Using Educational Technology to Improve Creativity and Socio-emotional-Learning Competences among Gifted and Talented Children

MÒNICA GONZÁLEZ-CARRASCO[1]
Quality of Life Research Institute, University of Girona

GEMMA CROUS
Quality of Life Research Institute, University of Girona

DOLORS NAVARRO
Quality of Life Research Institute, University of Girona

FERRAN CASAS
Quality of Life Research Institute, University of Girona

MARTA PERACAULA
Faculty of Education and Psychology, University of Girona

MARIONA NIELL
Faculty of Education and Psychology, University of Girona

MERITXELL ESTEBANELL
Faculty of Education and Psychology, University of Girona

JORDI FREIXENET
Faculty of Education and Psychology, University of Girona

Abstract

This paper presents the results of evaluating a Creative Computing-related activity in a non-formal setting conducted by 19 gifted and talented children aged between 8 and 12. We focus on how educational technologies can help high-skilled children manage their emotions and resolve conflicts, while at the same time promoting creativity, and problem-solving. A questionnaire was administered before and after the activity to gather children's and their parents' opinions. Results show that the activity was highly motivating, while also having some impact on enhancing socio-emotional learning competences such as emotion identification. Parents also perceived positive changes, although their perspective differed from that of their children with regard to the issues raised. The activity implemented here opens the door to new ways of intervening with gifted and talented children, using educational technology to improve not only digital but also creative thinking skills and socio-emotional learning competences.

Keywords: Socio-Emotional Learning Competences; Creativity; Thinking Skills; Gifted and Talented Children; Educational Technologies.

---

[1] Postal Address: Quality of Life Research Institute, Faculty of Education and Psychology, University of Girona, Pl. St. Domènec, 9, 17004 Girona. E-mail Address: monica.gonzalez@udg.edu

Introduction

Gifted and talented children: challenges facing schools and parents

Gifted behaviours are considered to be the conjunction between an above average ability (general or specific), high levels of task commitment (action-oriented motivation) and high levels of creativity (Renzulli, 1978). According to Renzulli (2002), personality and environmental factors must be added to this 3-ring conception of giftedness, as they have an impact on the person's ability to engage in creative and productive endeavours. Because contemporary models of giftedness - Sternberg's triarchic theory of successful intelligence, for instance - consider that the environment and the individual interact to produce gifted behaviour, identification is thought to take place under a context-based measurement (Heller, 2013) that also includes parents' and/or teacher's viewpoints (Davidson, 2009).

In their review, Neihart et al. (2002, cited in Reis & Renzulli, 2004) pointed out that high-ability students are generally at least as well adjusted as non-high skilled students. However, their social and emotional development is under higher risk due to the mismatch existing between the educational environment and their pace of learning and thinking. To this must sometimes be added the lack of a supportive social, school or family environment.

Among those intervention approaches that have proved useful in supporting the healthy social and emotional development of gifted and talented students, Neihart et al. (2002, as cited in Reis & Renzulli, 2004) highlighted the following: (1) support and encouragement of accelerative learning experiences, (b) time to learn with others of similar abilities, interests and motivation, (c) engagement in areas of interest with a variety of peers, (d) mentoring and pragmatic coaching to cope with stress, criticism, and social milieu associated with high levels of performance in any domain, (e) early presentation of career information, and (f) social-emotional curriculum approaches to help gifted children support one another, this last approach probably being among the least used with these children.

According to Morawska & Sanders (2008), little is known about the nature of difficulties experienced by gifted and talented children and even less about parenting issues related to these children. Garn, Matthews & Jolly (2012) consider that parents of such children face additional challenges in developing their children's academic motivation compared to parents of average-ability learners because gifted and talented children's needs are generally less catered to in the school setting. The aforementioned authors surveyed 211 parents of gifted and talented children and observed that these parents reported they were likely to be less permissive with their child and use a more authoritarian style of parenting characterized by a strong reaction to any problems; this despite the fact that gifted and talented children generally do no exhibit more behavioural problems than other children.

Creativity and the use of educational technologies

Creativity is an important facet of giftedness, but at the same time very difficult to define and measure (Runco, 1993). According to Piffer (2012), three dimensions must be taken into account in any definition of creativity, following Kaufman & Beghetto's model. They are novelty, appropriateness/usefulness and impact.

Divergent thinking tests are commonly used to measure creativity, although, as Runco states, they only estimate the potential for creative thought and not creative thought itself. In fact, all measures of creativity can be said to be indirect measures (Piffer, 2012). This same author argues that unstructured or semi-structured interviews would allow the researcher to collect information about people's creativity more than methods based on external recognition or standardized questionnaires.

It is also worth mentioning Lovesome's ideas (2002) regarding the potential roles of digital technologies in supporting creativity. This author considers that access to digital resources alone does not enhance creativity, as it does so only within a context that promotes exploration, play, risk-taking, reflection, flexibility, focus, commitment and sensitivity. Strongly connected to this, Housand & Housand (2012), state that the use of technology can enhance children's motivation as long as they are provided with the opportunity for control, autonomy, challenge, cooperation and just-in-time knowledge, and not only for the mere fact of using it. In this context, activities

related to programming computers and other devices in a way that connects with the child's interests assume special relevance. This kind of activity is usually referred to as "Creative Computing" and can be used as a cross-disciplinary educational tool (Brennan, Balch & Chung, 2014).

