group, and Corte experimental group with $\text{Eta} =0.833$. The table also shows that the mean score of TTCT test of creativity for CoRT experimental group has more creativity than the control group.

In conclusion, there is statistical significant difference in the level of creativity of the gifted and talented students at KASE Jordan, between the two groups, the experimental and the control group attributed to the CoRT program in favor of the experimental group.

Table 4.11
ANCOVA test

Tests of Between-Subjects Effects						
Dependent Variable: Pre_CoRT						
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	17.726 ^a	2	8.863	158.877	.000	.891
Intercept	1.431	1	1.431	25.657	.000	.397
pre_CoRT	5.	1	5.131	91.979	.000	.702
Group	10.823	1	10.823	194.016	.000	.833
Error	2.176	39	.056			
Total	900.667	42				
Corrected Total	19.902	41				

a. R Squared = .891 (Adjusted R Squared = .885)

Group

Dependent Variable: post_CoRT

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experiment	1.892 ^a	.052	1.419	2.00
Control	1.650	.052	0.980	1.33

a. Covariates appearing in the model are evaluated at the following values: pre_CoRT = 4.1548.

4.1.3.5 Fifth Hypothesis

There is no statistical significant difference between SCAMPER group and CoRT group's TTCT post-test mean scores

Table 4.12 shows the mean and standard deviation of the two groups. TTCT scores for CoRT and Scamper groups were higher in the post-test compared to the pre-test, that is during pre-administration of the programs. Levene's Test for Equality of Variances for both pre and post administration of the program variance is assumed equal (F=1.328 alpha .256 for the pre-test) and (F=.009 alpha= .924 for the post). As for the programs differences, in the pre and post administration, the results show that there are no significant differences between CoRT and Scamper (t=1.136 sig= .263 for pre situation) and (t=-.064 sig= .94). This suggests that the two programs had the same effect on students' creativity.

Table 4.12
Mean and Standard Deviation of the Two Groups

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre	CoRT	21	1.64656	.30689	.06697
	Scamper	21	1.63176	.41035	.08955
Post	CoRT	21	1.89209	.39407	.08599
	Scamper	21	1.95501	.40352	.08806

	Levene's Test for Equality		t-test for Equality of Means					
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	
Pre	Equal variances assumed	1.328	.256	1.136	40	.263	.12698	.11182
	Equal variances not assumed			1.136	37.041	.263	.12698	.11182
Post	Equal variances assumed	.009	.924	-.064	40	.949	-.00794	.12308
	Equal variances not assumed			-.064	39.978	.949	-.00794	.12308

4.1.4 Quantitative Findings Summary

The results showed significant differences in The Torrance Test of Creative Thinking (TTCT) between traditional teaching (control group) and SCAMPER group and CoRT

group's (experimental groups) for both SCAMPER group and CoRT group's. The charts in Figure 4.1 below shows that differences in pre-tests and post-tests for the three groups.

The chart shows that there is a no significant difference in the level of creativity of the gifted and talented students at KASE in Jordan in the pre-tests.

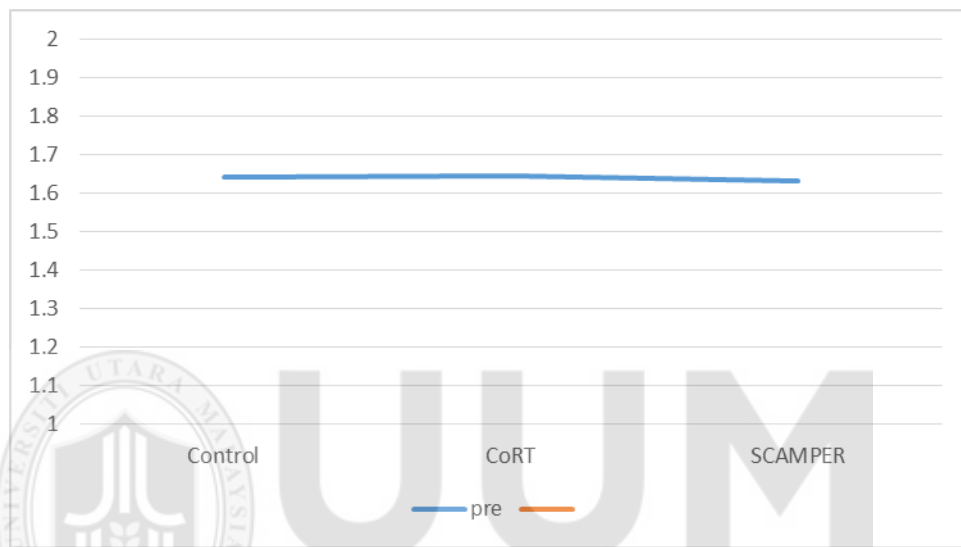


Figure 4.1 Mean Differences in TTCT between the Three Groups in the Pre-test

The chart (Figure 4.2) shows that there is a significant difference in the level of creativity of the gifted and talented students at KASE in Jordan in the post-test. Hence, the SCAMPER and CoRT programs group has the significant advantage in The Torrance Test of Creative Thinking (TTCT) from control group. In conclusion, SCAMPER, program group was slightly better than CoRT programs in The Torrance Test of Creative Thinking (TTCT).

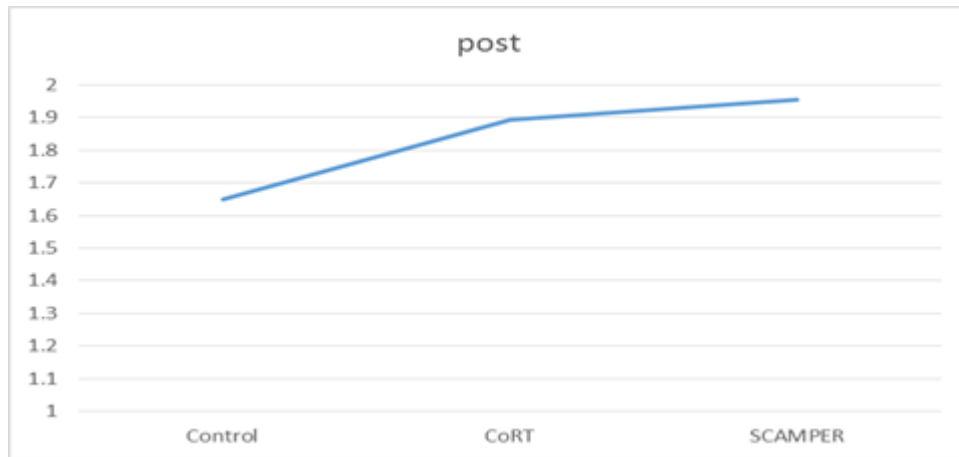


Figure 4.2 Mean Differences in TTCT between the Three Groups in the Post-test

4.2 Qualitative Analysis

For gaining qualitative information related to participants' experiences, views, and feeling towards SCAMPER and CoRT programs, a Structured Interview were used with talented students at KASE. Participants were divided into two groups that have been subjected to SCAMPER and CoRT programs; each one consists of 21 participants.

Face-to-face interviews were conducted, in a private manner whereby each interviewee was asked to present their views and discussed a series of questions asked by the interviewer. A semi-structured interview guideline or schedule was prepared by the researcher which included four parts:

- **Introduction:** The researcher started the interview sessions by explaining to the interviewees the purpose of the study, matters pertaining to privacy of the interviews and the interviewees, and guaranteed that all the information provided or mentioned during the interview sessions are solely for the purpose of the current the scientific research.

- **First section:** This section comprised of questions pertaining to personal information, level, grade, and the group's category.

- **Second section:** This section contains questions relating to schools, KASE programs and thinking programs in general. Below are the questions:
 - I. In your experience, what is the difference between teaching methods in regular schools and schools of KASE? How would you describe the learning environment in both of them?

 - II. Do you have enough information about the methods and programs such as the six thinking hats and other method? To what extent do teachers in KASE use in teaching these programs, either directly or through integrated with the curriculum?

 - III. What do think about the use of the methods and programs in teaching? What is the program's (thinking) strategy that you think that is effective to improve areas of your thinking?

 - IV. Do you think that this program is effective in raising the level of creativity you have? And does it affect the learning environment in terms of the interaction between teacher and student and between the students themselves?

- **Third Section:** This section contains questions related to the thinking activities and the thinking programs (SCAMPER- CoRT) which include the following questions:

- I. What do you think of the effectiveness of these programs on your ability to generate a large number of flexible alternatives in a creative way?
- II. What are the main advantages and disadvantages of using both SCAMPER and CoRT programs?
- III. Do you think these programs have a real impact on your creative skills and academic achievement? In your opinion, which of these two programs has greater effect on the degree of creativity?
- IV. What do you think about the inclusion of these programs in the school curriculum? How can these programs be included in the topics and in the teaching materials?

After introducing the objectives of the interview, the interviewer and the purpose of the interviews to enrich the research, all the interviewees were willing to express their experiences and discuss their views with the researcher. The total research participants (sample) were 42. All of them were from the tenth grade, half of the sample was under the CoRT program, and the rest was under the SCAMPER program.

4.2.1 The Differences in Teaching Methods and Learning Environment Between Kase and the Other Regular Schools.

Most of the interviewees see that KASE are totally different from the other regular governmental schools, “the teaching methods are different, and they encourage us to think deeply”, except of three participants who said: “no, there is no difference in the teaching methods”.

The interviewees argue that the teachers in KASE are different from those teachers in regular schools, since they are so qualified in practicing the new teaching methods, because they are being selected according to the principles and high standards that meet KASE schools' requirements, "our teachers are so distinguished from that in regular schools". The interviewees feel that there is no discrimination towards the students in KASE, since all the students are treated in a very good way by their teachers, which is totally different from regular schools. In addition, teachers in KASE introduce the analytical methodology in presenting the curriculum materials, as opposed to the traditional way of teaching in regular schools, "the teachers do not differentiate in dealing with students if there is a discrepancy between them because all the students are high achievers".

Unlike regular schools, the learning environment in KASE is creative, in which students can think properly, it can be described as a positive learning environment, "I feel so comfortable and confident in the classroom", "I feel so satisfied because I have very high achievement levels". Also the psychological environment is excitement, since the teachers take care of how they teach, follow the students achievements, and how they feel about the learning process," there are specific rules which posted consequently in the classroom and clearly explains to us", "my teachers are so calm and patient, they always focus on helping the students", "this environment is not existed in the governmental schools".

4.2.2 The Using of Thinking Activities (Six Hats Or TRIZ etc.) In KASE, Either Directly or Through Integrated With the Curriculum.

One-third of the interviewees argue that they do not have enough information about thinking activities like the six hats or TRIZ programs, but they are encouraged to use

the brainstorming by teachers and motivated to reflect it on the teaching programs indirectly, meanwhile some other interviewees argue that brainstorming in teaching programs is implemented directly without mentioning the six hats programs, and TRIZk, but most of the interviewees note that they practice the thinking methods through brainstorming in teaching programs and directly programs in general as a result of the efficiency of well-trained teachers, that apply the thinking activities and brainstorming in teaching programs in a direct manner.

4.2.3 The Effect of Using the Strategic Thinking Through Learning Process.

All the interviewees argue that the strategic thinking programs have a great positive effective on their learning process and on their daily life, and they believe that their ability to think properly is improved; they know how to deal with problems, make their decisions. They feel enthusiasm to participate in the learning process; they have curiosity to learn more about what is new and do the additional works in an exciting manner, “I like to bring new ideas and solutions”, “I feel so happy when I deal with situations that need to be solved”, “I use the strategic thinking in my daily life”, “the strategic thinking is so effective”, “it’s not used only in the classroom”, “it increases my awareness towards life events”.

4.2.4 The Effectiveness of Creativity on the Learning Environment.

All the interviewees believe that their awareness levels are raised because of the using of the creativity through the learning environment at KASE. They argue that their interaction with themselves and with their teachers was so great, since they know how to act within the groups, and to deal with teacher to get a better understanding, “I know how to be a good team worker”, “everything around me helps me to think properly”, I have a different way of thinking and solving problem

comparing with my friends and relatives outside KASE”, “the creativity makes the learning environment so comfortable”. “My classroom helps me to be creative”. All the interviewees can feel the great and positive effectiveness of the creativity on the learning environment through the good relationship and interaction in their daily life, solving problems, their self-confidence and the extraordinary solutions that can be reached, “creativity makes my life easier”.

4.2.5 The Effectiveness of (SCAMPER-Cort) Programs on Students’ Ability to Generate a Large Number of Flexible Alternatives in a Creative Way.

All the interviewees agree that these programs would help them to generate many flexible alternatives in a creative way, since they increase their ability to identify and distinguish between the positive information and negative information, and to work towards improving the positive information, and transforming the negative aspects into positive, and find alternatives that help them to achieve the plans to ensure future success, “yes, I can make so many good alternatives”, I can think of the positive information and make them better’, I might make the negative ones into positives”. In addition, they believe that these programs can develop the students’ perceptions and abilities which help them to produce the greatest possible solutions. Substantially, these programs can develop students' abilities to think and create, because they have sufficient means to enrich the students’ capabilities towards creativity, since it is very easy to implement these programs through the educational programs.

4.2.6 The Advantages and Disadvantages of Using (SCAMPER and Cort Programs.

Most of the interviewees agree that there are great advantages and some disadvantages to these programs. According to them, by using the SCAMPER and CoRT methods, an individual or a group may be spurred into generating new ideas by simply evaluating an existing one. This process can result in vast improvements being made to both products that may exist already and product ideas that are still in their infant stages. Where an idea may have encountered a development obstacle, the SCAMPER and CoRT methods may prove to be a systematic approach to overcoming that obstacle, allowing new ideas to be generated and an improved product to come to fruition. "Positive aspects to be fun, to develop our thinking", "The positive aspects, we can ask different questions to answer in the course because it increases our imagination. No negative way ", "There are positive side only", "Positive sides; our mind has lead to new ideas. Disadvantages; He was confusing took our time. ". "Positive aspects; He developed enough imagination and thinking. Its scamper questions for the first time. Our beautiful example suspended separately". "But I think there were no negative aspects ", "The positive side is on us to have an idea we can use in the future and provide more modern ideas come to mind. Disadvantages: sometimes confuse us", "Attention is clutter, and sometimes it turns out questions I hear."

