

DaVinci program: Enhancing children's creativity through experiential learning activities

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Abstract

Problem Statement: Developing creative potential is a current problem, because this experience facilitates the access to the development of the inner potential, especially in children. This research presents an experiential learning program, called DaVinci Workshops, which is a Romanian experiential perspective on enhancing creativity in children.

Purpose of Study is to find out if creative potential can be enhanced through certain experiential learning activities.

Methods: This research included intervention trainings, made in 12 sessions, on a number of 122 non-clinic subjects, aged between 6-11 years. The research had a pre-test post-test design, while classical tests from Guilford and Minnesota measuring flexibility, fluidity and originality were used.

Findings and Results: The tested factors of the creative potential were enhanced, implying a development of the creative potential.

Conclusions and Recommendations: Enhancing creativity through experiential learning activities is a very pleasant process for children, who are very positive and enthusiastic during this kind of programs, with numerous good outcomes.

Keywords: creativity, intervention, experiential learning, children

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1. Introduction

This article describes the results of an experiential learning program for increase in creativity level of children. We are presenting the results on three of the creativity intellectual factors: originality, flexibility and fluency. Creativity is a concept that has gained an important place in the field of psychology over the past decades. Guilford (as cited in Bass, De Dreu and Nijstad, 2008) addresses the American Psychological Association on the importance of focus on the study of creativity within the psychology field from specialists.

In the educational field there are numerous specialists that are advocating for a school system based on developing students' creative thinking and learning (Pang, 2015; Wright, 2010; Hennessey, 2015), even so as there is evidence of a lack of creativity regarding children as it has been shown by the PISA 2012 results concerning students' creative problem-solving activities, where only one in five students demonstrated to have this ability (Pang, 2015). The need of programs and trainings related to creativity for students' is increasing. There are studies in scientific literature in which creativity is related to important findings. Firstly, there are trainings that have the objective to increase creativity both in students and children (Munteanu, Costea & Jinaru, 2010; Alfonso-Benlliure, Melendez & Garcia-Ballesteros, 2013). Secondly, there are positive outcomes that have been found following a creativity program: in academic achievement (Brown, Broderick, Lantieri & Aber, 2004; Hansenne & Legrand, 2012; Kuncel, Hezlett & Ones, 2004), developing social and emotional competencies, reducing the risk of future school failure, aggression, and violence (Brown et al., 2004). Creative thinking that can be developed through creative activities has been reported as playing an important part in resilience of children after a natural disaster (Metzl, 2009). There are a range of activities that can be related to children's creativity that include: playing games, dancing, coloring, drawing, telling stories, singing (Alfonso-Benlliure, 2013), also there are positive results coming from creative writing (Vass, 2007), working creatively with various objects (Guerra, M., Zucooli, F., 2012). Mental imagery is often associated with creativity it is applied successfully at children (Smith, Wright, Allsopp & Westhead, 2007). To summarize what have been said so far, creativity programs and creative activities have been found very efficient for the education of children. A creativity program could be used as a self-development, intervention or prevention program. *DaVinci* Program was intended to be a prevention program and a self-development program.

1.1 The Concept of Creativity

Creativity has been described as *"the interaction among aptitude, process and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context"* (Plucker, Beghetto & Dow, 2004). From this definition we can trace creativity throughout the entire history of human-kind: all the great inventions, achievement, technology, knowledge that we acquired most probably came through the process of creativity. According to Munteanu (1999) there are four psychological factors that are responsible for the creativity process:

- Intellectual factors;
- Non-intellectual factors;
- Special aptitudes;
- Abyssal factors.

The most common factors that are studied in relation with creativity are the intellectual factors: originality, flexibility and fluency. Originality is the ability of the subjects to find new and

original solutions. Flexibility represents the capacity to restructure the thinking process in accordance with new demand's. Fluency is defined by the richness and rapidity of a subject response.