Emotion regulation, conflict solving and creativity among gifted and talented children
Contradictory results have been found regarding whether gifted and talented children have more interpersonal difficulties compared to the mainstream population (see, for instance, Plucker & Callahan's review of the literature on gifted research and education, 2014). Beyond the different results found, there are some specific factors that seem to lead to social difficulties and interpersonal maladjustment among gifted and talented children, such as their asynchronous development, their tendency to introversion, the stigma of giftedness, high expectations and perfectionism (see Gómez-Pérez et al., 2014). In relation to this, although some successful efforts have been made to improve interpersonal skills among these children (see, for instance, Gómez-Pérez et al., 2014), to the best of our knowledge they have not simultaneously combined the promotion of digital competences with training in socio-emotional learning competences.

The term socio-emotional learning competence is being used with increasing regularity, highlighting the relevance of emotions and social relationships within child development (see Duckworth & Yeager, 2015), including emotion regulation and conflict solving. Newton (2012) considers that teachers' success in fostering creative thought might be greater if attention was paid to the feelings and emotions involved in learning.

Emotions are "*mental states arising from personal evaluations of the world which prompt a readiness to act in support of well-being*" (Damasio, 2000; Oatley & Jenkins, 1996, as cited in Newton, 2012, p.35), while moods generally refer to low intensity diffuse states which can last from hours to months (Newton, 2012). Mumford (2003) considers that both emotions and moods can shape creative thinking to a great extent. In a study by McCoach & Siegle (2003), it was observed that gifted achievers and gifted underachievers differed, among other factors, in their motivation/self-regulation but not in their academic self-perception.

Moods and emotions can also be classified according to different factors. Thus, they can be more or less pleasant, more or less activating or more or less directing (see Newton, 2012). According to Aldao & Wisco (2015), it is very important to identify how and when emotions are likely to reach high levels of intensity in order to regulate them more effectively. In fact, Reis & Renzulli (2004) noted the existence of potential higher levels of stress among gifted and talented children in relation to their giftedness in home and/or at school. Strongly connected to this, emotional over-excitability (both in terms of intensity and sensitivity) is a characteristic frequently reported among gifted and talented children (Jackson, Moyle & Piechoswki, 2009) and may lead to a strong self-critical attitude (see Hyatt & Cross, 2009). Another common feature of gifted and talented children is an unusually accelerated level of moral development (see Hyatt & Cross, 2009), which manifests itself through concern for problems in the world that other children do not think about (Roeper, 2003, as cited in Hyatt & Cross, 2009). These children also generally have a profound sense of justice, meaning that being treated unfairly or with insensitivity may have devastating consequences for them (Roeper, 2003, as cited in Hyatt & Cross, 2009).

Among strategies for turning negative emotions into positive ones, we find deep breathing, relaxing the body and mindfulness. Mindfulness or "full attention" is defined as a state of consciousness that involves paying conscious attention to experience, moment by moment (Brown & Ryan, 2003). It involves focusing one's attention in a particular way, with intention, on the present moment, and without judgment (Kabat-Zinn, 1994). To achieve this control, the first step needed is to be able to recognize one's own emotions and those of others, which forms part of what has been called emotional intelligence. Previous studies have shown the importance of introducing an affective curriculum within the school via development-oriented and teacher-led small-group discussions.

Research in the emotional arena has received very little attention in the sphere of technology use, according to Hatzigianni, Gregoriadis & Fleer (2016). When it has been analysed, it has tended to concentrate on online environments, multimedia design and children with emotional

and behavioural difficulties to determine which personal characteristics boost motivation, satisfaction and achievement in the face of digital situations. One exception to this is the work conducted by Hatzigianni, Gregoriadis & Fleer (2016), who explored school computer use among 3,345 Australians aged 8 to 9 and its association with socio-emotional outcomes and attitudes towards school. A significant, although small, association was observed between creativity and self-concept, but not between computer use, emotional problems and liking school.

Despite notable advances in the field, Duckworth & Yeager (2015) highlight the difficulty of measuring improvements in social and emotional learning competences. Common approaches to measuring these are self-report questionnaires administered to students and questionnaires administered to teachers about their students and task performance, all of which have some limitations. Therefore, the aforementioned authors recommend the use of a mix of measurement approaches wherever possible.

Using all of the above as a starting point and taking into account that research into the effectiveness of gifted programs is relatively limited, especially what refers to other outcomes different than academic achievement (Morgan, 2007), the aim of this article is to evaluate whether the strongly technology-based activity carried out helped to improve creativity - but also socio-emotional learning competences - in a sample of gifted and talented children through a two-informant self-administered measure (one questionnaire for children and another for their parents). The overall goal is to increase knowledge on how to use educational technologies in a way that helps promote creative thinking skills and socio-emotional learning competences, while also enhancing digital learning competences and creativity, both being crucial to gifted and talented children's school and everyday life.