4.2.7 The Effectiveness of the (SCAMPER- Cort) Programs on the Students' Creative Skills and Academic Achievement.

Most of the interviewees can feel the positive effectiveness of these programs, as they develop the strategic and creativity. The SCAMPER and CoRT process is also largely used in regard to encouraging the creative process in the minds of students,

influencing the generation of new ideas without placing boundaries on where they come from. Some students have trouble with the development of new ideas when they haven't been provided much of a creative influence, and the SCAMPER- CoRT methods can be used by educators and teachers to influence the generation of creativity in students by using the process to promote creativity. This process has also been largely proven to promote constructive problem-solving abilities in students by engaging their minds to think around obstacles in order to overcome them.” Yes, I can solve the problem around me”, “I like to use my intelligence”.

4.2.8 Using the (SCAMPER-Cort) in Other Curriculum and Teaching Materials.

Most of the interviewees except one interviewee believe that they want to use the SCAMPER- CoRT techniques in other curriculum and teaching materials. In the course of the reason for using other courses more fun to go through, to find creative ideas and they referred to the intelligence will help in their development. Also especially "Science" they view that they can be used in the course remarkably. "Yes I want. In particular, it can be useful for science experiments in class. It has contributed to the problem solving ", "Yes, because we can use the science", "Yes, I do, because lessons can be more fun to scamper late", "We can do it. Because this method can improve intelligence can help us find creative ideas, help improve our success ", "Yes, because it improves our other courses and provides a better understanding of our lessons", "We can use SCAMPER and CoRT events also in our other classes”. “Because you are writing stories or can give us a more advanced and modern answer when asked a question in a different course ”.

Based on responses, most of students believe that they are able to unlock and develop their potential. consequence, it can be suggested that creativity programs particularly SCAMPER and CoRT can be used in a variety of schools, the first reason of that, the creative thinking programs provides an enjoyable environment for practicing creative thinking.



CHAPTER FIVE

THE DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter reviews the purpose, methodology, and findings of this investigation. Following the review, discussion of these findings is provided, and delimitations as well as limitations represented. Finally recommendations for practice and further research are suggested, and conclusion will also be offered. The study was organized in such a way that it follows the traditional way of research report. It was a cross-sectional study in which the major variables were accessed once and the relationships between them were determined.

5.2 Summary of Findings

The study shows that there is a statistical significant level of creativity among the gifted and talented students at the KASE in Jordan. The SCAMPER and CoRT programs have positive significant effect on the level of creativity on TTCT, Torrance scale, and the study has reached the following findings:

The effectiveness of the SCAMPER program on creativity among the gifted and talented students at King Abdullah School for Excellence.

The results show that there is a statistical significant level of creativity of the gifted and talented students at the KASE in Jordan who have been subjected to SCAMPER programs. The results show that SCAMPER programs have positive significant effect on the level of creativity on TTCT, Torrance scale.

The effectiveness of the CoRT program on creativity among the gifted and talented students at King Abdullah School for Excellence.

The results show that there is a statistical significant level of creativity of the gifted and talented students at the KASE in Jordan who have been subjected to CoRT program. The results shows that CoRT program have positive significant effect on the level of creativity on TTCT, Torrance scale.

The differences in creativity among the gifted and talented students at King Abdullah School for Excellence according to teaching methods (Traditional method, CoRT program, SCAMPER program).

The study shows that there is a statistical significant difference in the mean score of TTCT test of creativity among the gifted and talented students at the KASE for excellence in Jordan. Between the two groups, the experimental and the control group (Traditional method) attributed to the SCAMPER program, the result is in favor of the experimental group (SCAMPER program).

The study shows that there is statistical significant difference in the mean score of TTCT test of creativity of the gifted and talented students at the KASE for excellence in Jordan. Between the two groups, the experimental and the control group (Traditional method) attributed to the CoRT program, the result favors of the experimental group (SCAMPER program)

The differences in the effectiveness of SCAMPER and CoRT programs on creativity among the gifted and talented students at King Abdullah School for Excellence.

There is no statistical significant difference in the level of creativity of the gifted and talented students at KASE in Jordan, between the experimental SCAMPER group and CORT program", this can be seen as the two programs had the same effective on creative thinking.

The study clears-out that experimental groups (SCAMPER program) have higher level of creativity than control group. This result is consistent with the findings of (Majid, Tan & Soh, 2003; Toraman & Altun, 2013; Animasahun; 2014; Ozyaprak, 2016) which confirmed that when the SCAMPER technique is effectively applied, it can bring about the students cognitive development in their related subjects by providing the motivation and opportunity to engage in creative thinking.

The study shows that the experimental groups (CoRT program) have higher level of creativity than control group and this result is consistent with the findings of Al-Jallad (2006) which reveals that there was a statistical difference on the development of creative thinking skill of the experimental group of (CoRT Program) with respect to fluency, flexibility and originality than control group. That results were emphasized by many other studies, for example Al-Makhatra, 2007; Hmeadat, 2016) reported that there was significant difference between control and experimental group in favor of the experimental group of CoRT program. In a study applied on gifted students, Al-Faoury (2014) found that CoRT Program No. 4 entitled "Creativity" has the power of helping gifted learners to develop creative abilities.

The study also shows that the gifted students in SCAMPER experimental group have highest level of creativity in ACTIVITY6; ACTIVITY2 was in the second place; ACTIVITY5 was the in the third place; and ACTIVITY3 was in the last place with

regards to the amount of creativity activities. The study found that gifted and talented students in the CoRT experimental group have highest level of creativity in ACTIVITY2 and ACTIVITY3; with ACTIVITY1 in the second place; ACTIVITY4 in the fourth place; ACTIVITY5 and ACTIVITY6 were the in the last place with regards to amount of creativity activities.

Students' perceptions about their learning experience using the SCAMPER and CoRT programs.

The results shows that King Abdullah School for Excellence's gifted and talented students have positive trend toward using the SCAMPER and CoRT programs, which are exciting and challenging programs and work to increase the orientation of students to get a higher rating than their peers.

Most of the students believe that they are able to unlock and develop their potential. The students are ready to learn by taking special courses on creativity and mastering creative techniques. This is essential to remember when designing the courses and programs, which can unleash and foster students' creativity and improve their creative problem solving skills. Hence, it can be suggested that creativity programs particularly SCAMPER and CoRT can be used in a variety of schools because seemingly creative thinking programs provides an enjoyable environment for practicing creative thinking.

5.3 Discussions

The results in this study regarding the effect of thinking programs towards the improvement of creative skills among the gifted and talented students in KASE are in

line with the results of the previous studies. Thus, these results in a sense contribute to the growing body of knowledge on the influence of creativity training towards raising creativity to buffer creative skills among gifted and talented students. Creativity training was also affirmed by the literature review to be a successful practice and to be effective on students with different abilities (e.g. Guilford, 1950, 1967; Torrance, 1962, 1972; Plucker and Runco, 1999; Sternberg, 2003; Runco, 2007, among others). In addition, these results are also in line with assertions made by organizational creativity theorists that point out to the importance of creativity training (e.g. Amabile, 1983, 1988, 1996, 1999, 2012; Woodman, et al., 1993; Alkahtani, 2009 Al-Edwan, 2011; 2012; Al-khatib, 2012; Albuainain, Jassim & Alnbhan, 2015; Alzoubi, Al Qudah, Albursan, Bakhiet & Abduljabbar, 2016).

As teachers and curriculum developers nowadays find it difficult to motivate students and encourage them to learn, thinking programs when appropriately developed could provide alternative teaching methods that meet the teachers and students' needs. Moreover, thinking programs are designed based on students' interests to help them utilize their maximum potentials (Kaplan, 2009).

In light of this, neglecting the students' needs and choosing subjects and class activities that do not meet their levels could cause laziness among them and affect them adversely. On the contrary, Harlen (2000) indicates that taking into consideration the students' opinions and interests in selecting the offered program is essential to keep learners engaged and motivated. The strong relation suggested by McAllister and Plourde (2008), between students' motivation and their educational performance also supports this believe, and suggests that learning activities must challenge the gifted students' abilities in order to be more engaging and motivating.

The creative thinking programs are designed in accordance with these results as they efficiently meet the students' needs and encourages them to further investigate and explore as well as help them in achieving self-learning without having to worry about any negative consequences (McAllister & Plourde, 2008; Wheeler, Waite, & Bromfield, 2002).

The qualitative data analysis of this study shows that using the creative thinking programs provides the student with the necessary skills which they need to improve their educational path, career, and life style, the way of thinking, problem solving, and find creative and alternative solutions, as well as the students' ability to be involved in such programs.

5.4 Recommendations

Based on the findings within this study, the following recommendations are made pertaining to the learning and teaching of the gifted and talented students in Jordan:

- I. It is recommended that KASE in Jordan has to apply modern and effective programs of creativity and SCAMPER program is an example due to the results of the study and many similar studies which emphasized the positive effect of that program on the level of creativity.
- II. It is recommended that KASE in Jordan to apply CoRT program, gifted and talented students, due to the results of the study and many similar studies which emphasized the positive effect of that program on the level of creativity.

- III. It is recommended to apply CoRT program and SCAMPER program to other schools. In that case, it is necessary to find the appropriate measure to detect talented students and highlight their talents and develop it. There are many talents that are not disclosed, because they are in the schools that do not bother to discovery gifted students and develop their talents.

5.5 Suggestions of Future Research

As with other studies, this study has raised many further issues and questions for future work. Research for further investigation will be suggested in this section.

- I. There has been more than sixty years of research on the creativity, yet, among both leaders and researchers of this field there is no agreement on what creativity is, or how to assess it. However, the need for more qualitative and quantitative research for assessing and developing creativity.
- II. Future directions for research on the longitudinal studies to better explore the effectiveness of the SCAMPER. There is a further need for studies focusing on the effectiveness of the SCAMPER on the myriad aspects of the social and personal traits of gifted students (particularly self-regulated learning). In addition, further research efforts are needed on the effectiveness of the SCAMPER on fostering creative thinking skills in the gifted.
- III. Results of the current study add to a large number of experimental results on the CoRT thinking lessons which have confirmed the usefulness of using it to enhance students' thinking skills. However, the present study used only

twenty lessons from CoRT 1, 4,. Therefore, an examination of the other parts or the entire programme is suggested for further study.

- IV. At the national level, the government has a responsibility to promote higher levels of creativity in both teaching and learning

5.6 Conclusion

The study aims to examine the effectiveness of the SCAMPER program CoRT program on creativity among the gifted and talented students at King Abdullah School for Excellence (KASE). It also examines the differences creativity among the gifted and talented students at King Abdullah School for Excellence according to the different teaching methods (Traditional method, CoRT program method, SCAMPER programs method). The study reaches the results that there is statistical significant level of creativity of the gifted and talented students at the KASE in Jordan with the implementation of both the SCAMPER and CoRT programs. The SCAMPER and CoRT programs have positive significant effect on the level of creativity on TTCT, Torrance scale.

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Appendix A

How To Present The SCAMPER

It takes least two people to SCAMPER, a child of 3 years or at older, and an adult of The adult, as game leader, may serve an any age, individual child or a group number to about 35 To play the games, the leader reads the script, paying close attention to the required pauses indicated by the three dots (...) The purpose of the pause is to provide time for the children to follow the cues and directions given. During the pause, the game leader should observe the emotions, reactions, and gestures of the players. Remember, the dots are your signal to wait and watch. You will know when to continue, usually when the players nod of approval, a smile, or other response. This is discussed further in the section titled "Introducing SCAMPER to students".

A "note to the game leader" will precede some games. These additional instructions are particular to those games. Aside from these occasional notes, all of the text in each SCAMPER game is a full script to be read aloud to the players.

The games should be played with enthusiasm and expressed wonderment. This requirement places great responsibility on the leader. The leader, too, must be open to what might be, and willing to entertain extravagant and unrestrained ideas. An expression of enthusiasm set the pace and establishes the emotional tone of the game. The success of the games clearly depend on the leader's ability and willingness to openly display an outpouring of warmth, enthusiasm, and positive expectation.

Within the structure of the games, ample opportunity is provided for the leader to exercise his or her own creative imagination. Games may be adapted for particular use.

Leaders may wish to improvise or write their own games. Wide margins have been provided on the game pages; leaders may use this space to make notation of adaptations they wish to implement. Many suggestions for adaptation are included in Appendix A: SCAMPER on Your Own.

Before playing the games, it is recommended that the following procedure be followed:

- Read "Introducing SCAMPER to Students," and as you read practice the expression you will use in giving the direction to the players. Imagine you are a child hearing the directions for the first time. How would you feel?
- Read the first two games as if you were actually playing with children. Take time to pause, pretend that you are a child, and envision the images that children will see when you lead them in this game. Timing yourself in this activity helps determine the actual time needed to play the game.
- It is good to recognize the attention span of the age group that will be playing. It can be expected that children in the 5-7-year-old age range will be able to focus attention on a game for about 10 minutes. Leaders have found it helpful to set a announce time limits before playing the games.

You are now ready to SCAMPER. Good luck! If all well you goes will find that playing creative imagination will lift and your games you players to new heights of living and learning enjoyment.

Students will formulate a minimum of four questions for each of the seven SCAMPER verbs that are related to their individual concentration topic.

- Students will generate a minimum of two responses to the questions formulated to facilitate their creative thought related to their chosen concentration topic.
- Students will formulate a minimum of three questions that address personal style and/or message and generate a response for each.

Sometimes it is really tough to come up with new ideas for your concentration. Sometimes you just get stuck in one place and can't seem to get beyond that point. Today, you will learn a technique that will help you expand your ideas called SCAMPER. Scamper is an acronym or mnemonic for the action verbs: substitute, combine, adapt, modify, put to other uses, eliminate, and rearrange. It is a checklist to get your creative juices flowing again. With this technique, you take your concentration idea and apply these verbs to create alternative ways of thinking about your topic. By asking SCAMPER questions you will challenge your current way of thinking. You can try this technique on your own or with a partner. For example:

➤ **Substitute**

Take your subject/idea and ask; what can you substitute? What can be used instead? Who else instead? What other images? Other materials? Other processes? Other places? Other approaches? Ask yourself: Instead of ... I can...

➤ **Combine**

What can you combine or bring together somehow? How about a collage of images?

What materials, features, processes, people, products or components can I combine?

Ask yourself; I can bring together ... and ... to ...

➤ **Adapt**

What can you adapt for use as a solution? What else is like this? What other idea does this suggest? Does the past offer a parallel? What could I copy? Who could I emulate? What part of the idea/subject could I change? And in exchange for what?