1.2 Experiential Learning

"Experiential learning is learning by actual experience. By participating in real-life activities, students are able to efficiently transform the knowledge learnt from the classroom and textbooks into their understanding. Traditional classroom-based learning may not always create deep impressions in students because of its didactic, passive and standardized nature, yet the active and practical nature of experiential learning tends to facilitate deep understanding" (Chan, 2012). Taking into consideration the processes that occur when they are in the middle of the creation process, curiosity and the intrinsic motivation that come with it, may be used as a good argument to apply this type of learning to the children. The experiential learning strategy can give the sense that they are doing what they want and that they have the power in the learning process, it often happens that the child or the teenager has a problem with the "must do" or "must learn" expressions that are used by teachers in class. To support this, a list of experiential learning principles is presented as noted from the Association for Experiential Education in 2011 (as cited in Costea, 2014):

- Experiential learning occurs when carefully chosen experiences are supported by reflection, critical analysis and synthesis.
- Experiences are structured to require the student to take initiative, make decisions and be accountable for results.
- Throughout the experiential learning process, the student is actively engaged in posing questions, investigating, experimenting, being curious, solving problems, assuming responsibility, being creative and constructing meaning.
- Students are engaged intellectually, emotionally, socially, soulfully and/or physically. This involvement produces a perception that the learning task is authentic.
- The results of the learning are personal and form the basis for future experience and learning.
- Relationships are developed and nurtured: student to self, student to others and student to the world The instructor and student may experience success, failure, adventure, risk-taking and uncertainty, because the outcomes of the experience cannot totally be predicted.
- Opportunities are nurtured for students and instructors to explore and examine their own values.
- The instructor's primary roles include setting suitable experiences, posing problems, setting boundaries, supporting students, insuring physical and emotional safety, and facilitating the learning process.
- The instructor recognizes and encourages spontaneous opportunities for learning.
- Instructors strive to be aware of their biases, judgments and pre-conceptions, and how these influence the student.

1.3 DaVinci Program

DaVinci's program is an experiential learning program that aims to develop social-emotional and creativity competencies to children and adolescents. The idea for building this program is represented by the increasing need for self-development programs in the educational field that can provide tools for children to successfully adapt to social life. The program lasts for three months divided into twelve two-hour modules with two facilitators' participating in each session. The program activities are built in considering the age and the developmental stage of the children. There are four types of programs (only the first three were assessed in this study) which follow the same philosophy but address to different ages:

- DaVinci Smurf for children's 6-7 years old,
- DaVinci Whipster for children's 8 years old,
- DaVinci Junior for children's 9-10 years old,
- DaVinci Teens for children's 11-14 years old.

The twelve modules are divided in 3 main areas of development:

- 3 modules target the development of emotional competencies
- 3 modules aim the development of social competencies
- 3 modules attempt to develop creativity
- 2 modules (first and last) are intended for pre and post evaluation
- 1 module tries to enhance group identity and unity

1.4 Objective and Hypothesis

The objective of this study is to demonstrate that DaVinci experiential learning program is a reliable training program that can be used to enhance children's creativity and is easy to apply to class with minimum cost and effort. The hypotheses of this study are: (a) The originality level will increase at the end of the program for the 3 age groups; (b) The flexibility level will increase at the end of the program for the 3 age groups; (c) The level of fluency will increase at the end of the program for the 3 groups.

2. Method

2.1. Design and Procedure

We used a pre-test post-test design without a control group or process of randomization. The program was held in a public school in Timișoara (Romania), with children aged 6-11. The modules were implemented in class after the end of the school program. The testing occurred in the first and last modules in groups of 8-12 children and was paper based testing. SPSS program was used to analyze the data and T-test for comparing the results.

2.2. Participants

The participants in the present study were 165 children from a public school in grades 0-4. The parents of these children have completed a consent form in which they agreed to all the

requirements of the program, they were also informed that if the child misses more than 2 of the modules he/she can participate in the rest of the modules but will not be included in the final measurement. Out of the 165 children 122 completed the full program and were included in the final measurement, 58 boys and 64 girls. Participants were divided into 11 groups, the groups were formed so that if there were 10 children from the same class they were placed in the same group. There are various reasons for this, one being that their school schedule was the same and another one is the wish to have an ecological validity for the study as this program is intended to be included into the traditional school curriculum held by teachers and educators.

2.3. Instruments

The Romanian version of Minnesota and Guilford Creativity Tests – revised and adapted for children (A. Munteanu, 1999)-were used. They measure the factors of divergent thinking, one of the most important components of the creative potential. So, in this case, 3 tasks were applied, for the main factors of divergent thinking: originality, fluency, flexibility. The tasks for fluidity and flexibility were applied only for Whipster and Junior groups because they implied reading skills and the children from Smurf group had not acquired this skill up to the moment of study.