Material and Methods

Participants
Nineteen gifted and talented children aged between 8 and 12 and belonging to a non-profit association composed of gifted and talented children and their families whose main aim is to promote the development and protection of these children. Five of the participant children were girls. Three were 8-year-olds, four were 9, three were 10, six were 11, two were 12 and one was 13. They were not grouped according to their level of giftedness but by mixing the different ages as far as possible. While incorporating Morgan's (2007) claim on including parents' perceptions about the impact of giftedness programs in order to evaluate their effectiveness, given the difficulties of using control groups, fifteen of the participant children's parents also responded to the questionnaire evaluating the activity.

Development of the activity
The activity consisted of 6 sessions, each conducted one afternoon every two weeks for three months, which were designed for the participants *ad hoc* based on the authors' previous experience and a review of the scientific literature. Sessions lasted two hours. Learning experiences were designed to follow a spiral of creative thought based on the following stages: imagine, create, experiment (play), share and reflect (Rusk, Resnick & Cooke, 2009). During the sessions, children were faced with two main challenges, described below.

1. Building and programming robots to work in a challenge mat. In this task, children were introduced to the world of conflict resolution in a cooperative way through potential conflicts that could arise during the construction of a Lego Mindstorm robot. After building the robots, the children had to program them. The robots had to move around on a map drawn on a mat and solve different challenges. By way of example, in one of the challenges the robot had to grab an element and take it to a point on the map while avoiding certain areas. All of the challenges required computational thinking and creativity to achieve them. In planning, testing and demonstrating their robots' performances, the children had the opportunity to realize that there are many equally valid solutions to the same problem. The children worked in small teams to construct and program the robot, applying tools provided in advance to resolve conflicts. At the

end of each session, the students reflected on the conflictive situations that arose during the challenge as a group.

2. *Collaborative story through chain reaction.* In this task, the children were asked to invent a collaborative story by participating in teams. As a team, the children designed and programmed a collaborative animation using Scratch (see http://scratch.mit.edu). Each team programmed one part of the overall story on its own computer. They then synchronized the parts, and at the end of the activity all of the computers were placed together in a line so that the children could watch the full story with the characters moving, speaking and jumping from one computer to the next. This workshop is a paradigmatic example of Creative Computing. In addition to programming skills, it requires brainstorming, teamwork to create the parts of the story, and finally refinement and remixing to connect all the parts. This last step requires each team connect its story with the previous and the following one in the line in a coherent and synchronized way.

The activity involves art and storytelling, as the children had to create backgrounds and characters. They could use the paint editor within Scratch, or any other editor, or they could import images (for instance, images of hand-drawn characters) or search for images on the Internet. The story had to involve emotions and people's capacity to transform them when feeling blocked due to their negativity. A previous meeting was required to decide on the story to be created (characters, structure and script). Each group invented part of the story and programmed it using the Scratch software and it was finally connected by means of teamwork involving all the groups.

The working areas of emotional intelligence included in the activity, based on Bar-on & Maree's (2009) model, were **emotional awareness** and **emotion identification** (knowing what one feels and being able to name it), **emotion regulation** (transforming blocking emotions to make the best of oneself and of the relationships with others), **social values** (respect, teamwork and cooperation, developed in a cross-sectional way through the activity) and **cooperative conflict resolution** as a tool for developing emotional and social intelligence. These competences were trained using experiential tools such as mindfulness, group reflexion, role-playing, the traffic light as a metaphor for the need to stop (red light) and reflect (orange light) before acting (green light), and the use of balloons (balloons are metaphorically filled with emotions that may lead to negative consequences and bursting them symbolizes the person's release from these negative emotions). The activity evaluated here was therefore designed under the following hypothesis:

- Reinforcing emotional aspects among gifted and talented children will help to improve their abilities with regard to interpersonal relationships.
- The activity proposed will contribute to increase the participating children's awareness of how emotions influence their behaviour and well-being.
- The child participation framework adopted and the use of educational technologies will contribute to enhancing the participant children's motivation and creativity when dealing with the different challenges proposed.

Instruments and evaluation design

In order to measure the impact of the activity, two questionnaires were designed (one for children and the other for their parents) so as to compare children and parents' opinions and evaluations. The questionnaires included both closed-ended and open-ended items. All the closed-ended items used scales from 0 to 10. Because it was not possible to have a control group with which to compare the performance of the participating children, potential changes due to the activity were tracked through a pre/post-test design by administering the same questionnaire to the children and their parents before and after the activity. Table 1 provides a description of those items used for analysis in this article.

Table 1: *Items on the questionnaire (PRE- and POST-, for children and parents)*

	PRE Children	PRE Parents	POST Children	POST Parents
About the activity				
Have you liked attending the activity? (0= Not at all; 10=Very much)			X	X
How much have you participated in the activity? (0= Not at all; 10=Very much)			X	
Do you think what you have learnt will be useful in the future? (0= Not at all; 10=Very much) - How?(*)			X	X
Changes observed				
Have you observed changes in your son or daughter?				X
About creativity				
Does he/she resolve challenges in a non-conventional way? (0= Not at all; 10=Very much) - Why do you think this?(*)		X		X
About emotions and conflict resolution				
What emotions do you know?(*)	X		X	
Is what you feel related to what you do? (0= Not at all; 10=Very much) - Why? Give an example (*)	X		X	
When you don't feel good, are you able to change what you feel? (0= Not at all; 10=Very much) - How?(*)	X	X	X	X

(*) *Open-ended answer*

Procedure

The activity entailed 6 two-hour sessions, with the children's participation greatly encouraged so that they worked from their own experiences, previous knowledge and interests. The researchers were present during all sessions. The instructions given to the children were minimal so they had a lot of freedom on how to solve the proposed challenges. All of the tasks included in the activity were carried out on the research team premises.