What if I were to change the characteristics of a component? Ask yourself; I can adapt ... in this way ... to ...

➤ **Modify**

Can you change the item in some way? Change meaning, color, form, or shape?

What are other changes? What if I distort the image? Exaggerate the image? Also:

Magnify : What can you add? Longer? Thicker? Extra value? Duplicate? Multiply?

Exaggerate? And: 'Minify' : What can you remove? Make smaller? Condense? Make

lower, shorter or lighter? Omit? Streamline? Split up? Understate? Ask yourself; I

can change ... in this way ... to ...

➤ **Put to other uses or purposes**

How can you put the idea to different or another use or purpose? New ways to see it?

Other uses if it is modified? Ask yourself; I can re-use ... in this way ... by ...

➤ **Eliminate**

What can you eliminate? What can be removed? Think of what might happen if you eliminated various parts. Ask yourself; I can eliminate ... by ...

➤ **Rearrange**

What can be rearranged in some way? Interchange components? Other patterns? Other designs? What about the order or sequence? Transpose images? Reverse images? What about different angles? Ask yourself; I can rearrange ... like this ... such that ...

Introducing SCAMPER to Students

We are going to play game called SCAMPER In playing a the game, you will be asked to scamper about, but you won't really run around. This is a pretend game. When we pretend, we use our imagination. When you use your imagination, almost anything can happen. Making strange and unusual things happen in our imagination is fun. In playing the SCAMPER games, we hope to have fun. Here are the rules of the game. Listen while I read them to you.

Sometimes it is really tough to come up with new ideas for your concentration. Sometimes you just get stuck in one place and can't seem to get beyond that point. Today, you will learn a technique that will help you expand you ideas called SCAMPER. Scamper is an acronym or mnemonic for the action verbs: substitute, combine, adapt, modify, put to other uses, eliminate, and rearrange. It is a checklist to get your creative juices flowing again. With this technique, you take your concentration idea and apply these verbs to create alternative ways of thinking about

your topic. By asking SCAMPER questions you will challenge your current way of thinking. You can try this technique on your own or with a partner.

Rules of the Game

I will tell you about something and ask you to think about it...to imagine and pretend. Sometimes, I will ask you to do something... you won't be expected to do it, but can pretend that you are doing it. You know, just imagine that you are.

Remember, we are just pretending. Don't speak out when I ask you something. You may nod head yes or shake your head no

The best way to pretend is your hands over your eyes and to put close them, or to close and fold your arms in your lap. When your eyes you do this, you try to see and pretend to do what I am telling you.

Practice Game

- All right. Let's play a practice game.
- Are you ready?
- Are your eyes closed?
- Nod your head yes if you are ready and your eyes are closed
- Good. Let's pretend that you have dish of ice cream sitting right a there on the table in front of you...
- Do you see it

- Nod your head yes if it you see
- What flavor is it? Dont answer out loud Just answer to yourself
- Put a spoon on the table along side of the dish of ice cream...
- All right. Now, pick up the spoon and taste the ice cream
- Is it good?
- Go ahead and eat all of the ice cream in the dish
- Is there any ice cream left in the dish? Shake your head no if it's all gone
- Fine. Now open your eyes
- Do you think that you know how to play the game
- Do you have any questions about playing the game Take time to answer questions)

I believe we are ready now, let's go ahead and play the first SCAMPER game.

Appendix B

Contents Of The SCAMPER Program

No. Session	Session	The number of activities	No. Session	Session	The number of activities
1	cardboard box	5	11	eighth day of the week	7
2	new zoo	4	12	sights and sounds, upside down, and all around	4
3	Doughnuts	6	13	brown paper bags	7
4	stuffed animals	4	14	dogs and cats and hogs and bats	8
5	Sticks	4	15	Mindshower	5
6	Alphabet cake	3	16	leap before you look	4
7	Crazy	5	17	oops!	4
8	light bulb	6	18	room for the future	6
9	what in the world did you find	7	19	handy randy, the space-age robot	6
10	Repmacs	4	20	script writer	4

Game 1: Cardboard Box

Many kinds of things come in a cardboard box. Can you think of some You can take things out of a box, and you can put things into a box. Can you change a little box into a big box? Can you change a box into a doghouse Sure you can, it isnt hard at

all... if you use your imagination This game is called Cardboard Box. Close your eyes and we are ready to begin.

Pretend that you have a cardboard box about as big as a chair

- Set it on the floor in front of you...
- Make it whatever size you want it to be...
- Make the box bigger and change the color

Now, we are going to pretend that we are putting some things into the box. Think about the many different kinds of good things you could put into the about many box

- Put them in
- Keep putting things into the box until it is full
- Now pile things on top...
- Keep piling things on top...
- Do you have things piled high?
- Now, like magic, make everything in the box go away
- Is the box empty?...
- Take a long fat box and put some wheels on it...

- Make it into a wagon...
- Have it be a red wagon...
- Jump into your red wagon and steer as it zips around the room.
- Stop the wagon and get out
- Push it out the door...

Are you ready to make something else?..

- Take another box and make a doghouse
- Put a dog in the doghouse...
- Make him brown with long hair...
- Give him a name...
- Call out his name and have him bark three times
- Pet him and tell him he is a good dog.
- Give him food and tell him goodbye...

Now take wide, tall box and make a refrigerator..

- Put a door with hinges on it...
- Open the door

- Did the light come on?..
- Put some shelves in the refrigerator...
- Put different kinds of vegetables on the shelves
- Look at all of the food in the refrigerator and decide what you are going to have for lunch...
- Shut the door and come back when you're ready to fix lunch
- Get another box and we will make a space shuttle
- Put a door and some windows in it...
- Get into your shuttle and shut the door
- Get a little box and make a control panel with lights on it... > Sit down in your seat and buckle the seat belt...
- Are you ready to go?
- Grab the controls and push the button that starts the engines...
- Count down: 10,9,8, 7,6,5,4,3,2,1,0, ignition, blast off...
- Look out the window
- Is the Earth getting smaller?

- Unbuckle your seat belt and float around in the cabin
- Fly your shuttle around the moon...
- Take one more turn around the moon and head back to Earth
- Start to slow it down for a landing...
- Set your shuttle down easy
- Get out and walk around
- Doesn't it feel good to be back on Earth?..

You can do all of things with cardboard box if you use your imagination.

Game 2: New Zoo

Note to Game Leader: It may be necessary to review the rules of the game before you start. For younger children, there is an alternate game that may be more suitable. some things seem to go well together. For example, peanut butter and jelly make good sandwiches. Milk and cereal are a good combination, but some kids like cereal without milk. Root beer and ice cream go together to make something that is different from either root beer or ice cream. Sometimes, we can combine things or parts of things that we do not usually think of as going together When we do this, the results may be strange and interesting. It's possible to combine anything you want when you use your imagination New Zoo is the name of this Can you guess what it's about? game. If closed, we are ready to play the game.

A moose has a big head and antlers, take a look at him...

- Do you see him?...
- Take his big head and antlers and put them on a hippopotamus.
- Think of a name that would describe this animal
- Did you think of hippot-a-moose or moose-a-potamus?...

A kangaroo has big strong hind legs that help him jump...

- Give the kangaroo's hind legs to a donkey...
- Have this strange animal jump around on his hind legs..

Now look at a zebra

- Can you see anything about this animal that makes him different from most other animals?
- Remember what it is
- Now look at a camel...
- Take the words that describe the characteristics of these two animals-stripes and hump-and combine them to make a name for your new animal
- It could be a stripe-a-hump, hump-lines, or even humpster

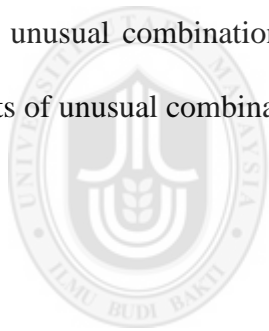
This time, choose any animal that you wish.

- Have you selected an animal?...

- Take a good look at her and notice any characteristics that tend to make her different from most other animals

- Combine the words that describe the unique characteristics and make up a name for your new animal. We should be able to determine which two animals you chose by the name that you give your animal

When things together we form strange and unusual we put combinations. Sometimes our unusual combinations may turn out to something valuable. We can try out all sorts of unusual combinations if we are willing to use our imaginations.



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Appendix C

Example Of SCAMPER Program In Arabic



اللعبة الأولى:



الاستهلال:

كثيرة هي الأشياء التي توضع في صناديق الكرتون. هل يمكنكم التفكير في بعض تلك الأشياء؟ يمكننا أن نأخذ بعض الأشياء الموضوعة في صندوق الكرتون، كما يمكننا أن نضع أشياء أخرى فيه. ولكن هل نستطيع تحويل صندوق الكرتون الصغير إلى صندوق كبير؟ أو هل يمكننا أن نستخدم صندوق الكرتون استخدامات أخرى كأن يكون بيتا للقطّة؟... بالتأكيد إننا نستطيع... فهذا ليس صعبا إذا استخدمنا خيالنا...



والآن ما رأيكم أن نلعب لعبة: صندوق الكرتون؟

عزيزي المدرب:

ذكر المتدربين بقواعد اللعب قبل بدء اللعبة أو استئناف أي جزء منها.



تخيل أن معك صندوق كرتون كبير...

ضع صندوق الكرتون أمامك...

اجعله في الحجم الذي تريده أنت...

اجعل صندوق الكرتون أكبر وغير لونه...

والآن، تخيل أنك تضع بعض الأشياء في صندوق الكرتون، تخيل أكبر عدد

ممكن من الأشياء الجيدة التي يمكنك وضعها في صندوق الكرتون...

ضع الأشياء داخل صندوق الكرتون...

استمر في وضع الأشياء في صندوق الكرتون حتى يمتلئ...

والآن اجمع أشياء أخرى وضعها فوق صندوق الكرتون الممتلئ أصلا...

استمر في جمع الأشياء وضعها فوق صندوق الكرتون...

هل أصبحت الأشياء مرتفعة وعالية؟...

اللعبة الأولى - الجزء الأول
بطاقة نشاط (١٠١)

والآن، اجعل كل شيء في صندوق الكرتون أو فوقه يختفي...

هل الصندوق فارغ الآن؟...

← خذ صندوقا طويلا وضع له عجلات...

حوله إلى سيارة...

اجعلها سيارة حمراء...

اركب سيارتك وقم بقيادتها داخل الغرفة...

والآن، أوقف سيارتك واخرج منها...

ادفع سيارتك إلى خارج الغرفة...

اللعبة الأولى - الجزء الثاني
بطاقة نشاط (٢-١)

← والآن، هل أنت مستعد لعمل شيء آخر؟...

خذ صندوقا كرتونيا آخر واصنع منه بيتا للقطعة...

ضع القطعة في بيتها...

ليكن لون القطعة بنيا وشعرها طويلا...

أطلق اسما على القطعة...

نادي القطعة باسمها واجعلها تموء ثلاث مرات...

دلل القطعة وقل لها: إنها قطعة لطيفة...

قدم لها بعض الطعام وقل لها: "باي باي"...

اللعبة الأولى - الجزء الثالث
بطاقة نشاط (٣-١)

← والآن احضر كرتوننا طويلا وعريضا ثم اصنع منه ثلاجة...

اصنع للثلاجة بابا بمفصلات...

افتح الباب...

هل أضاء النور؟...

ضع بعض الأرفف للثلاجة...

ضع أنواعا مختلفة من الخضار على الرف...

انظر إلى الطعام الموجود في الثلاجة وحدد ماذا ستأكل على الغداء...

اللعبة الأولى - الجزء الرابع
بطاقة نشاط (٤-١)

اقفل الباب وارجع مرة أخرى عندما تكون جاهزا لإعداد الغداء...

احضر صندوقا كرتونيا آخر وسنصنع منه مركبة فضاء...

اصنع باب ونوافذ للمركبة...

ادخل إلى مركبتك وأغلق الباب...

احضر كرتوننا صغيرا واصنع منه لوحة تحكم بها مفاتيح وكبسات تضيء...

اجلس في مقعدك ثم اربط حزام الأمان...

هل أنت مستعد للانطلاق؟...

استخدم لوحة التحكم ثم اضغط على الزر الذي يشغل المركبة...

ابدأ بالعد التنازلي ١٠ - ٩ - ٨ - ٧ - ٦ - ٥ - ٤ - ٣ - ٢ - ١ - ٠...

تشغيل... انطلاق...

انظر من النافذة...

هل أصبحت الأرض صغيرة؟...

فك الحزام ثم تجول في غرفة القيادة...

در بالمركبة حول القمر...

خذ دورة أخرى حول القمر ثم عد إلى الأرض...

ابدأ في تخفيف السرعة للهبوط...

اهبط بالمركبة على سطح الأرض...

اخرج من المركبة ثم تفقدها...

هل تشعر بالمتعة في العودة إلى الأرض؟...

بطاقة نشاط (٥-١)
العبة الأولى - الجزء الخامس

بطاقة نشاط (٥-١)
العبة الأولى - تابع الجزء الخامس

عزيزي المدرب:

يمكن أن تختتم اللقاء التدريبي بأن تقول: والآن ما رأيكم؟ يمكننا عمل كل الأشياء

باستخدام صندوق الكرتون ... إذا استخدمنا خيالنا..

بطاقة نشاط (١ - ١)



عزيزي المتدرب :

لقد أتيح لك المجال في هذا الجزء من اللعبة، أن تتخيل صندوقاً من الكرتون، وتكبره، وتغير لونه. كما أتيح لك أن تضع في هذا الصندوق الكثير من الأشياء حتى امتلاً، ثم قمت بوضعها فوقه حتى ارتفعت إلى الأعلى، وفجأة جعلت كل شيء داخل وفوق صندوق الكرتون يختفي. والآن أكتب في المساحة المتاحة لك أسماء جميع الأشياء التي قمت بوضعها داخل أو فوق الصندوق.



