The effect of a training programme in creativity on developing the creative abilities among children with visual impairment

Kholoud A. Al-Dababneh, Mu'tasem M. al-Masa'deh & Enass M. Oliemat

Queen Rania Faculty for Childhood, Hashemite University, Al-Zarqa, Jordan

Published online: 11 Jul 2014.

To cite this article: Kholoud A. Al-Dababneh, Mu'tasem M. al-Masa'deh & Enass M. Oliemat (2014): The effect of a training programme in creativity on developing the creative abilities among children with visual impairment, Early Child Development and Care, DOI: 10.1080/03004430.2014.924113

To link to this article: http://dx.doi.org/10.1080/03004430.2014.924113

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The effect of a training programme in creativity on developing the creative abilities among children with visual impairment

Kholoud A. Al-Dababneh*, Mu’tasem M. al-Masa’deh and Enass M. Oliemat

Queen Rania Faculty for Childhood, Hashemite University, Al-Zarqa, Jordan

(Received 6 April 2014; accepted 11 May 2014)

This study aims to investigate the effects of a training programme in creativity on developing creative abilities among 9–10-year-old children with visual impairment in Jordan. The study sample consisted of 41 students from fourth and fifth grades, who were randomly selected and divided into two experimental groups and two control groups. To achieve the study objectives, a 50-item inventory was developed by the researchers and used as pre- and post-tests. The result of multivariate analysis of variance showed statistical differences at the level of \( p = .01 \) in the study inventory between the performance of both the experimental groups and the control ones in favour of the experimental group at the overall dimensions and sub-dimensions. Furthermore, there are no significant differences at \( p = .01 \) due to gender at the overall dimensions and sub-dimensions. In the light of these results, the researcher addressed a number of suggestions and recommendations.

Keywords: creative abilities; children with visual impairment; creative imagination

Introduction

In contemporary life, various sectors including education are facing many problems which became more complex as a result of fundamental changes caused by scientific and technical development, globalisation trends, and others. As a result of this, more attention is paid to developing creative skills among individuals.

Consequently, since 1950 psychologists and educationists have made a great effort to study and develop creativity and talent, which are considered as two of the most important educational goals of human societies that seek to achieve (Sharma, 2011). They try to achieve these goals by defining creativity as a tool that helps to control human nature and as a means to improve the quality of life in all areas, and the progress that is seen and enjoyed by humankind today is nothing but a result of creative effort in various fields over the ages (Davis, 2004).

Theories and studies that focus on developing creativity agreed that creative potential is a natural thing in everyone at different levels and styles (Davis, 2004) including children with disabilities (Grimm, 1998; Halpin, 1977; Hashash, 2013; Ibrahim, 1997 in Ahmad, 2007; Tisdall, Blackhurst, & Marks, 1971). Torrance also indicated the importance of developing creativity among all children in all aspects of life and ensured that if no attention was paid to children’s creative abilities, then energy will...
be wasted and unemployed, which will result in the child being dependent on others and could lead to some kind of personality disorder (Ahmad, 2007).

Many institutions and researchers devoted their efforts for developing programmes, assessment tools, and strategies for developing creativity among people, and supporting the idea that creative thinking could be developed by training like in other mental abilities (Qahtani, 2001; Torrance, 1995).

In recent years, disability field received more attention in the communities and many researchers were interested in studying the best methods of providing the care they needed. Nowadays, society changes its view of these individuals from viewing them as economically dependent individuals to being a part of the human capital and product (Hashash, 2013).

The growing body of research identified creativity and its effect on various areas of development for regular children (Davis, 2004), as well as for disabled children (Ahmad, 2007; Halpin, Halpin, & Torrance, 1973a; Paget, 1979; Rogers, 1976), including hearing impaired (Rogers, 1976), visually impaired (Halpin et al., 1973a), those with learning disabilities (Abdel-Rahman, 1998), and emotionally disturbed children (Abdel-Rahman, 1998; Paget, 1979). It was found that these children have creative abilities as their peers without disabilities. Moreover, research studies have shown that developing children’s creativity related positively to academic achievement, social competence, and self-concept for regular children (Davis, 2004; Panda, 1997; Torrance, 1995). The studies also showed that developing children’s creativity is connected with enhancing academic achievement for children with disabilities (Halpin, Halpin, & Torrance, 1973b) and self-actualisation (Knight, 2001; Safan, 1991; Sharma, 2011), and developing the feeling of security for children with visual impairment (VI) (Ahmad, 2007), and with learning disabilities (Hashash, 2013). Other studies showed that accessing and using creativity can also release tension, support social competence (Ahmad, 2007), and help people live a healthy and more productive life (Davis, 2004).

Researches demonstrated that children with VI have the ability of thinking in creative ways, and some studies showed that there are no differences between blind children and sighted ones in the capacity of creativity (Grimm, 1998; Halpin, 1977; Ibrahim, 1997 in Ahmad, 2007; Tisdall et al., 1971). Research also found an encounter in differences between visually impaired children and regular children in relation to creative thinking, where some studies have shown superiority of creativity in blind children in the field of fluency of language more than that in the sighted children (Halpin, 1972; Halpin & Halpin, 1973; Halpin, Halpin, & Tillman, 1973; Tisdall et al., 1971), and in the originality and verbal flexibility (Halpin, 1972; Halpin & Halpin, 1973; Halpin et al., 1973a). This shows us that the visually impaired are superior in creative thinking and in their dependency on their imagination. Creativity can be a tool that compensates the suffering from an organic inability and directs the energies of this child to creativity. Creativity could be a way to self-achieve for these children.

Many researchers showed the effectiveness of training programmes on the development of creative abilities among these children (e.g. Abdel-Rahman, 1998; Ahmad, 2007; Grimm, 1998; Mohammad, 2010), including the skills of fluency and flexibility (Abdel-Rahman, 1998; Safan, 1991), originality skills, and creative imagination (Ibrahim, 2003; Jay, 1991; Mohammad, 2010).

Jordan has a great history of interest in creativity experience and focuses on kindergarten and school as crucial stages for developing student knowledge and skills. The Ministry of Education (MOE, 2014) in Jordan seeks to review the Jordanian education
policies, to develop the educational system more along with changes in all areas, and to convert the school system to be modern, more effective, and caring of all students.

During the last two decades, Jordan is considered to be a leader among the Arab states in being interested in developing gifted creativity among students within their schools or out of school programmes. For example, MOE organised many programmes of cultural and scientific content, aimed at developing student’s creative abilities in various areas. In addition, the Ministry enriched school programmes by employing technology in the educational process, in a way that develops the student’s talent and creativity (MOE, 2014).