The children's participation was voluntary and based on a proposal made through the association. Interested families applied to attend the activity, bringing their children to it and collecting them after each session.

Data analysis

A descriptive analysis of the quantitative data was carried out by calculating mean scores and standard deviations for each of the measures included in the questionnaires. Potential differences between pre- and post-questionnaire responses were explored through non-parametric statistics (Wilcoxon test), due to the size of both the children's and parents' sample. The children's and their parents' responses were compared by means of Spearman's bivariate correlation. All tests were considered at the $p < .05$ level of significance. Qualitative responses were categorized when appropriate.

Results

General opinions about the activity and changes observed by parents

Immediately after finishing the activity we asked both the children and their parents whether the children had liked attending the activity. We also asked the children to what extent they had participated in it and whether the children and parents thought that what they had learnt would be useful in the future. Both the children's and parents' mean scores for *like attending the activity* were high, the children's mean being slightly higher than their parents' ($N = 15$, $M_{children} = 8.67$, $SD_{children} = 1.345$/ $N = 14$, $M_{parents} = 8.57$, $SD_{parents} = 1.158$). The correlation between children's and their parents' opinions about liking attending the activity was not statistically significant.

The children evaluated the intensity of their participation in the activity as quite high ($N = 15$, $M_{children} = 7.87$, $SD_{children} = 1.407$) and the parents considered that what their children had learnt would be useful for them in the future to a greater degree than the children ($N = 15$, $M_{children} = 8.00$, $SD_{children} = 1.852$/ $N = 14$, $M_{parents} = 8.43$, $SD_{parents} = 1.284$). The correlation between the children's and their parents' opinions about the future usefulness of the activity was not statistically significant.

The few children that responded ($N = 7$) to the question, with the exception of one, whose answer was not related to it, considered that they had learnt about emotions and conflict resolution thanks to the activity. Comments included the following: "*It's been very useful*", "*Yes, although at the beginning I thought it was boring*", "*Yes, I've seen all kinds of activities and all kinds of conflict resolution during these sessions*", "*The traffic lights showed us how to solve problems*", "*I've learnt to control myself*".

An open-ended item was used to ask parents to what extent they had perceived changes in their children's behaviour after the activity was carried out. Fifteen parents responded to this question, positive answers ($N = 8$) being more frequent than negative ones ($N = 5$). Among the **positive answers**, they said: "*He seems to structure things to do and how to organize them more: homework, lessons to study. I see him as more organized*", "*He has come here very motivated. He wants to do this activity in depth. He explained the activity to his classmates*", "*Especially in the way he expresses himself to the other children and the way he works in a team with other children he doesn't know very well*", "*I think it has allowed her to find an environment where she doesn't feel strange or different and I think this will gradually happen more in the future*", "*Perhaps he is a little bit more tolerant*", "*Perhaps he has improved his teamwork*", "*He wants to come back*", "*He's only come to a few sessions and it's the first time he's done an activity enthusiastically and willingly. He even asked to come*". Among the **negative answers** we find: "*Not really at the moment, but we don't doubt that as he comes more into this world (it's his first year), his interest will increase*", "*Not especially*", "*Not a lot*", "*No*" (2 answers). Two parents replied that they did not know.

Giftedness and creativity

We asked parents to what extent their children resolved challenges in a non-conventional way. No statistical differences were observed among previous ($M = 7.62$, $SD = 2.063$) and later responses ($M = 7.31$, $SD = 1.843$) for the closed-ended answers corresponding to the same parents ($N = 13$).

Eleven parents responded as to why they thought this was the case in both the pre- and the post-questionnaire. Their responses were classified into the categories displayed in Table 2. The same categories were used to classify qualitative responses at the two times, with the exception of **implication** (which only emerged from responses to the pre-questionnaire). The most frequent categories were **finding different solutions** and **abilities used**.

Table 2: *Pre-questionnaire and post-questionnaire classification of parents' answers to the question of whether their child resolves challenges in a rather unconventional way*

Pre-questionnaire categories	Post-questionnaire categories
Finding different solutions ($n = 5$): "*Because he likes to find the non-orthodox answer. When he learns something he wants to do it his way*", "*Yes, because he usually finds solutions the others don't see*" (2 answers), "*He finds different solutions*", "*He finds strategies that we wouldn't have thought of*".	**Finding different solutions ($n = 6$):** "*He has a different perspective*", "*Rather than unconventional, in a more mature way*", "*She has non-frequent solutions*", "*Because the solution that he finds is perhaps not the one other people would find*", "*In both ways, conventional and unconventional*", "*He's always trying to find his own ways to solve problems, challenges*"
It is difficult for him/her ($n = 2$): "*He generally gets angry and blocked*", "*It depends on the challenges. Sometimes, the most everyday and easy problems are the most difficult ones*"	**It is difficult for him/her ($n = 1$):** "*It's difficult for him because he's obstinate, but he does it*"
Implication ($n = 1$): "*She really commits to solving the problem until she finds a solution*"	-

Abilities used (*n* = 3): "*She has a lot of imagination and relates very different aspects to one another*", "*He shows interest and ability in everything he tries; he's obstinate and has too great a sense of what it is fair. With all the problems that go with that*", "*He's very direct, practical and linear. When he has a clear mind, he doesn't doubt anything*"	**Abilities used (*n* = 4)**: "*He's very fast*" (2 answers), *"He has a lot of imagination", "He thinks a lot"*

In 6 of the cases, the answer given by the parent at the two different times corresponds to the same category, while in 5 cases the answers correspond to a different one. In one case, the answer turns from a negative category (**it is difficult for him/her**) into a positive one (**finding different solutions**).