3. Results

The data were processed with the program SPSS 20.0 for Windows. We used the following main statistical operations: The Paired Sample *t* test in order to compare the raw score and *T* score at variables originality, flexibility and fluency depending on the variable testing moment. To check the hypotheses a comparison was made between initial and final evaluation (pre-test and post-test) for variables of originality, flexibility and fluency.

3.1. Hypothesis 1 - The originality level will increase at the end of the program for all three age groups.

The results for hypothesis 1 show that: There is a considerable difference on the significance threshold $p \leq 0.00$ between the *T* scores at the variable of originality measured in the pre-test and post-test for all the three groups (Table 1). For Smurf it is [$t(52) = 4.853, p = 0.000$], for Whipster group [$t(31) = 5.670, p = 0.000$] and for Junior group [$t(39) = 5.000, p = 0.000$]. At the end of the program all three groups demonstrated significant increase of the creativity subfactor - originality (Fig.1). We also measured the effect size which is large for Whipster and Junior groups ($ES=1.02$ and $ES=0.90$) and average for the Smurf group ($ES=0.67$).

Table1. Descriptive statistics and effect size for originality in the pre and post test

Groups	Time	N	M(SD)	<i>t</i> value	Cohen's <i>d</i>
Smurf	Pre-test	52	12.71(5.08)	4.853	0.67***
	Post-test	52	16.11(5.45)		
Whipster	Pre-test	31	16.80(7.60)	5.670	1.02***
	Post-test	31	23.58(7.21)		
Junior	Pre-test	39	13.90(4.78)	5.000	0.90***
	Post-test	39	19.30(8.26)		

* $p < .05$; ** $p < .01$; *** $p < .001$

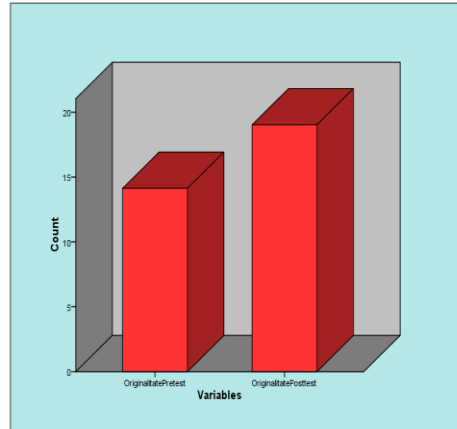


Fig.1 The level of originality before and after the program for the three groups

3.2. Hypothesis 2 - The flexibility level will increase at the end of the program for the two of the groups.

The results for hypothesis 2 show that: There is a considerable difference on the significance threshold $p \leq 0.01$ between the T scores at the flexibility variable measured in the pre-test and post-test for the two groups (Table 2). For Whipster group it is $[t(31) = 6.195, p = 0.000]$ and for Junior group $[t(39) = 3.244, p = 0.002]$. After the end of the program the two groups demonstrated significant increase of the creativity subfactor - flexibility (Fig.2). We also measured the effect size which is large for Whipster group (ES=1.17) and average for the Junior group (ES=0.53).

Table 2. Descriptive statistics effect size for flexibility in the pre and post test

Groups	Time	N	M(SD)	t value	Cohen’s d
Whipster	Pre-test	31	8.55(3.67)	6.195	1.17***
	Post-test	31	11.84(4.65)		
Junior	Pre-test	39	6.54(3.33)	3.244	0.53**
	Post-test	39	8.87(4.61)		

* $p < .05$; ** $p < .01$; *** $p < .001$

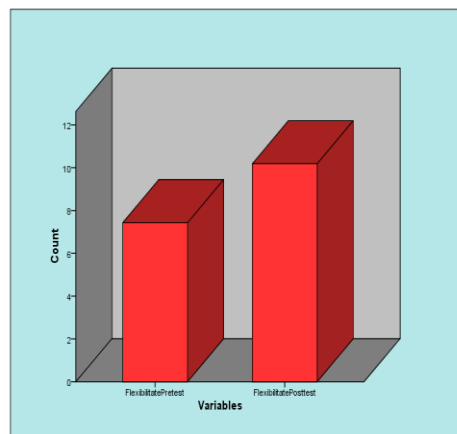


Fig. 2 The level of flexibility before and after the program for the two groups

3.3. Hypothesis 3 - The fluency level will increase at the end of the program for two of the groups.

The results for hypothesis 3 show that: There is a considerable difference on the significance threshold $p \leq 0.01$ between the T scores at the variable of fluency measured in the pre-test and post-test for the two groups (Table 3). For Whipster group we have $[t(31) = 4.663, p = 0.000]$ and for Junior group $[t(39) = 2.996, p = 0.005]$. At the end of the program the two groups demonstrated significant increase in the creativity subfactor - fluency (Fig.3). We also measured the effect size which is large for Whipster group (ES=0.84) and average for the Junior group (ES=0.50).