In 1982, MOE and non-government foundation established the first pioneer centre in Al-Salt and after that in Jubilee School in 1993 for gifted and creative students. Currently, many enrichment programmes are provided for such children. For example, there are about 19 pioneer centres established throughout the country. In addition to 80 resource rooms established for gifted and talented students in many primary schools, which provide students with many enrichment activities that help develop students’ talents and creativity, there are also 10 public schools for gifted and creative students scattered across the Kingdom under the name ‘King Abdullah II School For Excellence’.

Since 1994, the academic acceleration programmes work for the students from the first grade up to the seventh grade. Moreover, MOE organised Olympiad in mathematics, physics, language, and other areas through pioneering centres spread in governorates around the Kingdom. These services have been developed and provided for more than 6000 students, different educational levels benefit from these programmes, there are other programmes arranged in regular schools, and about 2500 staff members are involved (MOE, 2014).

Although the development of talent and creativity among individuals is an important criterion for measuring the development of civilisation in communities, developing creativity in children who have disabilities including people with VI has received the least attention from both educators and researchers, and there are still some shortcomings in relation to developing creativity among these children (Ibrahim, 2003).

Visually impaired students do not recognise the world in the same way as the sighted students, and as researches pointed out, students with VI have less information than others about the environment (Ibrahim, 2003). So, there is a need to develop imagination in children with visual disabilities. Studies have shown that the image formed by those with VI of the world is confusing, but a good article submitted to them in the form of activities dealing with their remaining senses will help to develop and activate their imaginations (Ahmad, 2007; Ibrahim, 2003).

The idea of the current study came from here; it aims to investigate the effects of a training programme in creative thinking on developing creative abilities among 9–10-year-old students with VI in Jordan. Hence, the problem of this study seeks to answer the following questions:

1. What is the effect of a training programme in creativity on developing creativity skills among students with VI?
2. How do teachers of participants perceive the effectiveness of a training programme in developing creativity skills among participants?
3. Are there significant differences affecting the training programme in creativity due to a child’s gender?
Significance of study

The theoretical importance of the current study arises from providing a conceptual framework for creative thinking by reviewing the educational literature in this area. This is the first study of its kind in Jordan (within the limits of researchers’ awareness) interested in studying the impact of a training programme in developing the creative thinking skills among students who are visually impaired. The current study also tries to create some tools and modify them to be used by the students with VI in Jordan.

The practical importance of the study is represented by asking professionals in the visually impaired field, their staff, and officials from the MOE to improve the performance of schools by taking care of this group of students using the training programmes. It is expected that this study will lead to further future studies in this crucial area.

Theoretical framework

Recently, educational concepts serve development trends in various countries in the world, which have made teaching to focus on increasing the quantum qualitative information, skills, and behaviour, to achieve high quality in the learning process, where progress in a country is measured by its ability to develop its children’s minds. The challenge focused on how to teach children the skills of thinking, and not only reading, writing, and arithmetic skills (Hashash, 2013). So, teaching creative thinking through institutional care makes us ensure the progress of future generations. From this standpoint, education of people with special needs has occupied an extreme importance in the era of information technology (Hashash, 2013).

Creativity like intelligence is multidimensional, and it is a holistic experience that integrates all development aspects: cognitive, affective, and psychomotor (Clark, 2004). Due to different approaches interested in creativity and due to the multiplicity of aspects of creativity and its complexity, there are many definitions of creativity, and it is difficult to agree on a clear and specific definition of this concept. In general, creativity is seen as a process that produces something new and useful. Torrance (1995) described creativity as similar to scientific research including sensing problems, forming hypotheses, testing them, and finally communicating results, and imagination is the food for creativity. According to Guilford creativity is identified as mental process and style of divergent thinking characterised by fluency, flexibility, originality, sensitivity to problems, and the resulting creative outputs. In 1989, Gardener added that ‘creativity is human’s capacity to solve problems in a way that is initially novel but ultimately acceptable in a culture’ (Davis, 2004). Other researchers such as Cropley (1992) suggest that to be creative means to be daring and innovative in one’s thinking. In 1975, Mackinnon also summarises creativity as a ‘process that is extended in time and characterized by originality, adaptiveness, and realization’ (p. 68) (Isaksen, Dorval, Treffinger, & Noller, 2000). Moreover, in 1987 Gryskiewiez defined creativity as novel associations that are useful, whereas Ruth Noller added that creativity is a function of imagination (Isaksen et al., 2000). Creativity is also linked to self-actualisation as conceptualised by humanist Maslow (Sherrill, 1996).

Despite the various differences in creativity, in 1961 a broad framework was originally used after collecting and analysing 56 definitions of creativity and it was found that it is more productive to describe creativity within four overlapping themes: person, process, product, and environment (Isaksen et al., 2000). They interrelate that creative
products are the outcome of creative processes engaged in by creative people, all of which are supported by a creative environment. Isaksen et al. (2000) clarified the interaction that occurs between the four elements and the need to consider the whole system to obtain the best picture of creativity.

Finally, it can be concluded that most of the definitions of creativity include three types of characteristics which are combined to produce creativeness within individuals, including personality traits (such as strong motivation, independence, risk-taking, high energy, curiosity, sense of humour, thoroughness, artistic interests, and intuition); cognitive abilities including information-processing styles (such as fluency, flexibility, originality, elaboration, sensitivity to problems, attraction to complexity, transformation, analogical/metaphorical thinking, imagination, logical thinking, evaluation, synthesis, and analysis); and biographical traits including people’s experiences related to creative products during their life (Davis, 2004). Such characteristics need to be improved by challenging educational training programmes to emphasise problem-solving, critical, and creative thinking skills (Davis, 2004). In addition, developing the already-mentioned creative abilities in students with VI helps them in integrating their experiences in more meaningful ways (Recchia, 1997).

With regard to students with VI, who have various abilities, and in order to foster their creative abilities, they need to be aware of their creative potential and because of the difficulty they face in dealing with visual experience, multisensory education should be integrated with the means of sensory and intuitive thinking, feeling, and external sense. Also, these students need to be encouraged to express their emotions and to solve their problems in a creative way (Beaty, 1994).

To understand creative abilities among students with VI, there is a need to identify them and to identify the impact of disability on the growth area. Thus, VI can be defined as a board term used to describe blindness in students with total or high grade of vision loss who use Braille for reading and writing, and others with low vision who have partial vision loss that cannot be corrected by ordinary visual devices (Haddad, 2009).

The disability affects a child’s development and motivation of self-actualisation. Most of the challenges that these children face are represented in mobility and difficulties in understanding and using non-verbal communication and written communication (Hallahan & Kauffman, 2003), and only small developmental delays in the acquisition of verbal skill have been found (Brambring, 2007). It is worth to mention that the needs and characteristics of the children with VI are affected by many factors, namely age at occurrence of visual disability, cause of VI, the amount of useful vision, the severity of injury, the presence of other disabilities (Hallahan & Kauffman, 2003), an individual’s personality, motivation to use vision, and educational and growth opportunities (Gabrialavičiūtė, 2008).