Emotions and conflict resolution
The children were asked which emotions they knew. The most cited emotion in the pre-questionnaire was sadness, followed at some distance by joy and anger, while in the post-test questionnaire children highlighted sadness and joy equally (Table 3). Positive emotions were reported more in the second questionnaire than the first and some emotions not mentioned in the first appeared in the second. This is the case with compassion and assertiveness.

Table 3: *Reported known emotions before and after the activity (number of answers, more than one answer was possible)*

Pre-questionnaire (*N* =16)	*n*	Post-questionnaire (*N* = 14)	*N*
Sadness	13	Sadness	9
Joy	8	Joy	9
Anger	7	Love	3
Love	4	Happiness	3
Surprise	4	Anger	3
Happiness	3	Surprise	2
Friendship	3	Fear	3
Calmness	3	Compassion	2
Annoyance	2	Assertiveness	2
Other answers:	1	Other answers:	1
Jealousy, rejection, anxiety, confusion, deception, empathy, treachery, loyalty, strangeness, respect, impotence, impatience, intrigue, doubt, disappointment		Annoyance, friendship, boredom, love, worry, despair, optimism, aggressiveness	

We wanted to explore whether children perceived any connection between what they feel and what they do through both a closed-ended and an open-ended question. No statistical differences were observed between previous ($M = 8.45$, $SD = 1.293$) and later responses ($M = 7.55$, $SD = 1.635$) for the answers corresponding to the same children ($N = 11$). Eight children responded to the open-ended question on both the pre-questionnaire and post-questionnaire. The same categories were used to classify qualitative responses at the two times (existence of a direct relationship, a conditional connection and do not know). The most frequent category was **the existence of a direct relationship between feelings and behaviour** (Table 4).

Table 4: *Pre-questionnaire and post-questionnaire classification of children's answers to the question of whether what you feel is related to what you do*

Pre-questionnaire categories	Post-questionnaire categories
Existence of a direct relationship (*n* = 6): "*Because when you are happy you want to do things well, but not so much when you are sad (if I'm sad I play the piano with sadness*", "*If I'm happy I do things better, more eagerly*" "*I don't*	**Existence of a direct relationship (*n* = 6):** *"Sometimes (e.g. I'm very happy, I fold my clothes and put the washing machine on)", "If you do something bad you may feel bad (e.g. if you are upset with a friend you may feel sad)",*

know (e.g. when I get angry I lose control)", "*Because I want to express what I feel (e.g. I'm upset and my friends see me and think of a way to solve it so I'm better")",",If I'm happy I express it (for instance when I'm happy I have a smile on my face, I'm kind and in a good mood*", "*If I think about things before doing them, I can avoid negative situations (e.g. if I do something wrong to a friend and when she says how she feels, I feel bad. If I had thought about it before and had been there she wouldn't have had problems)",* "*Because I always do things the way I feel (e.g. when I write and I'm upset I squeeze the pencil very hard and get confused easily").*	"*Yes (e.g. when I get angry I'm sad because I've done something to a friend to make us upset with one another)*", "*Because I feel they are very much related for me (e.g. if I'm sad I use blue to draw and if I'm happy I draw in red)*", "*It's not good to hold onto feelings (e.g. if you're ill you don't feel so good)*", "*If I did nothing, I wouldn't feel any emotion (e.g. if I play basketball and I'm very tired, I probably won't be in a good mood)*"
The connection depends (*n* = 1): "*You can feel different things, depending on what you do (e.g. if I hug a friend that I haven't seen for a long time, I feel happy)*"	**The connection depends** (*n* = 1): *"It depends (if I'm congratulated, I start studying)"*
I don't know (*n* = 1): *"I don't know"*	**I don't know** (*n* = 1): *"I don't know"*

Only in 3 cases did the answer given by the child at the two different times correspond to a different category. In one case, the answer turns from **I don't know** to **the connection depends**, in another from the **existence of a direct relationships** to **I don't know** and in the final one from **the connection depends** to the **existence of a direct relationship.**

The children were asked to what extent they can change what they feel when they are in a bad mood. This same question was also posed to their parents in relation to their child's behaviour. No statistical differences were observed among previous (M = 6.82, SD = 2.040) and later responses (M = 6.82, SD = 1.991) for answers corresponding to the same children (N = 11) and for their parents (N = 13) (M_{pre} = 3.92, SD = 2.431; M_{post} = 5.77, SD = 2.351). The children's and parents' answers do not correlate in either the pre- or post-questionnaire. In nine cases, we obtained paired responses from the children and their parents for both the pre- and the post-questionnaire (Table 5).