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ملاحظات المدرب:

اللعبة الأولى:

بطاقة نشاط (٢ - ١)

عزيزي المتدرب:

لقد أتيت لك المجال في هذا الجزء من اللعبة، أن تطور صندوق الكرتون لكي يكون سيارة حمراء، كما أتيت لك أن تتجول في هذه السيارة داخل الغرفة. في المرات القادمة ستقود سيارتك الحمراء في أماكن متنوعة ومختلفة، حاول أن تفكر في جميع تلك الأماكن التي ستذهب إليها، ثم قم بذكرها في المساحة التالية:



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ملاحظات المدرب:

اللعبة الأولى:

بطاقة نشاط (٣-١)



عزيزي المتدرب:

لقد أتيتك لك المجال في هذا الجزء من اللعبة، أن تستخدم صندوق الكرتون في شيء آخر، لأنك صنعت منه بيتا للقطعة، كما أنك حظيت بفرصة تسميتها وتديلها. والآن في المساحة المتاحة لك حاول أن تفكر ثم ترسم صورة تعبر من خلالها عن هذه القطعة، وضع أسفل هذه المساحة عنوانا أو اسما لها، حاول أن تكون الرسمة والاسم جديدين ولم يخطرا في بال أي من زملائك.



الاسم:

ملاحظات المدرب:

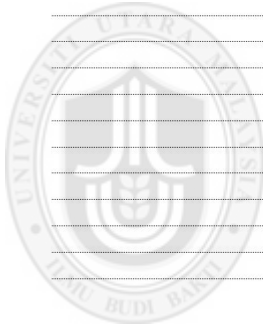
اللعبة الأولى:

بطاقة نشاط (٤ - ١)



عزيزي المتدرب:

لقد أتيتك لك المجال في هذا الجزء من اللعبة، أن تجعل صندوق الكرتون
ثلاجة لها باب، وبعض الأرفف، وبداخلها الكثير من الأشياء. والآن فكر في
الإضافات والتحسينات التي يمكن أن تجريها على الثلاجة لكي تكون أفضل.



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ملاحظات المدرب:

للعبة الأولى:

بطاقة نشاط (٥-١)



عزيزي المتدرب:

لقد أتيتك لك المجال في هذا الجزء من اللعبة، أن تصنع من صندوق الكرتون مركبة فضاء، كما أنك قد حظيت برحلة فريدة حول القمر. والآن فكر في أكبر عدد من الأشياء التي يمكن أن تصنعها باستخدام صندوق الكرتون.



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ملاحظات المدرب:

Appendix D

Description Of The CoRT Lesson*

CoRT-1: BREADTH

Lessons 1-10

Often, we take too narrow a view when we think, we tend to judge rather than explore. The purpose of this group of lessons is to encourage students to broaden their thinking, so that in any thinking situation they can see beyond the obvious, immediate and egocentric.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (1) PMI (Plus, Minus, Interesting)	PMI (Plus, Minus, Interesting) or how to treat an idea help students to deliberate examination of an idea for good (Plus), bad (Minus) or interesting possibilities instead of immediate acceptance or rejection
Lesson (2) CAF (Consider All Factors)	CAF (Consider All Factors) or the factors involved help students to think more effectively about a situation by looking as widely as possible at all the factors involved in that situation before coming up with an idea. Otherwise, students tend to think only about the first factors that come to mind.
Lesson (3) RULES	RULES. The purpose of this lesson is to summarises the first two lessons and gives students the opportunity to practice PMI and CAF. CAF is used when making a rule while PMI is used on an existing or proposed rule.
Lesson (4) C & S (Consequence and Sequel)	C & S (Consequence and Sequel) or focus on the consequences. Any action has either an immediate, short, medium or long term consequence. In some circumstances, action has all these consequences. A thinker needs to be aware of these possibilities. The purpose of this lesson is to help students to forecast the possible consequences of a decision or action over time.

Lesson (5) AGO (Aims, Goals, Objectives)	AGO (Aims, Goals, Objectives) or focus on purpose. The intention of this lesson is to teach students the value of picking out and defining objectives. It explains how students should be clear about their own aims and understanding those of others. It is also help students to focus attention directly and deliberately on the intention behind actions. Both aspects “because” and “in order to”- are explored.
Lesson (6) PLANNING	PLANNING. There are basic features and processes involved in planning and this is the second practice lesson providing an opportunity for student to practice C&S and AGO, and to a lesser extent PMI and CAF.
Lesson (7) FIP (First Important Priorities)	FIP (First Important Priorities) or focus priorities. The intention of this lesson is to teach students choose from a number of different possibilities and alternatives and to put priorities in order. Priorities need to be put into order before effective thinking can take place. FIP is a focusing tool where students are required to pick out the most important ideas, factors, objectives or consequences. This tool should be applied in order to trim a list of ideas which have been generated using previous skills.
Lesson (8) APC (Alternatives, Possibilities, Choices)	APC (Alternatives, Possibilities, Choices) or focus on alternatives. A generative thinker or action thinker is always interested in generating new alternatives and finding new possibilities. The purpose of this lesson is to help students to generate new alternatives and choices, instead of feeling confined to the obvious ones. APC is a focusing tool where students are required to focus attention on exploring all the alternatives or choices beyond the obvious and satisfactory ones. It is used as an antidote to emotional reaction or rigid thinking.
Lesson (9) DECISIONS	DECISIONS. Because De Bono thinking is about making decisions in which different operations involved, this lesson provides students the opportunity to bring together the use of the principles and skills already.
Lesson (10) OPV (Other People’s Views)	OPV (Other People’s Views) or the other people involved. A useful thinking skill is to move away from one's own viewpoint and consider the points of view of others. This lesson encourages students to move out of there's own viewpoint to consider the points of view of all others involved in any situation by asking "Why does that person have that point of view?" OPV provides an antidote to selfishness.

CoRT- 2: ORGANIZATION

Lessons 11-20

The purpose of this group of lessons is to teach students some basic thinking operations and their organisation for use. The first five lessons, 11-15, deal with the five traditional operations. Each of these is given deliberate attention so that you can organise them with confidence, and skill. The next five lessons, 16-20, deal with the overall organisation of thinking so that thinking can be both organised and productive.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (11) RECOGNISE	RECOGNISE. Every situation is different and we need to make a deliberate effort each time we encounter a new situation to identify its characteristics in order to be able to think about it more effectively. This lesson encourages students to make a deliberate effort to identify a situation.
Lesson (12) ANALYSE	ANALYSE. Often, a situation has a number of parts, each of which is important to identify before thinking effectively. The purpose of this lesson is to teach student to deliberately divide up a situation in order to think about it more effectively.
Lesson (13) COMPARE	COMPARE. An excellent thinking skill is to use comparison in order to understand a situation. This is sometimes called "going from the known to the unknown". This lesson asks students to examine points of similarity and points of difference in a situation.
Lesson (14) SELECT	SELECT. We need to learn how to select from among a collection of different possibilities. Sometimes this is difficult and time-consuming. This lesson teaches students that they need to make a deliberate effort to find something that fits their thinking requirements.
Lesson (15) FOW (Find Other Ways)	FOW (Find Other Ways). Looking for alternatives is the basis of lateral thinking, generative thinking and action thinking. The emphasis in this lesson is to help students on making a deliberate effort to find alternative ways of looking at things.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (16) START	START. Everything has a beginning. Sometimes, making a move in the right direction is a problem. The purpose of this lesson is to help students to learn that the practical business of starting is to think and ask what the first thing to do is.
Lesson (17) ORGANISE	ORGANISE. When we think about a situation, we need to design a strategy. The purpose of this lesson is to teach student the practical business of organising the way a situation is to be tackled.
Lesson (18) FOCUS	FOCUS. Looking at different aspects of a situation, especially being clear as to what aspect is under consideration at the moment is an important thinking skill. This lesson teaches students that there may be a number of different aspects to a situation but they need to be clear about what aspect is being considered at the time.
Lesson (19) CONSOLIDATE	CONSOLIDATE. When thinking about any situation, we need to ask, "What has been achieved so far?" This lesson encourages students to be clear about what has been done and what has been left out.
Lesson (20) CONCLUDE	CONCLUDE. On most occasions, we need to be able to design a conclusion even if we conclude that a conclusion is not possible. This lesson encourages students to make a definite conclusion; even if that declares that no definite conclusion is possible.

CoRT- 3: INTERACTION

Lessons 21-30

The purpose of this group of lessons is to deal with two-people situations. The thinker is no longer looking directly at the subject matter but at someone else's thinking. This is the area of argument, debate, conflict, and opinion. The lessons look at ways of assessing evidence. They look at different ways to prove a point. The aim of this group of lessons is to encourage students to listen to what is being said and to assess its value. They are also encouraged to adopt a constructive approach to resolving arguments. Winning an argument for the sake of winning an argument is not especially worthwhile. The emphasis here is not on point scoring, proving somebody wrong or winning debates. The emphasis is on bringing forth something useful from the argument or the negotiation.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (21) EBS (Examine Both Sides)	EBS (Examine Both Sides). Examining both sides of an argument instead of blindly supporting one side is an important thinking skill. Just as OPV encouraged students to look at the viewpoint of others, EBS asks students to examine both sides of an argument, theirs side and the sides of those with other points of view.
Lesson (22) EVIDENCE: TYPE	EVIDENCE: TYPE. Many arguments are a mixture of fact and opinion. This lesson teaches students to look carefully at the type of evidence being promoted in an argument and distinguish between fact and opinion.
Lesson (23) EVIDENCE: VALUE	EVIDENCE: VALUE. Not all evidence promoted in an argument is good evidence. Some evidence has high value. Some evidence has little value. This lesson teaches students to assess the value of evidence.
Lesson (24) EVIDENCE: STRUCTURE	EVIDENCE: STRUCTURE. This lesson encourages students to use the following structure to exam evidences. Does this evidence stand on its own? Is it dependent on other evidence which in turn depends on something else? What would happen if this evidence is questionable?

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (25) ADI (Agreement, Disagreement, Irrelevance)	ADI (Agreement, Disagreement, Irrelevance). This lesson encourages students to use ADI when analysing an argument or situation in order to increase areas of agreement and reduce areas of disagreement.
Lesson (26) BEING RIGHT 1	BEING RIGHT 1. This lesson encourages students to consider two of the main ways of being right: (1) Examining the idea itself, its implications and potential effects. (2) Referring to facts, authority, feelings.
Lesson (27) BEING RIGHT 2	BEING RIGHT 2. This lesson encourages students to consider the other two ways of being right: (1) Use of names, labels, classifications. (2) Judgment, including the use of value words.
Lesson (28) BEING WRONG 1	BEING WRONG 1. This lesson encourages students to consider two of the main ways of being wrong: (1) Exaggeration - false generalizations, taking things to extremes. (2) Basing conclusions on only part of the situation.
Lesson (29) BEING WRONG 2	BEING WRONG 2. This lesson encourages students to consider the other two ways of being wrong: (1) Making a genuine mistake. (2) Being prejudiced.
Lesson (30) OUTCOME	OUTCOME. This lesson encourages students to make a conscious and deliberate effort to assess what has been achieved from an argument.

CoRT- 4: CREATIVITY

Lessons 31-40

It is quite wrong to suggest that creative ideas come only from inspiration. This group of lessons covers the basic creative techniques, procedures and attitudes. Creativity is always fun and highly motivating to the people involved. This sense of fun should be kept throughout CoRT-4, but at the same time creativity is a serious matter.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (31) YES, NO AND PO	YES, NO AND PO. While YES and NO are judgements made within the channels of personal experience, PO is offered as a provocation or creative stimulus in order to start up new ideas or new ways of looking at things. This lesson encourages students to use PO as a device for showing that an idea is being used creatively without any judgment or immediate evaluation.
Lesson (32) STEPPING STONE	STEPPING STONE. Stepping Stone is a method for getting out of existing ways of thinking by using deliberately provocative statements as “stepping stones” to new insights. One idea can lead to another and once new ideas are generated the stepping stone can be forgotten. This lesson teaches students that they can use ideas, not for their own sake but because of other ideas they might lead to.
Lesson (33) PANDOM INPUT	PANDOM INPUT. The random input technique involves a deliberate association with something that is unconnected to the situation so that new ideas might be triggered. This lesson teaches students that the process of generating new ideas sometimes needs to include the input of unrelated spurious ideas into the situation.
Lesson (34) CONCEPT CHALLENGE	CONCEPT CHALLENGE. Just because something has "worked" for ages does not mean it should be taken for granted. This lesson teaches students that testing of the "uniqueness" of concepts may lead to other ways of doing things.
Lesson (35) DOMINANT IDEA	DOMINANT IDEA. In most situations there is a dominant idea. In order to be creative, to find other ways and to generate new ideas one must find the dominant idea and escape from it. The aim of this lesson is to help students to recognize the idea which dominate a situation and escape from it.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (36) DEFINE THE PROBLEM	DEFINE THE PROBLEM. When thinking about anything, we need to ask, "What is the problem?" An effort to define a problem exactly may make it easier to solve. This lesson encourages students to strive towards a more exact definition of problems throughout the lesson. Multiple definitions are first generated to allow one to define the problem more precisely.
Lesson (37) REMOVE FAULTS	REMOVE FAULTS. When thinking, we need to recognise faults and remove them. This lesson encourages students to ask the following questions: What is a fault? Why is it a fault? to recognise faults and remove them from an idea.
Lesson (38) COMBINATION	COMBINATION. When thinking creatively, combining the parts of apparently unrelated items may be a valuable technique. This lesson teaches students that by examining the attributes of seemingly unrelated items new items may be created either by fusion or by combination.
Lesson (39) REQUIREMENTS	REQUIREMENTS. An awareness of requirements may influence the creation of ideas. This lesson teaches students that knowing what is required in a particular situation may influence the way ideas are generated.
Lesson (40) EVALUATION	EVALUATION. This lesson encourages students to ask the following questions: Does an idea fulfill the requirements and what are its advantages and disadvantages could there be if the idea is applied?