With regard to emotion, social competence, and self-concept, some studies found that children with VI have low self-concept and feel lonely, as in Al-Qahtani (2001) study suggests. In contrast, many studies have confirmed that there were no significant differences in these aspects between the blind and sighted children regarding self-concept, and sometimes students with VI have higher degrees on self-concept compared with sighted students (Beaty, 1994). In addition, Huurre, Komulainen, and Aro (1999) showed that relations with friends helped in raising self-concept among children with VI. Besides, researches showed that there are other factors affecting social adjustment and self-concept of people with visual disabilities such as the position of people with VI due to their blindness, the degree of children’s acceptance of their impairment, nature of the training given to the visually handicapped, social trends over the visually
impaired (Hadidi, 2013), educational level they received (Beach, Robinet, & Hakim-Larson, 1995), and awards (Russello & D’Allura, 2000).

VI also impacts cognitive development, and perceptual organisation of blind and partially sighted changes. This is due to limitations and inaccuracies in visual inputs. They are slow in processing compared to other people, and also depend on memory and other senses to format concepts, which provides these people limited information. So they face difficulties in the possibility of integration and understanding of the experiences undergone by the normal sighted humans through the sense of sight. But this does not mean that these people suffer from default in knowledge or in mental abilities, it means that their performance in intellectual tests is weak because these tests are non-standardised and appropriate (Hadidi, 2013). Usually visually impaired children have difficulties with spatial tasks and reasoning about concrete situations. Also, these children usually experience developmental delays, especially if they do not receive appropriate interventions in early years to compensate for the lack of the visual input and experience (Hadidi, 2013).

Children with severe VIs often show more deviation in their skills compared with those other disabilities, particularly in sensorimotor and symbolic playing. In addition, creativity and exploration often are reduced in their play (Skellenger & Hill, 1994).

So, the greatest impact of VI is the reduction of a child’s visual experiences, and therefore, they need to be provided with education and training programmes that help them get as much information and perception as possible by employing cognition, hearing, touch, smell senses, and visual remains. Also their curriculum should consist of the normal regular curriculum, and extra curriculum, which focuses on social training and personal competence, daily life skills, movement and mobility, communication skills, vocational guidance, tools and equipment, and visual excitement (Barraga & Erin, 2001).

Although vision plays a vital part in an individual’s life and provides them with the significant opportunities to foster their growth aspects, children with VI are not any less sensational than the sighter world, they enjoy their curiosity and desire to explore the world like other sighted children (Barraga & Erin, 2001), and they have the ability to generate something novel by using imagery and performance on the mental synthesis task which is connected with creative thinking just like sighted children (Eardley & Pring, 2007). That being said, we should note that other senses have limited capacity in compensating the individual for the loss of vision.

Although the earlier mentioned literature believes that children with VI have the ability to be creative thinkers, they may be less creative compared with their sighted peers; this could be due to many reasons. For example, they may suffer from poor adjustment with themselves and with others as a result of conducted comparisons between them and others, and as a result of exposure to different types of treatment from those who surround them. Some people may make fun of them; others may be sympathetic on children with disabilities, so these children may feel weak (Zahran, 2005).

In addition, the lack of exposing these children to stimuli may lead to one degree or another in the weakness of mental abilities and lack of cognitive process, especially in those who depend on complex concepts. In addition, many researchers reported that such children might not be identified, and programmes that are interested in developing the talents and creativity of children with disabilities are rare and few (Ahmad, 2007; Halpin et al., 1973b); furthermore, individuals with disabilities are excluded from programmes that aim to develop talents and creativity (Ahmad, 2007; Fox & Brody, 1993). This neglect to develop creative abilities of children with VI, as mentioned by many researchers, can result in interaction of their creative potential with difficulties they
face due to VI, as well as the identification of their disability, which leads teachers and parents immediately to concentrate on the disability and therefore to reduce their expectations from the student, although they have talent and creative abilities, which leads to a lack of attention to the student’s creativities and talents. So, disability status may mask the individual creative talents and make it difficult to identify those talents, even within programmes that direct care to children with disabilities (Khoja, Kaador, & Shawli, 2006).

Clark (2004) added that the specialist instructors in the field of special education rarely have the relevant experience that could help them discover the creative abilities of the students with VI. Also, the programmes, tools, and assessment procedures used in teaching creativity are mainly designed for normal students and are not appropriate for these students in their special condition. Quraiti (2005) added that there are limited numbers of specialists that can spot creative and talented people among regular or disabled groups therefore can identify student’s abilities and determinate future academic and vocational opportunities based on inaccurate observations. So, the omission of creative thinking when setting curricula and organizing class environment and teaching methods, is one of the most important reasons for this group of students to be demolished and not have any motivation students to show actual performance and to develop their creative abilities (Khoja et al., 2006).

Therefore, the real problem of blindness is not the loss of eyesight; it is the misunderstanding, lack of information, and appropriate training and opportunity (National Federation of the Blind, 2007). Hadidi (2013) adds that these children could develop their creative abilities by providing them with rich sensory experiences and encouraging self-expression, as well as the need to be identified, taking into consideration the impact of the disabilities on their development aspect, and providing them with intervention opportunities, special education programmes, and appropriate environments for their creative abilities.

The question that should now be raised is: What are the main factors that should be considered to stimulate creative thinking in children, including those with VI?

Recently, researchers drew attention to environmental contexts that stimulate creativity (Davis, 2004) and believe that the essential place that pushes society onto the path of creativity is the school. It includes a child who has a tremendous ability to receive and accommodate knowledge (Sharma, 2011). Therefore, schools’ programmes need to be prepared in a way that focuses on identification, curricular modifications, and counselling, especially involving trained teachers who respond to children needs, and enables students to think and solve problems in a creative way (Omdal, Ruconich, Ferrell, & Corn, n.d.).

Educational literature confirms that the teacher has a key role in stimulating creativity in children; he/she should be well prepared, welcoming, and encouraging for students’ attempts and participation, and should have certain characteristics including self-confidence, realism, seriousness, sincerity, and compassion (Higgins, 2000). Davis (2004) added that teachers should have diverse teaching methods. The teacher should be able to adapt the ideas and materials to fit with the needs of the class and plan to make learning meaningful for the students.

Schools also, according to Davis (2004) and Isaksen et al. (2000), should encourage individuals to achieve success in a possible way for him/her. It should encourage using divergent and creative problem-solving tools and skills when performing learning activities, and it should build a feeling of control over what is to be done by
encouraging individuals to have choices, and be involved in goal-setting and the decision-making process.