Table 5: *Paired children's and parents' answers to the question about how they change what they feel on both the pre-and post-questionnaire*

	Children's responses	Parents' responses
Child-parent 1	**Child pre:** "*I take a deep breath and try to calm myself*"	**Parent pre**: "*He's very aggressive. When he's okay, then it's okay. When he's in a bad mood, he gets a mental block and everything is negative and bad*"
	Child post: *"I can't"*	**Parent post:** *"He's like a mirror"*
Child-parent 2	**Child pre:** *"I stop thinking about what makes me feel bad"*	**Parents pre:** *"He gets obsessive and gets blocked when his parents give him explanations"*
	Child post: *"I think about other things and practise mindfulness and the traffic light"*	**Parent post:** *"We get him to change but with time and patience"*
Child-parent 3	**Child pre:** *"I imagine I'm with animals"*	**Parent pre:** *"He has a lot of character and believes in justice"*
	Child post: *"I skip an imaginary rope, run to drink some water…"*	**Parent post:** *"He has always done it when you talk to him and make him understand"*
Child-parent 4	**Child pre:** *"It's difficult, but in the end, after a while, I can"*	**Parent pre:** *"She has a forceful character and a strong sense of justice"*
	Child post: *"Hitting the wall until I relax"*	**Parent post:** *"He has always done it when you talk to him and make him understand"*
Child-parent 5	**Child pre:** *"I don't know"*	**Parent pre:** *"With time yes, not immediately"*
	Child post: *"Doing it"*	**Parent post:** *"Because now he has learnt to listen and think"*

Child-parent 6	Child pre: *"Listening to music, following the psychologist's suggestions: if I can't change it, I shouldn't worry about it"*	Parent pre: *"He identifies it, expresses it and tries to find a solution"*
	Child post: *"Reading or listening to music"*	Parent post: *"What she feels is stronger than what she thinks"*
Child-parent 7	Child pre: *"I close my eyes and think"*	Parent pre: *"He's very closed"*
	Child post: *"Nibbling things"*	Parent post: *"He closes himself inside what he's feeling"*
Child-parent 8	Child pre: *"I try to solve the problem from the basis (the source of the problem)"*	Parent pre: *"I don't have much perception about when he's not okay. He's very closed and I don't think he changes what he feels. He manages very well"*
	Child post: *"Concentrating on a good thing"*	Parent post: *"He always wants us to feel okay and comfortable"*
Child-parent 9	Child pre: *"Listening to music"*	Parent pre: *"He does not recognize it and externalizes it"*
	Child post: *"Listening to music"*	Parent post: *"She needs a lot of support"*

Discussion

Departing from a contemporary conception of giftedness as learnable and teachable while considering the impact cultural context may have on mediating and channelling individuals' creative potentials and personal sensitivities, the activity evaluated in this article dealt with three of the approaches highlighted by the literature as being useful in supporting the healthy social and emotional development of gifted and talented students (see Reis & Renzulli, 2004): a) time to learn with others of similar abilities, interests and motivation - all participants were gifted or talented children interested in technologies; b) engagement in areas of interest with a variety of peers -participation was voluntary and based on an intensive use of technology, which is strongly motivating for children; and c) social-emotional curriculum approaches to help gifted and talented children support one another - during the activity strong emphasis was placed on promoting group cohesion and teaching socio-emotional learning competences for participants to manage their own emotions and behaviours.

The participating children reported feeling very comfortable as it was an out-of-school activity in which achievement was not evaluated in terms of marks, as is generally done at school. This connects with Davies et al.'s (2013) opinion that a more flexible and informal approach, which is different to formal education, allows high-skilled children to work at their own pace without the pressure they usually have at school.

The activity carried out was perceived as challenging by the participating children, which fostered their motivation and commitment towards the proposed tasks. This connects with Clinkenbeard's (2012) consideration that when students spend most of their time in school working on tasks that are too easy, which is often the case with gifted and talented children, they are unlikely to be in a state of flow (a core concept within the model of creativity in Csikszentmihalyi's system), or to experience any form of intrinsic motivation. In coherence with Deci & Ryan's (1985) self-determination theory, the children were praised for their effort and not so much for their abilities. To obtain this motivation and commitment, we asked the children to use technology to create things and emphasized discovery, so we let the children develop strategies to find their own creative solutions. Activities were designed and implemented on the basis of interactive, collective, dialogic and deeply contextual premises, given that none of them were done individually but in conjunction with the other members of the group in a specific out-of-school context. Departing from Shavinina's (2009) consideration that the full potential of modern technology has not yet been fulfilled in gifted education, a strong emphasis was placed on "Creative Computing", as it was deemed crucial in allowing the children to encounter challenges in accordance with their "ascending intellectual demand" (Tolimson et al., 2009, as cited in Housand & Housand, 2012).