CoRT- 5: INFORMATION AND FEELING

Lessons 41-50

Information and feeling underlie all thinking thinking depends on information and is strongly influenced by feeling. The purpose of this group of lessons is to deal with information processes such as questions, clues, guessing, belief, ready-made opinions and the misuses of information. It also deals with emotions and values. The aim of CoRT-5 is to encourage a definite awareness of these influences - not necessarily to change them. The students are also trained to recognise what information they have, what they still require and how to use information. The techniques used in each lesson are designed to develop detachment and observation.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (41) INFORMATION	INFORMATION. We need to ask, "What information do we have and what information do we need?" When we have sufficient quality information, our thinking can be more effective. This lesson encourages students to be aware of analysis of information and appraisal of its completeness. And to ask what desirable information is missing?
Lesson (42) QUESTIONS	QUESTIONS. Asking questions skilfully is a way of giving purpose and direction to thinking. This lesson teaches students the purpose and direction of questions and how to opening-up questions and closing-down questions.
Lesson (43) CLUES	CLUES. Sometimes, we gather clues that help our thinking processes. From clues, we can deduce and imply. Clues help us assemble better ideas. This lesson encourages students to use clues by putting things together to maximum extrapolation of given information.
Lesson (44) CONTRADICTION	CONTRADICTION. In the search for good information, we are sometimes at risk of making false jumps, false conclusions and incorrect uses of that information. This lesson encourages students to be aware of false jumps, false conclusions and other incorrect uses of information.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (45) GUESSING	GUESSING. Sometimes, we cannot obtain sufficient information and we have to guess. On most occasions, information is incomplete. Guesses can be good or bad. This lesson teaches students the use of guessing when information is incomplete. Good guesses and bad guesses.
Lesson (46) BELIEF	BELIEF. Sometimes we may hold our beliefs until they are challenged and proved to be wrong. At other times we may continue to insist that our belief is right even though all the evidence indicates that it must be wrong. This lesson encourages students to be aware of the origin of their beliefs. Where do their beliefs come from? Why do they hold them? Why do they believe something to be true? No attempt is made to show that one type of belief is more valid than another. It is enough that a person should be aware of the origin of a belief.
Lesson (47) READY-MADES	READY-MADES. When thinking, we can sometimes use substitutes for effective thinking (e. g. stereotypes, prejudices, and standard opinions). This lesson encourages students to be aware of the commonly accepted opinions and the like.
Lesson (48) EMOTIONS AND EGO	EMOTIONS AND EGO. Emotions are always involved in thinking. Emotions and ego colour our thinking. Usual emotions and ego-emotions (having to be right, trying to be funny, face-saving, etc.) restrict effective thinking. This lesson encourages students to be aware of the way emotions are involved in thinking.
Lesson (49) VALUES	VALUES. Values are firmly-held opinions or beliefs. Values are difficult to change. Values determine thinking and the acceptability of the result. When thinking, we should be wary of our own values and the values of others. This lesson encourages students to be aware of the way values determine thinking and acceptability of the result. Appreciation of the values involved rather than trying to change them.
Lesson (50) SIMPLIFICATION AND CLARIFICATION	SIMPLIFICATION AND CLARIFICATION. Often, the skill of simplification improves our thinking skills. This lesson encourages students to ask the following questions: What is the thinking about? What does it boil down to? What is the real situation?

CoRT- 6: ACTION

Lessons 51-60

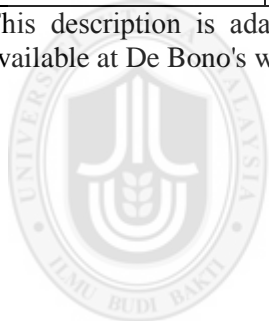
The "action" in the title of this group of lessons suggests that the purpose of the thinking is to end up with some action. In this set of ten lessons the structure takes the form of a framework. The purpose of the framework is to divide the total thinking process into definite stages, each of which can be tackled in turn. At each stage in the overall framework there is a definite thinking task to be carried out and a definite aim for the thinking. This simplifies thinking by removing the complexity and confusion. Without a framework everything tends to crowd in at once on the thinker, who tends to be overwhelmed by all the aspects of the situation. The result is that the thinker takes the easiest way out and uses a slogan, cliché or prejudice instead of thinking. The stages suggested in the framework are very simple and straightforward. At each stage the thinker concentrates on carrying out the task defined by that stage.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (51) TARGET	TARGET. This is the first step in thinking. We need to direct attention to the specific matter that is the subject of the thinking. It is important that we pick out the 'thinking target' in a definite and focused manner. This lesson teaches students to direct attention to the specific matter that is to be the subject of the thinking and to learn the importance of picking out the "thinking target" in as definite and focused a manner as possible.
Lesson (52) EXPAND	EXPAND. Having picked out the target the next step is to expand upon it: in depth, in breadth, in seeking alternatives. This is the opening-up phase of thinking, therefore, in this lesson students encouraged to "Say as much as they can about...".
Lesson (53) CONTRACT	CONTRACT. This lesson teaches students the third step which is to narrow down the expended thinking to something more tangible and more usable: main points, a summary, a conclusion, a choice or selection.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (54) TEC (Target- Expand- Contract)	TEC (Target-Expand-Contract). The use of the thinking tools in Lessons 51-53 is the basis for this sequence. Therefore, in this lesson students encouraged to practice the use of defining the target, exploring the subject and narrowing down to a usable outcome.
Lesson (55) PURPOSE	PURPOSE. We must be clear about the exact purpose of our thinking. This lesson summarises the general purpose of thinking and the need for a specific objective. It also reinforces what was learned in the AGO lesson from CoRT-1. Students are encouraged not to lose sight of the final objective in projects by reference to two questions: “What is the purpose of this thinking?” and “With what do I want to end up: a decision, a problem solution, an action plan or an opinion?”
Lesson (56) INPUT	INPUT. This lesson revisits the situation, the scene, the setting, the information available, the factors and people to be considered. The lesson reviews the total input that goes into the thinking being done. Therefore, in this lesson students learn to appreciate the need to avoid leaving out important input by reference to two questions: “What is the input?” and “What sources of input are available to me?”
Lesson (57) SOLUTIONS	SOLUTIONS. This lesson looks at alternative solutions including the most obvious, the traditional and the new. It also introduces a range of techniques for generating solutions and filling gaps. This lesson encourages students to generate at least three solutions to various problems with reference to two questions: “What is the solution here” and “What alternative solutions are there?”
Lesson (58) CHOICE	CHOICE. Once several possible solutions to a problem have been generated the Choice lesson from the PISCO procedure focuses attention on the “best” solution. A range of choice procedures are introduced leading to the best solution for an identified purpose-further linking each of the PISCO components. This lesson teaches students the decision process, choosing between the alternative solutions, priorities and the criteria for choice, and reconsider consequences and review of decisions made.

<i>The CoRT Lessons</i>	<i>Achievement Objective</i>
Lesson (59) OPERATION	OPERATION. This lesson is about implementation, carrying through the results of thinking. It also considers ways of setting up specific action steps that will help bring about the desired result. In this lesson which put the thinking into effect and the last lesson of the PISCO procedure students use at least four operating steps to implement their preferred solution for a particular purpose. The emphasis is on establishing a specific action plan.
Lesson (60) TEC-PISCO (Target, Expand, Contract - Purpose, Input, Solutions, Choice, Operation)	TEC-PISCO (Target, Expand, Contract - Purpose, Input, Solutions, Choice, Operation). This lesson presents a consolidation of the total TEC-PISCO framework in which the first three tools (TEC) are used to define and elaborate each of the five stages of the PISCO procedure. These five stages are the final component of "action thinking", the summary of the CoRT thinking lessons. This lesson encourages students to use the whole PISCO sequence.

* This description is adapted from De Bono's CoRT thinking lessons (1998) and also available at De Bono's website: [http://www.edwardDe Bono.com/Default.php](http://www.edwardDeBono.com/Default.php).



Appendix E

The CoRT (1) And CoRT (4) In Arabic

فيما يلي بعض المقترحات العامة لتدريس الكورت، وأنت أعلم بتلاميذك من مؤلف هذا الكتاب، وتعرف أسلوب التدريس الأفضل بالنسبة لك. والمعلومات المذكورة فيما يلي القصد منها لفت انتباهك للصعوبات التي قد تواجهها ونقترح عليك الحلول الناجحة.

تركيز الدرس:

تذكر أثناء تدريس الكورت شيئاً هاماً: ان الهدف من الدرس هو تنمية المهارة في استخدام أداة التفكير، ولذا عليك دوماً أن تولي التركيز في الدرس على مهارة التفكير الخاصة بالدرس. وغالباً ما تؤدي دروس الكورت لنقاشات غنية، وقد تظهر العديد من القدرات التعليمية. قمت بتسجيلها وعد إليها لاحقاً، ولا تفقد التركيز على الدرس في سبيل مناقشة مطوّلة فبعض الأحيان قد تحتاج إلى تذكير التلاميذ بالتركيز على استخدام أدوات التفكير بدلاً من مضمون الفقرات التدريبية.

عمل جماعي:

يُعد العمل الجماعي أساسياً في دروس الكورت لأسباب عديدة، فإذا عمل التلاميذ كأفراد قد يميل التلميذ الأذكي للإجابة على كل الأسئلة وقد يفقد صبره ان لم يفعل ذلك، وقد لا يفعل باقي التلاميذ ذلك ولا يدخلون في النقاش، وربما يعود ذلك لكونهم لطفاء أو لأنهم لا يفهمون بشكل قاطع عملية التفكير التي هم بصددتها. ان التعلم التنافسي القائم على الذكاء والذي يميز دروس الكورت قد يمنح التلاميذ قدراً كبيراً من الثقة بالنفس، والذين قد يأنفون عن المشاركة بدونه. ولأن الإجابة لا تكون بالصح أو الخطأ فان جميع تلاميذ الصف يدخلون تجربة تمنحهم الرضى عن إجاباتهم إلى أن يرضى بها المعلم وزملاؤه كإجابات تستحق النظر.

حجم المجموعات:

تحتوي المجموعة في معظم الحالات على 4-6 تلاميذ بقدرات متنوعة ومع ذلك فان حجم المجموعة يعتمد بشكل كبير على طبيعة الصف. على سبيل المثال نرى أن مجموعة علاجية تحتوي على 9 تلاميذ قد تعمل بالشكل الأحسن كمجموعة واحدة مع المعلم، وقد يعمل التلاميذ ذوي الانجاز المرتفع في مجموعات صغيرة تسمح بإلقاء الضوء على أفكارهم الفردية، وعموماً كلما كانت قدرة التلاميذ أعلى كلما تطلب ذلك حجماً أصغر للمجموعة.

الناطق الرسمي:

يجب أن يعين المعلم لكل مجموعة ناطقاً رسمياً قبل الشروع في فقرات التدريب ويقوم الناطق الرسمي بتسجيل ما يدلي به أفراد المجموعة بأسلوب غير رسمي، ويقرأها في الصف، وتسجيل الملاحظات لا يتطلب كتابة جملة تامة، والمشاكل الإملائية والنحوية لا ينبغي أن تكون عائقاً لمشاركة فعالة من التلاميذ.

ودور الناطق الرسمي موجود ببساطة لراحة المجموعة، ولا ينبغي أن تُهمش مشاركة الأفراد ولا أن يترك انطباعات المجموعات يتوجب عليها الوصول للمطلوب في أي فقرة للتدريب. ويمكن إعادة تعيين من يحمل هذا الدور من آخر ومع ذلك يجب مراعاة ما يلي:

➤ بداية ربما يكون من الأفضل إيكال المهمة لتلميذ قادر على تسجيل الأفكار بسرعة.

➤ ليس من المجدي إرغام طالب متردد على تولي المهمة.

في بعض الأحيان قد ترغب بتزويد التلاميذ بدليل لتسجيلاتهم، مثال ذلك في درس معالجة الأفكار PMI (كورت 1، درس 1) تكون فكرة جيدة من قبل المعلم استخدام ثلاثة أعمدة واحد للنقاط الإيجابية PLUS وواحدة للنقاط السلبية MINUS، وواحد للنقاط المثيرة والممتعة INTERESTING

التوقيت:

يجب أن تكون فترة الدرس سريعة لتمكن التلاميذ من تلقي دفع مميز لاستثمار الوقت، وأثناء أداء التغذية الراجعة -على سبيل المثال- يكون من المهم أن يكون للتلاميذ الحرية فيما يريدون قوله؛ ومع ذلك يكون من المهم أيضاً أن يروا المهارات الأساسية التي يمكن استخدامها بسرعة وفاعلية.

ارجع إلى نموذج تسلسل الدرس من هذا البرنامج وذلك لمزيد من الإرشاد حول التوقيت الخاص بالدروس، ويمكنك أن تأخذ بعين الاعتبار استخدام تقنيات فاعلة لجذب انتباه التلاميذ أو لإنهاء نقاش المجموعة، وربما يكون ذلك برفع اليد أو قرع الجرس أو التصفيق أو إطفاء وإشعال الضوء.

فقرات التدريب:

تم اختيار فقرات التدريب التي تناسب الصف، ويمكنك أن تختار الفقرات المقترحة المذكورة في كل درس أو يمكنك إن أردت ابتداء فقرات من عندك. ويجب أن تراعي عدم اختيار فقرات ذات طابع عاطفي جدا أو ما قد يشتت التلاميذ ويجعلهم يضيعون في تفاصيل المسألة ويفقدون اتصالهم بعملية التفكير. أيضاً عليك أن تختار فقرات متنوعة المواضيع وواقعية وغير أكاديمية (وفي كل درس هناك فقرات ومقترحات تحمل هذه المؤهلات).

التغذية الراجعة:

قم بحث التلاميذ لإصغاء السمع أثناء جلسات التغذية الراجعة. بداية قد لا يكون التلاميذ مصغيين لأفكار بعضهم على الدوام خصوصاً إذا تم التعبير عن الأفكار بهدوء أو بشيء من الغموض، وفي هذه الحالة على المعلم أن يُلخص أو يعيد الإجابات قبل الانتقال إلى الفكرة التالية، وإذا استمر الشعور بعدم الارتياح بين المجموعات حاول تعديل الموقف بشكل تقريبي وببساطة تنقل في الصف وقف بالقرب من المجموعات المختلفة. لا توافق على جعل النشاط يميل إلى التفاهة من قبل التلاميذ، ورغم أن روح الدعابة ستكون منتشرة خلال الدروس إلا أنهم يجب أن يفهموا حدود ذلك. ويجب الحث على الإجابات غير العادية والإبداعية إذ يهيء الكورت الفرصة للخروج عن المألوف مع العلم أن الإجابات الهزلية قد تكون مزعجة إذا سئمت لها الفرصة.

استجلاب التغذية الراجعة:

هناك وسائل متنوعة لاستجلاب التغذية الراجعة وتتضمن ما يلي:

- تطلب من احدى المجموعات تقديم قائمة كاملة بالأفكار في الصف، وتطلب من المجموعات الأخرى تقديم الأفكار التي لم يتم التطرق إليها.
- اطلب فكرة واحدة من كل مجموعة من المجموعات.
- حاول التنويع في تقنياتك لتنمية مشاركة التلميذ، وعليك أن تحافظ على التوازن بين الانجاز في أسرع وقت ممكن وامكانية سماع التلاميذ وتقييم مشاركتهم.

ملاحظة:

التعلم المتسم بروح التعاون يعد أساسياً لتنفيذ هذا المنهاج.