Researchers (e.g. Ahmad, 2007; Sharma, 2011) also showed that there is a significant difference between rich and poor home environments in fostering creativity in children. Home environment can shape a child’s life and it can be considered as a powerful learning environment, by encouraging creative practices and by building a close relationship between parents and their child. Conversely, Amabile (1989) observes that there are some parents whose practices can impede creativity in their children; she stresses that pushing children in activities before they are ready or did not like could affect the growth of creativity in children. Also, Mohammad (2010) found out that there is an inverse correlation between family problems and the level of creativity in a child with VI. In this field, Torrance confirms on a variety of educational factors that must be taken into account for fostering creative thinking among children in school and home, such as the recognising the forces of potential among the students, respecting student’s questions, asking novel questions, engaging in thought-provoking discussions, and developing self-confidence, persistence, and imagination (Higgins, 2000). Also Davis (2004) confirms on the importance of establishing an open, democratic, and safe atmosphere by supporting and reinforcing unusual ideas.

Previous literature emphasises that enhancing creative abilities in students, including those with VI, requires an enriched environment focusing on creative thinking training within organised programmes. Guilford and Torrance are considered to be the first to draw attention to the importance of training in creativity by focusing on developing fluency, flexibility, elaboration, and originality skills and considering that the most effective programmes and techniques for stimulating creativity included both cognitive and affective factors (Davis, 2004). Since that time, there have been several attempts to stimulate creativity among individuals, for example, in 1938 Osborn took the initiative in developing brainstorming tools which focuses on encouraging children to generate ideas and unleash their imagination. In 1966, Osborn and Parnes built the Osborn-Parnes creative problem solving model (CPS), which including six steps: mess finding, finding facts; finding problem; finding idea; finding solution; and acceptance solution, it was the solid founding and the main entrance to the programs of a CPS (Davis, 2004).

In 1944 Gordon introduced synectics approaches; he used it to stimulate a new idea by encouraging students to examine ideas from a very different situation, and then find ways to draw relevant and original connections by using analogies and metaphors (Davis, 2004). Debono began his studies about thinking through the sixth decade of the last century, and he invented the term of lateral thinking that commonly means creativity, which seeks ‘to solve problems by unorthodox or apparently illogical methods’, and he has developed a range of programmes (e.g. CORT, 1974; Master Thinker, 1988; Direct Attention Thinking Tools, 1997) (Davis, 2004).

In 1953, Osborn developed the checklists tool, later Eberle (1996) developed this tool and named it SCAMPER, which is considered as one of the famous tools that stimulates creative and critical thinking; it encourages the person to generate new ideas about how he/she could improve existing ones by using SCAMPER thinking techniques that include substitute, combine, adapt, modify, magnify, put in to other uses, eliminate, reverse, and rearrange ideas.

As disability is associated with limited access to information, resources, and opportunities, programmes and environment should be adjusted to facilitate exposing these children to real-life experience that requires solving problems. It is important to
encourage such children to use and integrate information coming from different senses and teach them how to use it in a unique way to solve problems and challenges they face. Teachers should not forget the role of the students in the process of understanding their strengths, difficulties, and learning to use compensatory strategies to overcome negative consequences of the disability (Gabrialavičiūtė, 2008).

Finally, to effectively plan creative activities for children with VI, teachers must consider each child’s unique needs. This could be achieved by ensuring the use of appropriate materials and making necessary modification, changing or adding special items for these children, embedding of special objectives in creative activities by selecting specific individualized education plan objectives for children to work on during the activity. The space also has essential role when teachers plan creative activities. For children with visual needs to participate actively, it is important to make changes in the environment and provide them with additional time to actively engage in an activity (Mitchell, 2004).

Methodology
The proposed study suggests different procedures focusing on tools, collecting data, and training and analytical techniques in order to achieve its objectives. So, this research will adapt the experimental approach to investigate the effectiveness of the proposed programme to develop the creative abilities of students with VI in the Jordanian environment. The following is a description of the main features of methods and procedures that will be used in the study frame to answer the questions of the research.

Participants
The population for this study consisted of all students with VI in the MOE schools in fourth and fifth grades for the academic year 2011/2012 in the Amman district. The estimated number is about 90 students (male and female) according to the MOE survey.

The participant sample was selected from the Royal Academy for the Blind in Amman. The school has 105 teachers specialised in teaching students with VI, 25 administration staff of both genders, and about 310 students studying in the Academy from the first primary to high school grades within 35 classrooms. The classrooms are equipped with the latest means of special education for the blind and weak vision, and each class includes only six to eight students, where the Academy includes a special unit to convert the curricula of the MOE allocated for the sighted to ‘Braille’ Blind and provides curriculum for any student or teacher associated with VI in any area in the Kingdom. The participants consisted of all children in the fourth and fifth grades enrolled in this school, totalling 41 students spread over six classrooms at a rate of six to eight students per class.

Two experimental groups and two control groups were randomly chosen for each group representing male or female students. Table 1 summarises the distribution of the study samples.

Research instrument
In order to examine the effectiveness of the training programme, a self-report questionnaire was developed by researchers to identify the creative abilities of the children with VI based on a comprehensive review of the related literature and previous studies. The
The final questionnaire consisted of 50 items that addressed eight dimensions: curiosity, imagination, complexity, risk-taking, fluency, flexibility, originality, and elaboration. Table 2 shows the sample of the scale items.

Each item was formulated in a form of sentence that measure one of the creative ability. Respondents were asked to use a 3-point Likert-type scale that ranged as follows: 3 = “often”; 2 = “sometimes”; 1 = “seldom”, to measure the degree of having the creative ability listed in each item.

Ten referees specialising in special education teach at Hashemite University and 10 teachers of students with VI reviewed the study scale, ensuring the validity of the scale. Taking their comments into consideration, changes were made: some items were added and others excluded. For instance, the referees suggested that more items regarding vocabulary should be included in the fluency dimension. Some referees suggested removing one item regarding curiosity dimension which was considered inappropriate for visually impaired children. Thus, the testing field was helpful in giving the researchers an opportunity to make refinements. Finally, the testing field instruments gave the researchers a good opportunity to test the time needed to complete each of the three instruments. For each of the student scale it took most children with VI around 30 minutes. Items needed to be read to each of these children as they follow, marking their responses.