Giftedness and parenting
Considering the results of previous studies (see Morawska & Sanders, 2008; Morgan, 2007), which seem to suggest the importance of knowing the perspective of both the parents and their gifted or talented children in order to promote better family relationships, we administered a questionnaire to both. In respect of this, we have observed that parents' mean scores were lower than their children's with regard to the questions posed. This indicates that parents are more critical of their children's abilities and behaviour than children themselves. Strongly connected to this, Garn, Matthews & Jolly (2012) stated that "*the manner in which parents view the abilities of their gifted and talented children can influence the parenting practices they implement*" (Garn, Matthews & Jolly, 2012, p. 661). Parents' high expectations based on their children's high abilities may, for example, lead to a dysfunctional perfectionism among these children (Ablard & Parker, 2007, as cited in Garn, Matthews & Jolly, 2012). This higher criticism by parents is also observable in the comparison of open-ended paired responses to the questions on how children change what they feel, these results being congruent with the literature on the subject (see, for instance, Garn, Matthews & Jolly, 2012). Only in one closed-ended question were the parents' mean scores higher than their children's, namely the one asking about the usefulness of what they'd learnt for the child's future.

The fact that no correlations exist between the children's and parents' answers to the closed-ended questions posed is a worrying result that highlights the need for increased communication between them so that they can share their different perspectives. According to Garn, Matthews & Jolly (2012), these children should be given opportunities to self-direct their learning experiences at home. This can be done by allowing them to make meaningful choices, reducing achievement pressure, and providing resources related to the children's learning interests. The aforementioned authors also consider that parents should reinforce self-initiation learning behaviour regardless of outcome achievement.

Giftedness and creativity
Probably because participants' creativity was already high before commencing the activity, the parents did not perceive any change in the way their children face challenges and the children did not report varying their strategies much when facing a new situation. It could be also the case that the *environment of creativity* fostered throughout the activity was too context-dependent and not generalized to other contexts where creativity is not generally promoted. This environment of creativity was generated by ensuring the presence of those factors Davies et al. (2013) highlighted as most likely to support creative skills in children and young people in their systematic review of 210 pieces of educational research, policy and professional literature relating to creative environments for learning in schools. These factors are: flexible use of space and time, availability of appropriate materials, working outside the classroom/school, "playful" or "games-based" approaches with a degree of learner autonomy, respectful relationships between teachers and learners, opportunities for peer collaboration, partnerships with outside agencies, awareness of learners' needs and non-prescriptive planning. The proposed tasks were developed through teamwork and collaboration, which meant that negotiation and conflict-solving skills were greatly needed, this being considered very important in stimulating creativity (see Davies et al., 2013). The activity carried out also took into account the recommendations by Nemiro, Larriva & Jawaharlal (2015) under their componential model for developing creative behaviour in students through robotics, this including helping the students to understand the iterative, trial and error nature of creativity and using probe questions to help the students through periods of frustration.

Emotion regulation and conflict resolution among gifted and talented children
Because the aspects of emotion regulation and conflict solving have traditionally been considered far less than creativity among gifted and talented children, the main focus of the activity evaluated here was not only creativity but also emotion regulation and conflicting solving. The first observation we can make is that the children perceived they had learnt about emotions and conflict resolution thanks to the activity. In addition, a higher number of parents considered positive changes had occurred in their children's behaviour after the activity had taken place than those who said they did not notice any change.

The children's knowledge of positive emotions expanded as a consequence of the activity, this being reflected in the fact that they mentioned new emotions when asked the second time. However, the analysis of the closed-ended question on the perceived connection between emotions and behaviour showed that the participants' awareness of this connection had not increased, probably because the majority already considered that the two things are clearly related before the activity took place. The activity did not have much impact on the children's capacity for changing their feelings when they are in a bad mood, although they did seem to incorporate some of the techniques learnt during the sessions, this suggesting that more sessions would be needed in order to achieve more visible results.

Conclusions

The activity developed also requires a change in the adult-child relationship, from an adult-directed approach to a child-centred one. According to Kangas (2010), this entails adults adopting a variety of roles, including facilitator, instructor and learner, a finding which strongly connects with the rights-based paradigm (see, for instance, Ben-Arieh, 2005). According to this perspective, children are active agents in their own lives, and in line with this the activity described here was not based on the traditional educational framework in which the adult is the one who knows and the child the only one who learns, but rather both learn from one another (Ben-Arieh et al., 2013).

Despite the need for improvements in the future, the activity carried out opens the door to new ways of intervening with gifted and talented children that uses technology not only to improve digital but also creative thinking skills and socio-emotional learning competences, the latter not always being as equally developed as cognitive skills among these children.

Limitations of the experience
The activity was carried out with a limited number of participants and it would be recommendable to extend it to a larger number and even to non-gifted or non-talented children. The proposed activity was not linked to what children do at school, this limiting its effectiveness in promoting changes and maintaining these afterwards. Future efforts should be addressed to generate collaborative dynamics with schools if possible.

A good number of the participating children, but not all of them, had previous experience of activities using technology to promote creativity. None of them had participated in an activity like the one described here, which combined the use of educational technologies with emotional regulation and conflict-solving tasks. We could not therefore compare whether the approaches to problem solving adopted by the more experienced children differed from those adopted by children who were new to it, although some authors highlight that expertise is essential to any form of creativity thought (see Mumford, 2003).

Despite these limitations, the activity carried out is an important step forward in developing interventions in which gifted and talented children are facilitated with self-determined activities based on technology and the development of thinking skills and socio-emotional learning competences.