الكورت عبارة عن هيكل بسيط لمهارات التفكير الأساسية التي يمكن استخدامها لدعم أي مادة أو منهاج أكاديمي ولإيضاح مرونة البرنامج وتوفير أمثلة على كيفية استخدام أدوات الكورت لدعم أنشطة الصف نبين فيما يلي نماذج لفقرات التدريب الموجودة في دروس الكورت.

ملاحظة: انظر ملاحظات المعلم لمزيد من التفاصيل والتي تشرح كل أداة تفكير وطريقة تطبيقها على المادة.

فنون اللغة:

ان شخصية بطل الكارتون يقوم بعمل جيد عبر الأخطاء التي ترتكبها، فهو يشرع بعرض انانيته، ولكن عن طريق الخطأ فان هذه الانانية تعود بالخير. قم بابتداء فصل كارتوني ينتهي بأن يحصل كل من في الشارع على علبه شكولاتة مجانية. (انظر وحدة ٤).

دراسات اجتماعية:

تم اختراع رجل آلي جديد ليحل محل العمل الانساني في المصانع، وتم اعلان ذلك الاختراع. قم بتطبيق أداة النتائج المنطقية وما يتبعها حول ذلك الموضوع. (انظر وحدة ١).

رياضيات:

يتعلم التلاميذ أن يسألوا: "هل ثمة وسائل أخرى بالنظر لتلك المسألة؟" مثال: ٢x٨، ٤x٤، ٢32/ تعد بدائل للرقم 16 (انظر وحدة ٢).

علوم:

يحاول أحد العلماء ايجاد الكيفية التي يجد فيها طائر البطريق طريق العودة لأفرانه. ما هي الخطوات العملية التي يجب وضعها لبحث ذلك الموضوع؟

يمكنك إن أردت تعديل دروس الكورت لتتناسب مع صفك بوسائل متعددة:

- ابدأ الدروس بقصص وأمثلة مرسومة تمثل الأحداث والمواقف التي تجذب انتباه التلميذ، فقرات جديدة واحداث في الوسط الذي تعيش فيه وأحداث رياضية ووظائف مدرسية
- يمكنك ابتداء فقرات تدريبية ومشاريع توكل بها للتلاميذ.

استخدام وحدات الكورت:

تم تصميم مواد تعليم الكورت لتكون متجددة، فكورت (1) "توسعة مجال الإدراك Breadth" يتم تدريسه في البداية، ويمكن بعد ذلك تنفيذ ما تبقى من الوحدات على مدار ٢ أو ٣ سنوات بأساليب متنوعة. يمكن للمعلمين أن يقرروا بعد تدريس الكورت (1) أن يدرسوا ٢ أو ٣ وحدات إضافية في السنة. وهذا بالنسبة لمعلمي الصفوف المتميزة والتي تم تكوينها خصيصاً من أجل درس الكورت. أما معلمي الشعب الدراسية فيمكن بعد تدريس كورت (1) اختيار وحدة أو اثنتين مما يشعرون أنها تدعم مواد الدرس.

مثال ذلك:

1. يستطيع معلمو اللغة اتباع المنهج المتمثل بتدريب كورت ١ مع ٢ وكورت 4.
 2. معلمو الدراسات الاجتماعية قد ينبعون المنهج المتمثل بتدريب كورت ١ مع كورت ٣ وكورت 5.
 3. معلمو العلوم والرياضيات: كورت ١ مع كورت ٢ وللطلبة المتقدمين يمكنهم إضافة كورت 6.
 4. معلمو الكتابة الإبداعية والطلبة الموهوبين: كورت ١ مع ٤ و6.
- يمكن تدريس الكورت لطلبة المرحلة المتوسطة والثانوية على مدى فصل أو عام ويمكن أن يدخل الكورت كملحق ضمن العمل المنزلي وذلك حتى تسنح الفرصة والوقت لدراسة المهارات ونشاط التوجيه، وفي الكليات المتوسطة قد يتضمن الفصل أو الكورس الأساسي برنامج الكورت الشامل (١-٦) أو كورت (١) ووحدات أخرى يختارها المعلم.

تحديد شكل الدرس

يتطلب كل درس قرابة 35 دقيقة، ومع ذلك يستطيع المعلم تحديد ان كان الصف أو أسلوب التعليم يتطلب وقتاً أكثر. فعلى سبيل المثال: يمضي بعض المعلمين قرابة الساعة في شرح الدرس الواحد، أو يقومون بتدريس درس واحد خلال فترتين متباعدتين وكل فترة تستغرق 35 دقيقة.

يجب أن تتضمن كل جلسة (بغض النظر عن الوقت) فقرتي تدريب على الأقل، ليفهم التلاميذ إمكانية تغيير أداة التفكير في مواقف مختلفة، والجلسات المحددة بـ35 دقيقة لا تستوعب أكثر من فقرتين، وفي الفقرات الأطول قد تسنح الفرصة لمزيد من التدريب والتغذية الراجعة. وينصح المعلمون بالتوفيق بين شكل الدرس والصفوف والأساليب المستخدمة في التدريس، ويقوم بعض المعلمين بتطوير فقرات تدريب مألوفة وبعضهم يستخدم وسائل إيضاح وأجهزة الفيديو كوسائل تساعد على تسهيل وممارسة أدوات التفكير وتوضيحها في تنوع شكل الدرس على المعلمين أن يتذكروا دوماً الآتي :

- أن يتضمن الدرس ما لا يقل عن فقرتين تدريبيتين.

➤ المحافظة على الضبط وتنشيط المحيط.

➤ تركيز الدرس على عملية التفكير بدلاً من مضمون المناقشة.

➤ جعل التلاميذ يحسون أنهم قادرون على الانجاز.

فيما يلي نموذج لدرس الكورت :

ارجع لملاحظات المعلم من وحدة ١-٦ لمزيد من المقترحات الخاصة بدروس الكورت الفردية.

ملاحظة: يُستحسن أن يتبع المعلمون الشكل التالي في صفوفهم:

خطوة 1: مثال ايضاحي (٥ دقائق تقريباً).

ابدأ الدرس بقصة أو مثال يوضح مهارة التفكير والتي هي موضوع الدرس.

خطوة 2: مدخل للأداة (٥ دقائق تقريباً).

اطرح الأداة أو موضوع الدرس وأشرح بشكل مبسط ودقيق المطلوب. يمكنك استخدام المدخل المبين

في بطاقات التلاميذ.

خطوة 3: تدريب جماعي (٣ دقائق تقريباً).

حدد فقرة تدريب وأطلب من المجموعات (من ٣-٥ طلاب) مناقشتها وتسجيل أفكارهم.

خطوة 4: تغذية راجعة (٤ دقائق تقريباً).

استجلب تعزيزاً من كل مجموعة وأبق ذلك قائماً ما دام هنالك العديد من الأفكار وخذ بعضاً منها من كل

مجموعة.

خطوة 5: تدريب جماعي (٣ دقائق تقريباً).

تنفذ المجموعات فقرة ثانية في التدريب.

خطوة 6: تغذية راجعة (٤ دقائق تقريباً).

اطلب من كل مجموعة تغذية راجعة مرة أخرى.

خطوة 7: مناقشة المبادئ (العملية) (٥ دقائق تقريباً).

كورت (1) توسعة مجال الإدراك

الأهداف السلوكية كورت (1)

➤ أن يشعر المتعلم بأهمية التفكير

➤ أن يتعرف المتعلم على برنامج كورت

➤ أن يتعرف المتعلم على موضوعات برنامج كورت 1

➤ أن يمارس المتعلم استراتيجيات التفكير

الدرس الأول : كيف تدبر درس معالجة الأفكار

كيف تدبر درس معالجة الأفكار (PMI)

(P= plus , M= minus , I= interesting)



معالجة الأفكار:

إن درس معالجة الأفكار (PMI) هو عبارة عن عملية تبلور لنظرة العقل المتفتح نحو الاداة التي يمكن استخدامها ، وهو درس أساسي جداً في البداية حتى تتمكن من استخدام عملية معالجة الأفكار (PMI) ذاتها كأداة في الدروس اللاحقة وبدلاً من التقرير في كونك تحب الفكرة أو لا تحبها فإن عملية التفكير هذه تجعلك تسعى لتجد النقاط الجيدة والنقاط السيئة والنقاط الملفتة للنظر (الهامة) عن الفكرة، وتعتبر النقاط الملفتة للنظر تلك النقاط التي ليست جيدة ولا رديئة، إلا أنها تستحق الملاحظة.

إن ردة الفعل الطبيعية لفكرة ما هي القبول أو الرفض، ومن الطبيعي ألا تفكر بسلبية الفكرة ان وجدتتها جيدة والعكس صحيح. وينطبق ذلك على النقاط المثيرة إذ لا ضرورة للنظر فيها إن كانت الفكرة جيدة أو سيئة يُعطى الاستخدام المتروكي لأداة معالجة الأفكار (PMI) التلاميذ الوسيلة في عبور ردة الفعل الانفعالية نحو فكرة ما، وتتغير أهدافهم من ردود فعل انفعالية الى المهارة في العملية التي تأخذ شكل الرسمية.

لا يقصد بدرس معالجة الأفكار (PMI) كبح قرار ما أو التسليم به، ولكن ما يقصد به هو أن الشخص يتخذ قراراً ما؛ بعدما ينظر الى جانبي المسألة وليستقبل ذلك بأي حال من الأحوال وتوسع أداة (PMI) النظرة الى اي موقف كان، وبدون استخدام هذه الأداة تكون ردة الفعل انفعالية وضيقة.

مثال: يجب ان تصنع الشبائيك من البلاستيك الشفاف بدلاً من الزجاج.

الجانب الايجابي: إذا انكسرت لا تشكل الخطورة التي يشكلها الزجاج. لا تنكسر بسهولة.

الجانب السلبي: يتأثر البلاستيك بإمكانية قشطه بسهولة أكثر من الزجاج. البلاستيك باهض الثمن قياساً بالزجاج.

الجانب المثير: ربما من المسلم به أن الزجاج هو الأحسن لأننا اعتدنا استخدامه. لكن يمكن ان تتلون الشبابيك ان كانت من البلاستيك.

التمارين:

تستخدم فقرات التمارين (١ و ٢ و ٣) الواحدة بعد الأخرى، ولكن قد يختار المعلم استبدال الفقرات من ٤- ٧ بأي من تلك الفقرات، وكالعادة يعمل التلاميذ في مجموعات.

تمرين (1):

تقوم كل مجموعة بمعالجة الأفكار (PMI) من ٣-٥ دقائق. ويتعين على كل مجموعة طرح النقاط الإيجابية، ويمكن ان يضيف إليها الآخرون من المجموعات الأخرى، ويتعين على مجموعة أخرى طرح النقاط السلبية، وأخيراً يطرح أفراد مجموعة أخرى النقاط المثيرة.

النقاط الإيجابية:

يكون من الأسهل رؤية السيارات الصفراء في الليل، أو في ساعات الضباب وبذلك تقل احتمالية وقوع الحوادث.

يفضل ان ينظر للسيارة على أنها وسيلة نقل، وليست رمزاً للمكانة الاجتماعية.

النقاط السلبية:

سيكون ذلك مملاً.

سيمر أصحاب مصانع واعلانات الأصباغ بأوقات عصيبة.

سيكون من الصعب على رجل الشرطة مطاردة سيارة معينة تم سرقتها.

النقاط المثيرة:

هل سيكون لون السيارة ذا فائدة للمالك أو للآخرين؟

هل تتغير قيادة السيارات بتغير ألوانها؟

تمرين (2)

تقوم هنا كل مجموعة بدرس معالجة الأفكار (PMI) كاملاً أيضاً، ولكن في هذه المرة يكون الهدف محاولة تخمين نقطتين إيجابيتين واثنتين سلبيتين، وفي النهاية تقدم مجموعة اقتراحاً واحداً إما بالإيجاب أو السلب أو ما هو مثير من النقاط وذلك عندما يخمن أفراد المجموعة، إحدى النقاط المستهدفة، والمذكورة فيما يلي، ويشير المعلم للنقاط المتبقية في حال عدم توفر المزيد من النقاط.

النقاط المستهدفة:

النقاط الإيجابية:

تستطيع تجنب الناس ذوي المزاج السيء.

يمكن ان يجتهد الناس في كبح مزاجهم السيء ان كان سيكون واضحاً.

النقاط السلبية:

قد لا يكون الناس صادقين في ارتداء الاشارات الصحيحة التي تدل على المزاج.

النقاط المثيرة:

يمكن أن ترى مزاج بعض الأشخاص في وجوههم.

هل يفضل الناس اظهار أمزجتهم أو اخفائها.

تمرين (3)

تقوم المجموعات الفردية بنقاط الـ(P) أي النقاط الإيجابية، نقاط الـ(M) أي النقاط السلبية، أو الـ(I) أي الجديرة بالاهتمام.

في كل حالة تستطيع المجموعات الأخرى اضافة نقاط أخرى كما ترغب تلك المجموعات.

العملية:

ارجع الى باب العملية في مجموعة بطاقة عمل التلميذ).

➤ فتح نقاشاً في الصف ودع التلاميذ يناقشون بصورة فردية أكثر منها جماعية.

➤ متى يكون درس معالجة الأفكار (PMI) أكثر فائدة؟

➤ هل ينظر الفرد دائماً إلى النقاط الإيجابية والنقاط السلبية لفكرة ما؟

➤ هل يضيع درس معالج الأفكار (PMI) الوقت؟

➤ هل يعتبر القيام بدرس معالجة الأفكار (PMI) سهلاً؟

يجب أن يدوم هذا النقاش حوالي (5 دقائق) قبل أن يتحرك الصف للقسم الثاني.

المبادئ:

تنظر مجموعات التلاميذ إلى قائمة المبادئ التي سجلها التلاميذ، ويطلب المعلم منهم اختيار المبدأ الذي

يروونه الهم

وقد يطلب منهم نقد المبادئ الأخرى، أو وضع المبادئ التي تخصهم.

المشروع:

في دروس الفترة الواحدة لن تسنح الفرصة لمثل هذا القسم. ان فقرات المشروع يمكن استخدامها كأفكار رئيسة لمقاله، وقد تُمنح للتلاميذ للعمل بها في مدارسهم، وفي الدروس المخصص لها وقتاً أطول، يمكن أن تعمل المجموعات في فقرة المشروع التي يختارونها أو يختارها المعلم لهم كما يبين ذلك نموذج الدرس المعمول به.