To estimate the reliability of the scale, an internal consistency coefficient for the instrument was calculated using Cronbach’s alpha method for each dimension and for the total score. Consequently, the reliability coefficients were between 0.62 and

<table>
<thead>
<tr>
<th>Sub-scale</th>
<th>Number of items</th>
<th>Sample items</th>
<th>The degree range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluency</td>
<td>4</td>
<td>9 – I use a huge number of worlds when I want to express my idea</td>
<td>4–12</td>
</tr>
<tr>
<td>Flexibility</td>
<td>4</td>
<td>10 – I can give many variety ideas</td>
<td>4–12</td>
</tr>
<tr>
<td>Originality</td>
<td>5</td>
<td>27 – I refer to be different from others</td>
<td>5–15</td>
</tr>
<tr>
<td>Elaboration</td>
<td>4</td>
<td>4 – I can feel the deep meaning of the answer and I add more on the deep meaning</td>
<td>4–12</td>
</tr>
<tr>
<td>Curiosity</td>
<td>9</td>
<td>38 – often I asked about what others thinking</td>
<td>9–27</td>
</tr>
<tr>
<td>Imagination</td>
<td>8</td>
<td>43 – I tend to dream of things that I knowing and doing</td>
<td>8–24</td>
</tr>
<tr>
<td>Complexity</td>
<td>8</td>
<td>23 – I have strong memory and many information that I can deal with in complex ways</td>
<td>8–24</td>
</tr>
<tr>
<td>Take risk</td>
<td>8</td>
<td>8 – I put for myself favorable objective, and I am not afraid from try to do it</td>
<td>8–24</td>
</tr>
<tr>
<td>Total degree</td>
<td>50</td>
<td></td>
<td>50–150</td>
</tr>
</tbody>
</table>
0.85 for the scale and its dimension. These results indicated that the reliability coefficients were satisfactory for the purpose of the present study.

Semi-structured interview
The researchers adopted a semi-structured interview as it collects information via direct interaction with the respondent and allows the collection of broad and in-depth views and information. One advantage of the semi-structured interview is that it gathers a greater depth of information in comparison with other methods of data collection (Cohen, Manion, & Morrison, 2000). The purpose of the interview in this study was to clarify how the teachers of participants perceive the effectiveness of training programme in developing creativity skills among participants in more depth.

Training programme
A training programme was developed by researchers for developing creative ability in children with VI based on a comprehensive review of the related theoretical and experimental literature. For example, SCAMPER tools (Eberle, 1996), brainstorming tool (Osborn, 2006), and analogical thinking (Davis, 2004) were selected and were modified for use in building the content and activities of the present study programme to ensure that the activities were culturally relevant to the Jordanian children with VI. Therefore, the researchers determine the theoretical basis for the programme by adopting the cognitive theory, as a basis to build the training programme, which suggested that creativity is a mental process that can be developed, according to the training case and organised activities.

The final training programme activities consisted of 30 training sessions aimed at helping students with VI in developing their creative abilities by focusing on developing the following creative abilities and traits: fluency, flexibility, originality, elaboration, risk-taking, curiosity, and attraction to complexity. This programme was finally designed to apply to two sessions weekly for each experimental group for three months, during the school days with agreement with the school administration; each session takes 45 minutes.

The content of the programme was designed as structured lessons to introduce the ideas of developing creative thinking in a complete training cycle; each lesson in the programme typically includes four sections and the trainer implemented each activity through it, as follows:

First section (10 minutes): Building familiarity with students and welcoming them, then presenting the title of the game (activity), with a brief introduction about it, and telling the students that each game includes an existing product that they need to improve by suggesting ideas. The trainer offers to the trainees verbal examples and cut-outs that will help them perform the game properly.

Second section (5 minutes): Reminding the students the instructions before starting the game by telling the students

Now we will play the game and the act activities titled, I will ask you to fly in a fantasy world. Use your imagination, everything is acceptable and can happen, and we can create really strange and wonderful things in our imagination, which in reality you are not expected to do it effectively, but you’ll just have to imagine that you are doing it … you have to know that you are only imagining.
Then the trainer asks the students if they have any questions.

**Third section (15 minutes):** Applying the game according to the following steps: provide teaching aids and tools needed, and models based on the goal of the game and the needs of the students; then, the trainer starts displaying the game through expressive reading, with attention to the requirements of short pause mentioned by three points (…). The goal of this pause is to provide an opportunity for the children to reflect and to give them time to implement the directions given by the trainer, and let the ideas flow in their brain. Upon completion of the game or any of its parts, the trainer creates a group discussion in order to exchange ideas and motivate them to mainstream the experiences gained in different life situations.

**Final section (5 minutes):** It aims to quit the activity by providing students with follow-up activities; these activities are discussed with the children within the introductory step.

The training programme activities mixed with the following techniques try to promote students in developing creative and novelty ideas, depending on their imagination and intuition. The programme technique aims at encouraging students to seek for related information, ideas, and alternatives; the following techniques were used and integrate the programme content:

- SCAMPER and brainstorming techniques, which help students in generating ideas for any problem or product by encouraging a student to think about how he/she improves the existing ones by substitution, combinations, adaption, magnify or minify, put to another use, elimination, and reversal ideas.
- Using random words and analogical thinking to stimulate ideas by asking them to look deeply at how problems have been solved.
- Thinking of consequences of actions, seeing other’s points of view, thinking about aims, and evaluating the ideas.

To ensure the validity of the training programme, it was sent to a group of 10 referees specialised in the fields of special education and early childhood education at Hashemite University. Taking their comments into consideration, changes were made; some content activities were added and others removed. For instance, the referees suggested that more activities regarding imagination should be included in the programme. A number of referees suggested removing some content activities that focused on abstract language and vocabulary.

**Data collection**

In order to examine the effect of the training programme, the researchers visited the targeted schools and met the head teachers of the schools, the participants, and their teachers in order to identify the training programme to them, its goal, and the method of training.

Two research assistants of graduate students at Hashemite University were used for implementing the programme after subjecting them to training on how to apply the study tool and training programme. Then, a time table was developed implementing the training programme with the school administrators, after that the programme was implemented under the direct supervision of the researchers, as follows:

- Administrating a pre-test on each of the experimental and control groups.
Explaining students in the experimental group the purpose of this programme and what is expected from applying the activities.

Administrating a post-test on both the experimental and control groups at the end of the programme implementation.

Interviews with the participants and their teachers were conducted after completing the training programme. The researchers obtained permission from the respondents to record the interviews on tape. All of the respondents agreed to have their responses to the interview recorded. The interviews were conducted in Arabic, transcribed on paper, and took approximately 15 minutes.

Data analysis
To address the research questions, descriptive statistics, including means and standard deviations, were used to describe the performance of the experimental and control groups in each dimension and the average of all items for the instruments. To address the effect of the training programme, a three-way multivariate analysis of variance (MANOVA) was used as the main statistical technique in the present study to determine any statistically significant differences among the study sample with regard to group (experimental and control) and gender. An alpha level of 0.05 was set a priori. The interviews with the practitioners were analysed. Relevant data were placed under each topic.

Experimental design
The current study used the quasi-experimental approach, where the students were divided into two groups: the experimental group, which was exposed to the training programme, and the control group, which was not exposed to the training programme.