Table 3. Descriptive statistics and effect size for fluency in the pre and post test

Groups	Time	N	M(SD)	t value	Cohen’s d
Whipster	Pre-test	31	5.65(2.80)	4.663	0.84***
	Post-test	31	8.45(3.03)		
Junior	Pre-test	39	7.71(2.31)	2.996	0.50**
	Post-test	39	9.23(3.27)		

* $p < .05$; ** $p < .01$; *** $p < .001$

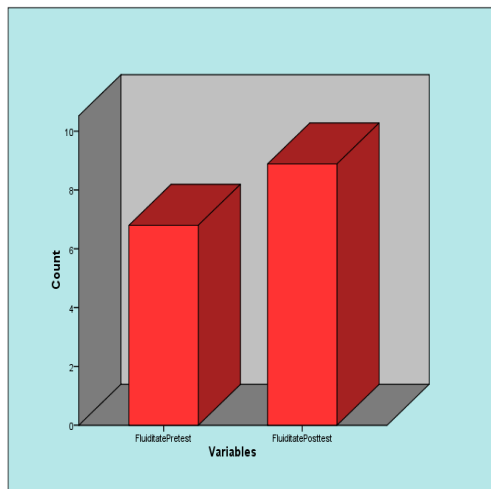


Fig. 3 The level of fluency before and after the program for the three groups

4. Discussion

The main purpose of this paper is to demonstrate that the DaVinci experiential learning program can help to increase children’s creativity. As proved by the results, all three hypotheses were confirmed and the creativity level of the children was increased at the end of the program. Thus, considering the previous research (Alfonso-Benlliure et al., 2013; Munteanu et al., 2010), creative potential can be increased through activities that are focusing on experiential learning. The main factors of divergent thinking (Munteanu, 1999) - originality, flexibility, and fluency – were tested. For originality the results have revealed a significant statistical difference between the pre-test and the post-test, also the effect size for all three groups was average to large (ES=0.67, ES=1.02, ES=0.90). Originality is assumed to be an important part of creativity (Munteanu et al., 2010), and, finding that through an experiential learning program it can be increased, it gives us a confirmation that we are on the right track. Flexibility is the creativity

factor that is accountable for the quick adaptation of the individual in various situations, and for what we are interested in it can be a good tool for children to use in social interactions. The effect size of flexibility was comparable to originality, average to high (ES=1.17, ES=0.53). Fluency is a part of creativity that implies verbal development, the results were significant at the end point and the effect size was moderate to high (ES=0.84, ES=0.50). The most important thing is that creativity was increased in all of the tested variables, thus it's worth taking a look at the results from the age perspective. If we take a good look to the composition of the groups, the Whipster group obtained the most improved results. The average age of this group was approximately 8 years; it doesn't seem that much of a difference compared to the other groups but it is definitely something that needs more research.

The important results of this paper also confirm the great potential that the experiential learning has; it confirms that children are more open to information when it appears in a more dynamic way (Chan, 2012). Experiential learning can account for positive outcomes (Costea, 2014) and it can also be a joyful way for the children to learn something new and useful.

5. Conclusion and limitation of the study

After the results of this experiential learning program we can say that creativity can be enhanced in children during DaVinci training. There are still plenty of things to do in the field of self-development for children but research is on the right track. If studies continue to appear, they can only apply pressure on the decisional factors in the matter of paying more attention to the children's needs in terms of educational and psychological field. As part of a bigger picture, the creative modules have done their part and demonstrated to us and of course to the children that DaVinci program is a valid and trustworthy training of the most important competencies that we are looking to work with.

We can mention as constraint the relative small size of the groups and also the lack of a control group that would have explained better if the results we obtained are because of the program or because of the natural development of the children. Another constraint is that there was no follow up evaluation to support the results that were gathered at the end of the program.

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