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كورت (4) الإبداع

الأهداف السلوكية كورت 4

- أن يتعرف المتعلم على أساليب التدريس الابداعية الملائمة
- ان يعرف المتعلم على موضوعات برنامج كورت 4
- ان يمارس المتعلم الطرق الابداعية في التفكير
- ان ينظر المتعلم الى الأشياء والأفكار بطريقة إبداعية

الدرس الأول : كيف تدبر درس نعم ولا وإبداع

الدرس الأول

نعم ولا وإبداعي (Yes, No, PO)

كيف تدبر درس نعم ولا وإبداعي



(PO): مفهوم جديد، وهو عبارة عن كلمة تستخدم للدلالة على أننا ننظر للفكرة بطريقة جديدة وتدل كذلك على ابتعادنا عن الطرق التقليدية المتبعة للنظر الى الأشياء والحكم عليها فيما إذا كانت صحيحة أو خاطئة، مفيدة أو غير مفيدة، مناسبة أو غير مناسبة.

إن الهدف من عملية الحكم على الأفكار (صحيحة، خاطئة) هو ابقائنا داخل مجال قنوات الخبرة الاعتيادية لنا، وكلما تحركنا بعيداً عن هذه القنوات التقليدية، فإن نظام الحكم الذي اعتدنا عليه يدفعنا بطريقة عفوية لكي نعود الى هذه القنوات التقليدية التي بدأنا منها تفكيرنا، وذلك من خلال تأكيد هذا النظام وتحذيره لنا بأننا قد خرجنا عن قنواتنا التقليدية المعتادة.

توضح كلمة "إبداعي (PO)" أن أي فكرة لا يتم النظر إليها على أنها صحيحة أو خاطئة، ولكن يتم النظر إليها بحس إبداعي، وذلك بهدف فتح طرق جديدة للنظر للأشياء، فالإبداع يسعى إلى اكتشاف قنوات جديدة، وفتح قنوات جديدة يكون مستحيلاً إذا بقي الفرد يصدر الأحكام طوال الوقت.

من الصحيح أن أي رأي أو فكرة يجري تناولها يتم الحكم عليها على أنها صحيحة أو مفيدة، لكن إذا تم استخدام الحكم في كل خطوة نخطوها، فإننا لن نصل إلى أي فكرة ابداعية أبداً.

إذا بدأ شخص برواية قصة مضحكة حول فيل فوق شجرة، فإنك تقاطعه لتخبره أن هذا الكلام غير صحيح. وهذا الشخص لا يستطيع اقناعك بأن هذه الفكرة أو القصة ممكنة. ولذلك تم تطوير أداة "ابداعي(PO)" لهذا الغرض، فهي طريقة لإيضاح أن الدعابة والخيال مطلوبة ومفيدة وذلك لتوليد الأفكار المبدعة.

الكلمة(PO) مشتقة من الشعر(Poetry) ، حيث الأفكار الغريبة يمكن أن توضع معاً من أجل تحقيق أثر ملموس، وكلمة(PO) مشتقة أيضاً من كلمة (Supposition) وكذلك من كلمة(Hypothesis)حيث توضع الأفكار غير المتفق عليها وذلك من أجل تفكير أعمق، وعليه فإن(PO)هي أداة وضعت لتوضح بأن بعض الأفكار يمكن أن يتم تناولها بعيداً عن نظام الحكم المعتاد.

يجب التركيز على أن(PO) لا تمثل عدم القدرة على إعطاء حكم على شيء ما، فلدينا تعبيرات مثل: "ممكن"، و"محتمل"، و"ربما"، أو "لا أعلم"، ونحن نستخدم هذه التعبيرات عندما نتعرض لظروف بحيث نكون غير قادرين على إعطاء حكم، ولكن(PO) هي عملية متعمدة بعكس التعبيرات السابقة، حيث أنها تدل على أننا نعمل بعيداً عن نظام الحكم المعتاد(صحيح، خاطئة) وبالتالي فهي لا تدل على عجزنا عن اعطاء حكم معين.

عندما يصنع الناس جملة من نوع(PO) ، فإنها تؤدي إلى استفزاز أو استثارة للإبداع من أجل البدء بأفكار جديدة أو طرق جديدة للنظر للأشياء، وعندما يستخدم الناس(PO)كاستجابة فإنهم يوضحون بأنهم سيتعاملون مع الأفكار على أنها جمل تستحق التفكير. وهذه القدرة على استخدام الأفكار بعيداً عن نظام الحكم هي الأساس الكامل للإبداع، إلا إذا كانت الفكرة غير مفهومة وغير واضحة، وهنا يصبح الإبداع مستحيل.

وتعتبر الـ(PO) أداة ملائمة لبلورة نقطة معينة أو فكرة معينة، بحيث يصبح من الممكن فهمها واستخدامها، وليس هناك حاجة للتمزق بشأن أداة(PO) أبداً، ويعتبر القليل من التمزق حول هذه الأداة في البداية ذا فائدة. فبعد ذلك يزداد التوجه للاهتمام بهذه الأداة.

فقرات الدرس:

الصف المفتوح:

يقرأ المعلم الفقرات ويسأل الصف بشكل جماعي وذلك من أجل إطلاق استجابة نعم، لا، ابداعي(PO) ، ويجب أن تؤدي الفقرات بشكل سريع دون توقف للسؤال لماذا تختلف استجابة طالب عن الآخرين، ومن الواضح أن الفقرتين الأخيرتين يجب أن لا تكونا صحيحتين، بحيث يراقب المعلم ردود الفعل حولهما ويمكن إجراء مناقشة قصيرة حول ما يجب أن تكون عليه الاستجابة، ويمكن أن لا تنتهي بجملة مثل: "نريد شيئاً معيناً يؤكد لنا متى تكون الفكرة غير صحيحة".

نقاش حول الحكم، وعدم الحكم:

يجب على المعلمين أن يوضحوا بأن هناك فرقاً بين الحالة التي يرغب الأفراد في الحكم عليها لكنهم لا يملكون معلومات كافية (وبذلك يقولون: "ربما"، "ممكن"، "لا أعرف"). وعندما لا يريدون الحكم (فإنهم يقولون PO). المرجعية يجب أن تكون بطاقة عمل الطالب، والتي تظهر "نعم"، و"لا" في شكل ثابت (على شكل صندوق) لكن (PO) تظهر داخل دائرة وتمثل إشارة الـ (PO) الحركة، (انظر غلاف بطاقة الطالب)، ومن المهم إيضاح أن الـ (PO) عملية لكنها مشتقة من الشعر (وضع الأفكار معاً بطريقة محفزة من الممكن أن لا تكون صحيحة) أو أنها افتراضية (وضع فكرة تجريبية وغير مثبتة) وفضوية (إيضاحات تخمينية).

الصف المفتوح أو المجموعات:

يمكن السماح للمجموعات بثلاثة دقائق لعمل جميع الفقرات ومن ثم الإشارة إلى أي الفقرات أعطيت "نعم"، وأيها أعطيت "لا"، وأيها (PO). ويمكن إجراء نقاش حول سبب اعطاء مجموعة (PO) لفقرة أكثر من الأخرى، ويجب أن يركز المعلم على أن (PO) ليست مثل "غير متأكد" أو "لا أعلم"، ومن خلال الصف المفتوح يمكن أداء الفقرة بنفس الطريقة كالفقرة الأولى عن طريق أخذ كل جملة بالدور لكل الصف (أو بتسمية طلبة معينين) لإعطاء إجابة نعم ولا أو (PO).

اقتراحات:

- (PO): المحلات يجب أن تخفض أسعارها ١٪ لمدة ساعة واحدة يومياً.
- (PO): كثير من الناس سوف يتسوقون ليلاً إذا بقيت المحلات مفتوحة لوقت متأخر.
- (PO): يمكنك أن تضغط على كبسات للحصول على الأشياء التي تريدها وفي النهاية تجمع هذه الأشياء معاً.
- (PO): للعديد من الناس التسوق يعتبر نوع من العادة أو الهواية، إنهم حقاً يستمتعون به.

ملاحظة:

ليس المهم التعرّف على العبارات التي تصلح لها كلمة (PO)، فالعملية ليست عملية تصنيف، ويكفي أن يدرك الطلبة أن كلمة (PO) يمكن استخدامها بدلاً من استخدام كلمات مثل: "إنها صحيحة" أو "إنها خطأ".

التركيز على العملية ذات الخطوتين:

➤ هل أريد أن أحكم على هذا؟

➤ هل أريد التعامل مع هذا بشكل إبداعي؟

هذه هي الأسئلة التي يجب على الطلبة توجيهها لأنفسهم، وقد يظهر أنه إذا كانت الإجابة على السؤال الأول سلبية فعندها يجب استخدام كلمة (PO) بشكل اوتوماتيكي، ولكن الأمر ليس كذلك، فكلمة (PO) يجب أن تستخدم فقط عندما يكون هناك حاجة لبذل جهد متعمد ومقصود للتعامل مع فكرة ما بشكل إبداعي.

يتم التعامل مع هذه الفقرة كما تم التعامل مع الفقرة رقم (٣)، أو أن يتم التعامل معها بشكل صفي مفتوح على طريقة إطلاق إجابات سريعة، وفي الحقيقة فإن أي واحدة من الجمل يمكن أن تعامل كجملة (PO) إذا رغب أي

شخص بذلك. وإذا تم وضع شيء ما بشكل جملة مثيرة فمن المناسب له كلمة (PO) ، لكن إذا وضعت هذه الجملة على شكل حقيقة فمن المناسب لها "نعم" أو "لا"، ويمكن أن يكون هذا الأمر أساس النقاش. يتم التعامل مع هذه الفقرة عن طريق، ويتم التعامل مع هذه الفقرة عن طريق الصف المفتوح أو المجموعات.

اقتراحات:

(PO) يجب أن تطير السيارات.

(PO) السيارات يجب أن تدوم مدى الحياة.

(PO) جميع السيارات يجب أن تدهن باللون الأصفر.

(PO) السيارات يجب أن تأكل راعيها.

(PO) الطعام المدرسي يجب أن يكون بدون طعم، بحيث أنك لا تلاحظ بأنك أكلته.

(PO) كلما أكثر من أكل الطعام كلما زادت كميته.

(PO) يجب أن يطهو الطلاب الطعام الخاص.

(PO) الشعر يجب أن لا يحتاج إلى القص.

(PO) يجب أن يكون لديك المقدرة على تغيير طول شعرك من لحظة إلى أخرى باستخدام قوة المشيئة.

(PO) يجب أن يتغير لون الشعر في الشتاء.

الفقرة في الصندوق هي تلخيص للدرس، ويجب قراءتها بصوت مرتفع، وإذا كان هناك وقت فيجب مناقشتها، والنقطة الأساسية أن (PO) يجب أن تعامل كأداة عملية وليس كنقطة فلسفية.

Appendix F

Example Of The TTCT Verbal

Example of the TTCT verbal pre and post-test

Activity one: Ask as many questions as you can about the picture. Work for 3 minutes.



Activity two: Try to improve this stuffed toy so that it will be more fun to play with.

Work for 3 minutes.



Activity 3: How many different uses can you think of for a spoon? List as many ideas as possible. Work for 3 minutes.

Activity 4: What if you could be a Christmas tree. What might some of the things be that you would do? Work for 3 minutes.



Appendix G

The TTCT Verbal - Modified Version For Jordanian Environment

اختبار تورنس للتفكير الإبداعي

تعليمات الاختبار

أخي الطالب / أختي الطالبة :

توفر لك الأنشطة المتضمنة في هذه الكراسة الفرصة كي تستخدم خيالك في توليد أفكار جديدة والتعبير عنها بكلمات .

وتذكر أنه لا توجد إجابات صحيحة وأخرى خاطئة، كما هو الحال في كثير من الاختبارات التي نقوم بها، إذ إننا نريدك أن ترى عدد الأفكار التي يمكنك توليدها، ونعتقد أنك ستجد ذلك ممتعاً، لذا حاول أن تصل إلى أفكار مشوقة، ومثيرة وغير مألوفة، لن يفكر بها أحد سواك .

بين يديك ستة أنشطة مختلفة عليك أن تقوم بها، لكل منها وقت محدد، حاول أن تستثمره بشكل جيد، اعمل بأقصى سرعة ولكن دون تعجل. وإذا نفذت أفكارك قبل انقضاء الوقت المحدد للنشاط عليك الانتظار حتى تعطى تعليمات جديدة لتنفيذ النشاط الذي يليه .

إن مجرد الجلوس والتفكير في النشاط يقود في بعض الأحيان إلى توليد أفكار أخرى يمكن إضافتها إلى الأفكار السابقة .

إن كانت لديك أية أسئلة بعد البدء بالإجابة، فلا تتكلم بصوت مرتفع ، وما عليك إلا أن ترفع يدك، وستجدي بجانبك لأحاول الإجابة عن أسئلتك.

الأنشطة من 1 - 3

اسأل وخبّن

تعتمد الأنشطة الثلاثة الأولى على الصورة الموجودة أسفل هذه الصفحة، وستوفر لك هذه الأنشطة الفرصة لمعرفة مهارتك في توجيه الأسئلة للبحث عن الأشياء التي لا تعرفها، وفي تخمين أسباب حدوث هذه الأشياء والنتائج التي يمكن أن تترتب على ذلك .

والآن، انظر إلى الصورة، ما الذي يحدث؟ ما الذي يمكنك أن تقول به بكل تأكيد؟ ما الذي تحتاج أن تعرفه كي تفهم ما الذي يحدث؟ وما السبب في حدوثه؟ وما النتائج المترتبة على ذلك؟
الإجابة عن هذه الأسئلة في الصفحات التالية :

الباب الثالث: قياس الإبداع

التشاطات رقم ١-٣ :

طَلَبَة

خبّن وأسأل

الاختبارات الثلاثة الآتية تعتمد على الصورة الموجودة في هذه الصفحة وتعطيك فرصة لأن تفكر وتساءل أسئلة بحيث تؤدي اجابتها لمعرفة الأشياء التي لم تعرفها من قبل، وأن تفترض الأسباب والنتائج الممكنة لما يحدث في الصورة. والآن انظر الى الصورة؟ ماذا يحدث؟ وما الذي تستطيع أن تقول به بكل تأكيد؟ وما الذي تحتاج أن تعرفه لكي تفهم ما يحدث؟ وما الذي سبب الحدث؟ وماذا ستكون النتيجة؟

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١٩٩

النشاط الأول

توجيه الأسئلة

اكتب على هذه الصفحة كل الأسئلة التي يمكن أن تفكر بها حول الصورة التي مرت بك في الصفحة رقم (2). اكتب جميع الأسئلة التي تحتاج إليها كي تعرف ما يحدث في الصورة بشكل مؤكد. لا تطرح الأسئلة التي يمكن الإجابة عنها بمجرد النظر إلى الصورة. يمكنك أن تنظر إلى الصورة كلما أردت ذلك .