Also pre–post-test was conducted for the groups (experimental and control) using a current study tool, in order to verify the effectiveness of the training programme based on the creative imagination on the dependent variables that consisted of creative abilities as students point on the study tool and as point on semi-structured. In contrast, this study tested two kinds of independent variables: group (experimental and control) and gender (female and male).

Results
The data collected from the sample were coded, entered into the Statistical Package for Social Sciences (SPSS) spreadsheets, and analysed using the SPSS software package (version 20). Descriptive statistics for all variables in the current study were examined using SPSS frequencies. Missing subjects were not detected, either. Results of the study are addressed by each research question as follows.

Results pertaining to research question 1
Research question 1 investigates the effects of the training programme in creativity on developing creative abilities, among 9–10-year-old children with VI in Jordan. Descriptive statistics (means and standard deviations) for the experimental and control groups’
scores were used, and the MANOVA test was run to analyse the effect of the training programme on developing the creative abilities among the study sample. After this the Tukey test of multi-comparison was used. Table 3 presents the means and standard deviations of the experimental and control groups on the student scale and the adult scale.

As shown in Table 3 the mean values of the study scale sub-dimensions ranged for performance of experimental groups between 2.87 with SD = .36 for risk-taking dimension and 2.95 with SD = .43 for elaboration dimension. Otherwise, the mean values of the study scale sub-dimensions for the performance of control groups ranged between 1.958 with SD = .50 for flexibility dimension and 2.29 with SD = .28 for curiosity dimension. This indicates that the experimental group had higher mean values than the control group at the overall scale and in all the sub-dimensions for this scale.

It is also obvious from Table 3 that the mean values of the females’ performance on the study scale were higher than those of the males’ performance on the study scale sub-dimensions, which ranged for females between 2.60 with SD = .42 for originality dimension and 2.76 with SD = .45 for fluency dimension, but the mean values of the males’ performance on the study scale sub-dimensions ranged between 2.3 with SD = .51 for originality and flexibility dimension and 2.55 with SD = .42 for the fluency dimension.

Table 3. Means and standard deviations of eight dimensions of ‘Creativity Assessment Scale’ according to the study variables (group and gender).

| Dimension          | Gender | Experimental | | Control | | Total |
|--------------------|--------|--------------|---------|---------|---------|
|                    | M      | SD           | M       | SD      | M       | SD     |
| Fluency            | Male   | 2.95         | .38     | 2.33    | .43     | 2.55    | .42    |
|                    | Female | 2.94         | .42     | 2.38    | .50     | 2.75    | .45    |
|                    | Total  | 2.945        | .41     | 2.36    | .46     | 2.68    | .44    |
| Flexibility        | Male   | 2.95         | .51     | 1.94    | .45     | 2.30    | .51    |
|                    | Female | 2.94         | .43     | 1.97    | .55     | 2.62    | .51    |
|                    | Total  | 2.945        | .44     | 1.958   | .50     | 2.51    | .52    |
| Originality        | Male   | 2.96         | .36     | 1.93    | .32     | 2.30    | .40    |
|                    | Female | 2.90         | .42     | 2.02    | .40     | 2.60    | .42    |
|                    | Total  | 2.935        | .41     | 1.975   | .37     | 2.30    | .41    |
| Elaboration        | Male   | 2.95         | .34     | 2.20    | .39     | 2.46    | .39    |
|                    | Female | 2.95         | .45     | 2.11    | .33     | 2.69    | .43    |
|                    | Total  | 2.955        | .43     | 2.18    | .36     | 2.61    | .42    |
| Curiosity          | Male   | 2.91         | .28     | 2.24    | .25     | 2.48    | .26    |
|                    | Female | 2.91         | .29     | 2.3     | .29     | 2.72    | .29    |
|                    | Total  | 2.915        | .29     | 2.29    | .28     | 2.64    | .28    |
| Tend to be complex | Male   | 2.97         | .37     | 2.27    | .27     | 2.52    | .33    |
|                    | Female | 2.93         | .37     | 2.33    | .32     | 2.73    | .35    |
|                    | Total  | 2.945        | .37     | 2.30    | .29     | 2.66    | .35    |
| Imagination        | Male   | 2.97         | .42     | 2.18    | .34     | 2.46    | .40    |
|                    | Female | 2.93         | .39     | 2.37    | .24     | 2.74    | .35    |
|                    | Total  | 2.945        | .40     | 2.27    | .32     | 2.65    | .37    |
| Risk-taking        | Male   | 2.86         | .32     | 2.17    | .32     | 2.42    | .32    |
|                    | Female | 2.86         | .38     | 2.28    | .31     | 2.67    | .36    |
|                    | Total  | 2.87         | .36     | 2.23    | .31     | 2.59    | .34    |
**Results pertaining to research question 2**

What effect will a training programme in creativity have on developing creative abilities among students who have VI due to their teacher’s point of view?

An interview was conducted with teachers of students who received the training programme, to verify the impact of the programme in developing a number of behaviours in these students. The analysis of the interview transcripts showed that the interview results confirmed the question 1 results. Majority of teachers of the students from the experimental group interviewed (five out of six) believed that such training programmes should be used as a part of the teaching process and school programme; they felt that including students with VI in such training programme may be a good idea, and suggested that students with disabilities need to start their educational life with activities that stimulate the development of thinking skills. As a result of teachers’ observations, the majority of students who were exposed to the training programme are becoming more active, asking questions, and have the tendency to explore. One teacher said ‘one of the students who received the training program has more tendencies to discover, and inquire, and to think more than many others when asked’.

More than half of the teachers of participants from the experimental group (four out of six) noticed that some of the students who received the training programme became more daring, took the initiative to answer, and participated in classroom activities. The following excerpts are exemplary of the teachers’ statements:

- ‘Well, students with VI need to be exposed to activities that promote their thinking. Through their exposure to the training program I noticed that some of them became more tending in analyzing situations and ideas.’

- ‘One of the students from the experimental group became more able to form concepts in a flexible way, which effected in reducing the impact of their disability on forming concepts.’

- ‘I noticed on some of the students who received the training program to be more imaginative and they are asking more about the things that they cannot see.’

All of the participant students from the experimental group according to their opinion have the tendency to try more and to generate possibilities and ideas in different ways, and they try to think of new solutions. In addition, most of the teachers interviewed (five out of six) agreed that the students who received the training programme when compared with students from a control group became more confident, were aware of their strength aspects, were flexible in solving problems, and faced the challenges with the learning situation and with their peers. It was also evident through the analysis of the interview that participating students who received the training programme became more motivated and persistent after it, and they showed readiness to try again when failure occurs. One teacher’s response on this matter is summarised as follows:

Samira is a student who usually does not interact with class discussions and usually sits alone and rarely interact with others and does not have the courage to talk with her classmates. However, after exposure to the training program, I notice that she sometimes become more confident, and she tries to talk with some of her classmate, and tries to participate in the classroom discussions.

The previous results confirm the programme’s effect on developing creative abilities among students of the experimental group when compared with the control
group, where the teachers noticed that the students under the training programme showed improvement in creative abilities such as increased desire of curiosity, questioning, motivation for achievement, and flexibility of thinking of many of the solutions to problems that may be encountered. This indicates also that students transfer the effect of training to the classroom.

**Results pertaining to research question 3**

To identify whether the variances of the performance of the experimental and control groups at the overall dimensions and its sub-dimensions were significantly different at the level of $0.05 \geq \alpha$, and whether it variances according to gender; two-way MANOVA was utilised for evaluating the performance of the participate ratings to creative abilities measured by study scale.

The two-way MANOVA was applied in order to check the equivalence on the pre-test, and the results showed no significant differences in gender, group, interaction between groups, and gender at $\alpha = 0.05$, by using Bonferroni-type adjustment. A Wilks’ lambda value equal to that of MANOVA was not used, as shown in Table 4.

Table 4 shows that there were significant differences at the 0.05 alpha level between the performance of the experimental group and the control group in favour of the experimental group at all study scale dimensions. Moreover, there are no significant differences at $p < .05$ due to gender in all dimensions. On the other hand, there was no statistically significant effect for interaction between each of the study variables. An analysis of variance (ANOVA) followed the MANOVA to test each individual domain separately to decide if there were any statistically significant differences that could be attributed to group and gender or the interaction between these variables.

Table 5 displays the results of the one-way ANOVA test for the effect of the group and gender, and interaction between these variables on the development of creative abilities in participants.

As shown in Table 5, there was a statistically significant main effect of a training programme for a group on developing fluency due to the participants’ point of view.

Table 4. The results of two-way MANOVA: the effect of group and gender, and interaction between them on responses of the participant’s students on the eight dimensions of the study scale.

<table>
<thead>
<tr>
<th>Source</th>
<th>Wilks’ lambda value</th>
<th>$F$</th>
<th>Hypothesis df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>0.939</td>
<td>0.246</td>
<td>8.00</td>
<td>0.978</td>
</tr>
<tr>
<td>Gender</td>
<td>0.159</td>
<td>19774</td>
<td>8.00</td>
<td>0.000*</td>
</tr>
<tr>
<td>Group × gender</td>
<td>0.883</td>
<td>0.498</td>
<td>8.00</td>
<td>0.848</td>
</tr>
</tbody>
</table>

*Significant at the $p < .01$ level.

Table 5. ANOVA test results for the effect of the training programme for the performance on the dimension of fluency.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>$F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>2.876</td>
<td>1</td>
<td>2.876</td>
<td>23.604</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>304.438</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the $p < .01$ level.
(\(f = 23.604, \ p < .01\), in favour of the experimental group (\(M = 2.95, \ SD = .41\)), when compared with the control group (\(M = 2.36, \ SD = .44\)) (see Table 3 for mean scores).

As shown in Table 6, there was a statistically significant main effect of a training programme for a group on developing flexible thinking for the students with VI points of view (\(f = 83.056, \ p < .01\)) in favour of the experimental group (\(M = 2.954, \ SD = .44\)), when compared with the control group (\(M = 1.958, \ SD = .50\)) (see Table 3 for mean scores).

Table 6. ANOVA test results for the effect of the training programme for the performance on the dimension of flexibility.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>(F)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>8.187</td>
<td>1</td>
<td>8.187</td>
<td>83.056</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>272.250</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the \(p < .01\) level.

Table 7. ANOVA test results for the effect of training programme for the performance on the dimension of originality.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>(F)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>7.591</td>
<td>1</td>
<td>7.591</td>
<td>116.664</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>268.040</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the \(p < .01\) level.

As shown in Table 6, there was a statistically significant main effect of a training programme for a group on developing flexible thinking for the students with VI points of view (\(f = 83.056, \ p < .01\)) in favour of the experimental group (\(M = 2.954, \ SD = .44\)), when compared with the control group (\(M = 1.958, \ SD = .50\)) (see Table 3 for mean scores).

As shown in Table 7, there is a statistically significant main effect of a training programme for the group on developing originality in thinking for the students with VI according to their points of view (\(f = 116.664, \ p < .01\)), in favour of the experimental group (\(M = 2.93, \ SD = .41\)), compared with the control group (\(M = 1.98, \ SD = .37\)).

As shown in Table 8, there was a statistically significant main effect of a training programme for the group on developing elaboration thinking for the students with VI according to their points of view (\(f = 78.681, \ p < .01\)), in favour of the experimental group (\(M = 2.95, \ SD = .43\)), compared with the control group (\(M = 2.18, \ SD = .36\)).

As shown in Table 9, there was a statistically significant main effect of a training programme for the group on developing curiosity for students with VI according to their points of view (\(f = 79.142, \ p < .01\)), in favour of the experimental group (\(M = 2.91, \ SD = .29\)), compared with the control group (\(M = 2.29, \ SD = .28\)).

Moreover, Table 10 shows that there was a statically significant main effect of a training programme for the group on developing imagination for students with VI according to their points of view (\(f = 99.98, \ p < .01\)), in favour of the experimental group (\(M = 2.94, \ SD = .40\)), compared with the control group (\(M = 2.27, \ SD = .32\)).

As shown in Table 11, there was a statistically significant main effect of a training programme for the group on developing a tendency to complex thinking for the students with VI (\(f = 101.586, \ p < .01\)), in favour of the experimental group (\(M = 2.94, \ SD = .38\)), compared with the control group (\(M = 2.30, \ SD = .29\)). Finally, Table 12 shows that there was a statistically significant main effect of a training programme
for group on developing risk-taking for the students with VI ($f = 66.260$, $p < .01$), in favour of the experimental group ($M = 2.87$, $SD = .36$), compared with the control group ($M = 2.23$, $SD = .31$).

Table 8. ANOVA test results for the effect of training programme for the performance on the dimension of elaboration thinking.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>$F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>4.695</td>
<td>1</td>
<td>4.695</td>
<td>78.681</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>288.320</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the $p < .01$ level.

Table 9. ANOVA test results for the effect of training programme for the performance on the dimension of curiosity.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>$F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3.274</td>
<td>1</td>
<td>3.274</td>
<td>79.142</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>291.790</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the $p < .01$ level.

Table 10. ANOVA test results for the effect of training programme for the performance on the dimension of imagination.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>$F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3.839</td>
<td>1</td>
<td>3.839</td>
<td>99.98</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>294.049</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the $p < .01$ level.