1. _____
2. _____
3. _____

النشاط الثاني

تخمين الأسباب

اكتب في الفراغات الموجودة أدناه، أكبر عدد ممكن من الأسباب المحتملة لما يحدث في الصورة التي مرت بك في الصفحة رقم (2). يمكنك أن تذكر أشياء ربما حدثت قبل الأشياء التي تحدث في الصورة بوقت قصير، أو أشياء حدثت منذ وقت طويل وسببت ما يحدث في الصورة. اكتب أكبر عدد من التخمينات للأسباب المحتملة ولا تخش من أن تخمن .

1. _____
2. _____
3. _____

الباب الثالث: قياس الإبداع

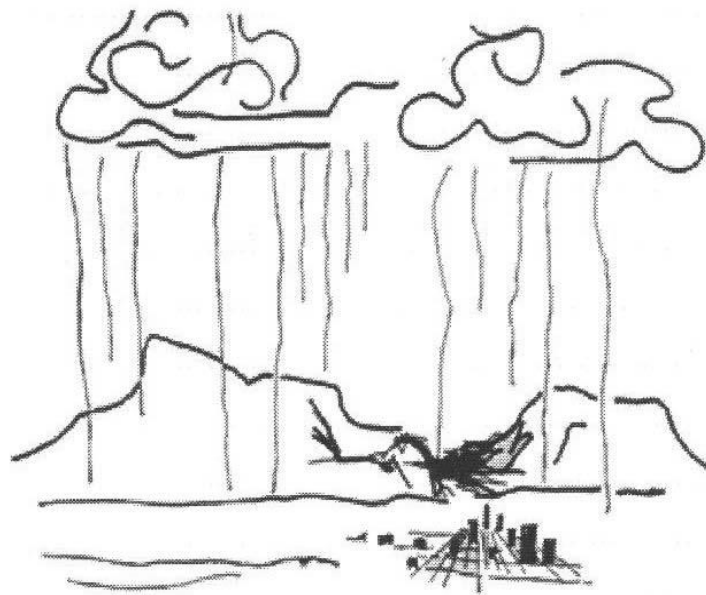
النشاط السادس:

إفترض أن

وفيما يلي موقف غير ممكن الحدوث، وعليك أن تفترض أنه قد حدث بالفعل، وهذا الافتراض سيعطيك فرصة لاستخدام خيالك لتفكر في كل الأمور المثيرة، والتي يمكن أن تحدث إذا تحقق هذا الموقف غير ممكن الحدوث.

افترض في مخيلتك أن الموقف الذي سنصفه لك قد حدث، فكر في كل الأمور الأخرى التي قد تحدث بسببه، وبمعنى آخر ما هي النتائج المترتبة على ذلك؟ اكتب كل ما يمكنك كتابته من تخمينات.

الموقف: افترض أن هناك خيوطا تتدلى من السحب وترتبطها بالأرض، ما الذي قد يحدث؟ اكتب كل تخميناتك وأفكارك على الصفحة التالية.



٢٠٦
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النشاط الثالث

تخمين النتائج

اكتب في الفراغات الموجودة أدناه كل ما يمكن أن تفكر به من نتائج لما يمكن أن يحدث في الصورة التي مرت بك في الصفحة رقم (2). يمكنك أن تذكر نتائج يمكن أن تحدث مباشرة بعد الأشياء التي تحدث في الصورة، أو بعد ذلك بوقت طويل.

اكتب أكبر عدد من التخمينات، ولا تخشَ من أن تخمن .

1. _____
2. _____
3. _____

النشاط الرابع

تحسين الإنتاج

في منتصف هذه الصفحة صورة للعبة من لعب الأطفال يمكن شراؤها من المحلات التجارية بثلاثة دنانير أو أربعة. وهي عبارة عن فيل محشو بالقطن طوله خمسة عشر سنتيمتراً ووزنه حوالي ربع كيلو غرام. والمطلوب منك أن تكتب في الفراغات الموجودة على هذه الصفحة والصفحة التي تليها، أذكى الطرق وأكثرها إثارة وغبابة لتحويل دمية الفيل إلى لعبة أكثر متعة للأطفال الذين يلعبون بها. لا تقلق حول كلفة هذا التغيير، فالمهم فقط أن تفكر فيما يجعل هذه اللعبة أكثر متعة وإثارة .

1. _____
2. _____
3. _____

النشاط الخامس

استخدامات غير مألوفة

(علب الكرتون)

كثير من الناس يتخلصون من علب الكرتون الفارغة ، رغم أن لها آلاف الاستخدامات المثيرة غير المألوفة. والمطلوب منك أن تكتب في هذه الصفحة والصفحة التي تليها أكبر عدد ممكن من الاستخدامات المثيرة وغير المألوفة التي يمكن أن تخطر ببالك . لا تقيد نفسك بحجم معين من هذه العلب ، ويمكنك أن تستخدم أي عدد من العلب التي تحتاج إليها .

تذكر بأن لا تقيد نفسك باستخدامات شاهدتها أو سمعت بها ، وفكر في أكبر عدد ممكن من الاستخدامات

الجديدة

1.

2.

3.



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النشاط السابع

افتراض أن

فيما يلي موقف لا يمكن أن يحدث، افتراض أنه قد حدث فعلاً، وسيعطيك هذا الافتراض الفرصة لاستخدام خيالك للتفكير في كل الأشياء الأخرى المثيرة التي ستحدث فيما لو حدث هذا الموقف الافتراضي .

افتراض أن الموقف الذي سيتم وصفه قد حدث فعلاً، ثم فكر في جميع الأشياء الأخرى التي يمكن أن تحدث بسبب ذلك. وبعبارة أخرى ما النتائج التي يمكن أن تترتب على ذلك؟

الموقف غير الممكن: افتراض أن للسحب خيوطاً تتدلى منها وتصلها بالأرض، ما الذي سيحدث؟

اكتب أفكارك وتخميناتك على الصفحة التالية :

1.

2.

3.

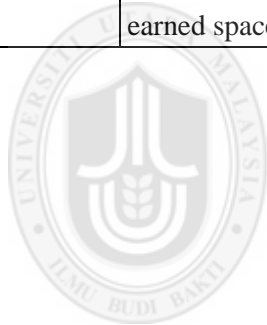
Appendix H

Description Torrance Scoring Guide

Scoring is different for fluency and originality. The fluency score is the sum of the student's responses on each item. The originality score is derived by assigning 2, 1, or 0 points to each response according to its frequency of occurrence among all the students being tested. Responses that occur only once among all the students are considered unique or original and assigned 2 points. Responses made by two students are considered semi original and assigned 1 point. Responses that occur three or more times within the group receive 0 points. flexibility (ability to shift thoughts or categories of ideas).

<i>Dimension</i>	<i>How to score</i>	<i>What to score</i>	<i>Comments</i>
<i>Fluency</i>	A count of relevant responses given to a novel stimulus. Measured by the ability to mention the largest possible number of answers appropriate in a given time, to give a score for each correct response for the largest possible number of appropriate responses within their time schedule and exclude responding random and not based on the logic of scientific, but must be suited to the requirements of the environment realism.	Ability to respond to both a single stimulus in several different ways and to respond to many different stimulus effectively. Fluency score is the number of ideas a person expresses through interpretable responses that use the stimulus in a meaningful manner. The essence of the idea may be expressed through the title, but the stimuli must still be used. Abstract designs without meaningful titles are not counted (Torrance et al., 1992, p.6).	Assessment of divergent thinking may be provided by scoring only fluency (Christensen, 1997). ideational fluency was a precondition for original ideas (Christensen, 1997).
<i>Originality</i>	Based on the statistical infrequency of a pertinent response. Measured by the ability to mention answers are not common in the group, which belongs to the individual, to give higher	A measure of the unusualness of a response. Originality score is based on the statistical infrequency and unusualness of the response (Torrance et al., 1992, p.8).	An important dimension of creativity, but taken alone it may be more indicative of style of response than degree of creativity

	grades Lander responses and the least frequent occurrences after converting all the answers to the percentages and then compared to the degree of Torrance, according to estimates of Authenticity.		
<i>Flexibility</i>	A count of different categories reflected in relevant responses. Measured by the ability to diversify the appropriate answers, giving the degree of responses in each group belonging to the largest possible number of areas, if the response has been varied and belong to the areas of highest degree earned spaced.	Bility to shift mental set and produce responses from several different categories// ability to break set, reconceptualize the problem, and respond in a different way	Removed from scoring on the figural test in 1984 due to a high correlation with Fluency (Cramond et al., 2005).



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Appendix I

Interview Schedule

Interview Schedule: Students Attitudes Toward Thinking Programs

These interview questions have been designed for the purpose of understanding your attitude toward thinking programs, availability and usefulness its.

Your candid and explicit answers will be of great value to this research as it will influence the final outcome. I reassure you that all information will be treated as confidential and no one other than the researcher will have access to it.

First section: personal information.

- Name: (Optional)
- Grade:
- Group:

Second section: Attitudes toward KASE and thinking programs in general.

1. In your experience, what is the difference between teaching methods in regular schools and schools of KASE? How would you describe the learning environment in both of them?

2. Do you have enough information about the methods and programs such as the six thinking hats and other method? To what extent do teachers in KASE use in teaching these programs, either directly or through integrated with the curriculum?

3. What do think about the use of the methods and programs in teaching? What is the program's (thinking) strategy that you think that is effective to improve areas of your thinking?
4. Do you think that this program is effective in raising the level of creativity you have? And does it affect the learning environment in terms of the interaction between teacher and student and between the students themselves?

Third Section: This section contains questions related to the thinking activities and the thinking programs (SCAMPER- CoRT) which include the following questions.

1. What do you think of the effectiveness of these programs on your ability to generate a large number of flexible alternatives in a creative way?
2. What are the main advantages and disadvantages of using both SCAMPER and CoRT programs?
3. Do you think these programs have a real impact on your creative skills and academic achievement? In your opinion, which of these two programs has greater effect on the degree of creativity?
4. What do you think about the inclusion of these programs in the school curriculum? How can these programs be included in the topics and in the teaching materials?

Appendix J

Arbitrators List

Name	University and Specialization	E-mail
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Prof Dr. Ibrahim El.Zraigat	The University of Jordan (UJ)/ Special Education	ibrahimz@ju.edu.jo
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Assoc. Prof. Dr. Najj Munar Saydah	Al- Balqa' Applied University (BAU)/ Special Education	Najesaadeh@Yhoo.com
Assoc. Prof. Dr. Mohamd AL Jabery	The University of Jordan (UJ)/ Special Education	m.algabery@ju.edu.jo
Assoc. Prof. Dr. Heabh Hammad	Al- Balqa' Applied University (BAU)/ Measurement & Evaluation	Hammad.H@yahoo.com
Assoc. Prof. Dr. Sarrie Saleem	jadara university / Measurement & Evaluation	info@jadara.edu.jo
Assoc. Prof. Dr. Haider Zaza	The University of Jordan (UJ)/ Psychology	h.zaza@ju.edu.jo
Assoc. Prof. Dr. ferial abuawwad	The University of Jordan (UJ)/ Psychology	f.abuawwad@ju.edu.jo
Mr. Bilal Mahmod Hawamdeh	King Abdullah Schools for Excellence/ Gifted and Talented Teacher	bhawamdeh@cader.jo
Mr. Harth Al Nsour	King Abdullah Schools for Excellence/ Gifted and Talented Teacher	alharth.alnswyyahoo.com

Appendix K

Official Letter From Ministry of Education



وزارة التربية والتعليم



الرقم ٤٦٤٦٠١١٠/٣
التاريخ ٢ ذو الحجة ١٤٣٦
الموافق ٢٠١٥/٩/١٦

السيد مدير التربية والتعليم لمنطقة السلط

الموضوع: البحث التربوي

السلام عليكم ورحمة الله وبركاته، وبعد؛

فأرجو إعلامكم بأن الطالب حمزة محمود علي خوالده يقوم بإجراء دراسة عنونها "فعالية برنامج سكامبر وكورت في تنمية التفكير الإبداعي لدى الطلبة الموهوبين في الأردن"، استكمالاً لمتطلبات الحصول على درجة الدكتوراه في تخصص الموهبة والإبداع في جامعة أوتارا الماليزية، ويحتاج ذلك إلى تطبيق برنامج تدريبي واختبار مكون من سبعة أنشطة على طلبة الصف العاشر في المدارس التابعة لمديريتك. راجياً تسهيل مهمة الطالب المذكور وتقديم المساعدة الممكنة له، على أن يتم مطابقة البرنامج التدريبي والاختبار المطبق مع البرنامج التدريبي والاختبار المرفق.

واقبلوا الاحترام

وزير التربية والتعليم

د. عويد عوض رتغان
مدير البحث والتطوير

نسخة/ مدير إدارة التخطيط والبحث التربوي
نسخة/ مدير البحث والتطوير التربوي
نسخة/ رئيس قسم البحث التربوي
نسخة/ الملف ١٠/٣
المرفقات : (٣٨) صفحة

الملكمة الأردنية الهاشمية

هاتف: ٥٦٠٧١٨١ +٩٢٢ ٦ فاكس: ٥٦٦٦٠١٩ +٩٢٢ ٦ ص.ب: ١٦٤٦ عمان ١١١١٨ الأردن. الموقع الإلكتروني: www.moe.gov.jo

Appendix L
Training certificates





Training Certificate

Ghena Al-Hayat Center for Human Development

Amman- Jordan

Certifies that

Hamzah Mahmud Ali Khawaldeh

Has successfully completed (12 hours) training course titled

CORT Program – Cognitive Research Trust

On May 13 - 20th, 2015

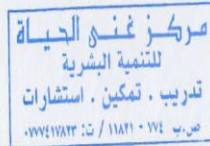
Thereof he is awarded this certificate



Universiti Utara Malaysia

General Manager

Reem N. Nakhli



Trainer