Table 11. ANOVA test results for the effect of training programme for the performance on the dimension of tend to be complex.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>$F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3.682</td>
<td>1</td>
<td>3.682</td>
<td>101.586</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>295.891</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the $p < .01$ level.

Table 12. ANOVA test results for the effect of training programme for the performance on the dimension of take risk.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>$F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3.63</td>
<td>1</td>
<td>3.633</td>
<td>66.260</td>
<td>0.000*</td>
</tr>
<tr>
<td>Total</td>
<td>5281.415</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the $p < .01$ level.
Discussion

The results of this study showed that there are statistically significant differences between the groups in favour of the experimental group for all study scale dimensions. This result can be attributed to the nature of programme and to the variety of training activities. The environment of the training programme was prepared with the necessary tools to enrich the training activities. The activity tools models and toys used in the programme motivated the children to explore and develop idea and creative imagination. During performing the programmes’ activities, the child has the freedom to use the activities’ tools which act as compensation for the lack of visual capability. Also, the result of the this study can be interpreted that students with VI subjected to programme activities prompt their imagination, motivation, curiosity, fluency, flexibility, and originality of ideas; all related to real life.

Finally, the time allotted for the children to deal with stimuli was sufficient to stimulate their creative thinking, and it provided children with time to explore things and arranged tools first, and then to interact with it practically. Afterward, children will produce new ideas and thoughts by themselves, with the use of many of the raw materials under the activity panels. For example, in the activity of carton box, boxes of several sizes and lengths were used in order to explain to the children the different sizes and shapes of the boxes, and then each child was asked to make the box big enough through their imagination to be a house, and design it. After that, the children were asked to make the box smaller as a cat house, then make a car, a refrigerator, a box for toys, and so on.

At the end of this activity, the trainers asked the children to make improvements to some of their products as they imagined it in order to make it better and more useful, and then the trainers conducted an open discussion between students to exchange and improve their ideas. This may have a role in regulating child thinking and storing a new set of links in his/her mind, which may stimulate the creative thinking skills he/she has, and Torrance (1995) points out that this type of instruction leads to get more original ideas, so the researchers focused on the way the child dealt with raw materials and encouraged the production of new materials or ideas.

All these factors have contributed in one way or another in the development of the skills of creative thinking among members of the experimental group who received the training programme based on the creative imagination, unlike the control group that did not receive the training programme, and stayed in the traditional environment that lacked those stimuli and activities which develop creative thinking.

This result is similar to the findings of and Davis (2004), which indicated that all children could develop their creative abilities, including students with VI, as many researchers emphasised (e.g. Grimm, 1998; Halpin, 1977; Ibrahim, 1997 in Ahmad 2007; Tisdall et al., 1971). The current study results agreed with those of Halpin (1972), Halpin and Halpin (1973), Halpin et al. (1973a), and Tisdall et al. (1971), which showed the superiority of the experimental group to the control one in fluency, and agreed with those of Halpin (1972), Halpin and Halpin (1973), and Halpin et al. (1973b), which showed a marked improvement in flexibility and originality. Also, results of this study agreed with many researches in studies (e.g. Abdel-Rahman, 1998; Ahmed, 2007; Grimm, 1998; Mohammad, 2010) that showed the existence of significant differences in the components of the ability of creative thinking (fluency, flexibility, originality, and details) among members of the
experimental group including the skills of fluency and flexibility (Abdel-Rahman, 1998), originality skills, and creative imagination among blind students (Mohammad, 2010).

In addition, the result of the current study is consistent with Ahmad’s (2007) study, which confirmed that the creative abilities depend on imagination, and creativity can be developed through enhancing creative imagination in children.

The results of ANOVA reveal that there were no statistically significant differences among participants attributable to their gender. This means that the creative abilities of students who participated in this study, regardless of their gender, have been developed as a result of the training programme. This could be due to the fact that creativity is a mental process which is distributed between normal individuals regardless of their gender, and that the childhood characteristics associated with creative abilities are similar among all children regardless of their gender, because they are subjected to the same educational experiences (Osborn, 2006). In addition, the activities and tools included were suitable for both genders, and therefore, it is expected that these activities will not lead to variations in mental processes or thinking skills possessed by children. In addition, the activities included in this programme were introduced in the same way for both equally, and this in turn led to a lack of variation in their performance according to their gender. The results of the current study agree with the results of some previous research on the impact of training indicated on the development of creative abilities in children, such as Halpin et al. (1973a) which emphasised that there is no significant difference in creative abilities due to age, gender, or race.

**Recommendations**

In the light of the current study and its results, the following recommendations are posed. From a practical standpoint, it is recommended to concentrate on building training programmes for developing creative thinking among students with VI at different stages, by developing curricula that focus on developing creative abilities. It is also recommended that their teachers be aware and pre-service trained on the importance of developing creative abilities of children with disabilities including the ones who have VI. The MOE and universities should update their programmes with the aim of training teachers on contemporary issues and how to focus on skills needed to enhance the creative abilities among children regardless of their disabilities. In this field, within the special education Bachelor degree programme, Hashemite University in Jordan offered two courses in developing creativity and talent for all children including children with disabilities, guiding and instructing the families and teachers of impaired children to the role of imagination and creative play in the growth of cognitive abilities of their children.

As with most researches, this study demonstrates the need of further studies in the area of developing creativity among children with disabilities and its impact on the quality of presented education programmes. One important step that would ensure progress in this area of study would be to conduct a similar study aimed at exploring the impact of the creative imagination on developing self-concept in children with disabilities. Other studies could be conducted to research the extent of the impact of different types of training programme on the development of creative thinking.

In addition, programmes designed to individuals with VI in kindergarten and school must be directed to pay attention to the need of developing creative thinking by
providing software that is designed based on the imagination, because of its extreme importance at early stage in children life. Finally, it is hoped that the findings of this research will serve as evidential data from which other empirical studies may develop.

Notes on contributors
Kholoud A. Al-Dababneh is an associate professor in Special Education Department at Queen Rania Faculty for Childhood, Hashemite University, Jordan. Previously she worked as vice dean of Queen Rania Faculty and head of the Childhood Education Department at Hashemite University. Her research interests in special education include gifted and talented students, creativity, early intervention, inclusive schools, learning disability, parental involvement, and students with disabilities.

Mu’tasem M. al-Masa’deh, Assistant professor of special education at Queen Rania Faculty for Childhood, the Hashemite University - Jordan. Previously worked as assistant professor of special education at Dammam University – Saudi Arabia. His work focuses on intellectual disability, talented children, and ADHD.

Enass Oliemat is an assistant professor of Special Education at the Department of Special Education, the Hashemite University, Jordan. Her research interests include evaluation and diagnosis, language disorders, inclusion, child rights and low, visual impairment, creativity.

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