References

1. Aldao, A., & Wisco, B.E. (2015). Motivational conflict influences the timing of emotions and their regulation. *Motivation and Emotion, 39*(6)*,* pp. 943-952. https://doi.org/10.1007/s12031-015-9496-8

2. Bar-on, R., & Maree, K. (2009). In search of emotional–social giftedness: A potentially viable and valuable concept. In L.V. Shavivina (Ed.), *International Handbook on Giftedness* (pp. 559-570). Netherlands: Springer. https://doi.org/10.1007/978-1-4020-6162-2

3.   Ben-Arieh, A. (2005). Where are the children? Children's role in measuring and monitoring their well-being. *Social Indicators Research,* 74(3), pp. 573-596. https://doi.org/10.1007/s11205-004-4645-6

4.   Ben-Arieh, A., Casas, F., Frones, I., & Korbin, J. (2013). Multifaced concept of child well-being. In A. Ben-Arieh, F. Casas, I. Frones, & J. Korbin (Eds.), *Handbook of Child Well-Being* (pp 1-27). Dordrecht: Springer. https://doi.org/10.1007/978-90-481-9063-8_134

5.   Brennan, K., Balch, C., & Chung, M. (2014) Creative Computing: Scratch Curriculum Guide. Licensed Under CC BY SA 4.0. Retrieved 9 October, 2017, from http://scratched.gse.harvard.edu/guide/

6.   Brown K. W., & Ryan R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4), pp. 822–848. https://doi.org/10.1037/0022-3514.84.4.822

7.   Clinkenbeard, P. (2012). Motivation and gifted students: Implications of theory and research. *Psychology in the Schools,* 49(7), pp. 622-630. https://doi.org/10.1002/pits.21628

8.   Davidson, J. E. (2009). Contemporary models of giftedness. In L.V. Shavivina (Ed.), *International Handbook on Giftedness* (pp. 81-97). Netherlands: Springer. https://doi.org/10.1007/978-1-4020-6162-2

9.   Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P., & Howe, A. (2013). Creative learning environments in education –A systematic literature review. *Thinking Skills and Creativity,* 8, pp. 80-91. https://doi.org/10.1016/j.tsc.2012.07.004

10. Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour.* New York: Plenum Press.

11. Duckworth, A. L., & Yeager, D. S. (2015). Measurement matters: Assessing personal qualities other than cognitive ability for educational purposes. *Educational Researcher,* 44 (4), pp. 237-251. https://doi.org/10.3102/0013189X15584327

12. Garn, A. C., Matthews, M. S., & Jolly, J. (2012). Parent's role in the academic motivation of students with gifts and talents. *Psychology in the Schools,* 49(7), pp. 656-667. https://doi.org/10.1002/pits.21626

13. Gómez-Pérez., M. M., Mata-Sierra, S., García-Martín, B., Calero-García, M. D., Molinero-Caparrós, C., & Bonete-Román, S. (2014). Valoración de un programa de habilidades interpersonales en niños superdotados. *Revista Latinoamericana de Psicología,* 46(1), pp. 59-69. https://doi.org/10.1016/S0120-0534(14)70007-X

14. Hatzigianni, M., Gregoriadis, A., & Fleer, M. (2016). Computer use at schools and associations with social-emotional outcomes –a holistic approach. Findings from the longitudinal study of Australian children. *Computers & Education,* 95, pp. 134-150. https://doi.org/10.1016/j.compedu.2016.01.003

15. Heller, K.A. (2013). Perspectives on gifted education in the third millennium. In A.G. Tan (Ed.), *Creativity, Talent and Excellence* (pp 231-246). Dordrecht: Springer. https://doi.org/10.1007/978-981-4021-93-7_16

16. Housand, B. C, & Housand, A. M. (2012). The role of technology in gifted student`s motivation. *Psychology in the Schools,* 49(7), pp. 706-715. https://doi.org/10.1002/pits.21629

17. Hyatt, L. A., & Cross, T. L. (2009). Understanding suicidal behaviour of gifted students: Theory, factors, and cultural expectations. In L. V. Shavivina (Ed.), *International Handbook on Giftedness* (pp. 537-556). Netherlands: Springer. https://doi.org/10.1007/978-1-4020-6162-2

18. Jackson, P. S., Moyle, V. F., & Piechoswki, M. M. (2009). Emotional life and psychotherapy of the gifted in light of Dabrowski's theory. In L. V. Shavivina (Ed.), *International Handbook on Giftedness* (pp. 437-465). Netherlands: Springer. doi: https://doi.org/10.1007/978-1-4020-6162-2

19. Kabat-Zinn J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York, NY: Hyperion.

20. Kangas, M. (2010). Creative and playful learning: Learning through game co-creation and games in a playful learning environment. *Thinking Skills and Creativity,* 5(1)*,* pp. 1-15. https://doi.org/10.1016/j.tsc.2009.11.001

21. Lovesome, A. (2002*). Literature review in creativity, new technologies and learning.* A NESTA Futurelab Research Report, 4. Retrieved 30 August, 2016, from https://hal.archives-ouvertes.fr/hal-00190439/document.

22. McCoach, D. B., & Siegle, D. (2003). Factors that differentiate underachieving gifted students from high-achieving gifted students. *Excepcionality,* 47(2)*,* pp. 144-154. https://doi.org/10.1177/001698620304700205

23. Morawska, A., & Sanders, M. R. (2008). Parenting gifted and talented children: what are the key child behaviour and parenting issues. *Australian and New Zealand Journal of Psychiatry,* 42 (9), pp. 819-827. https://doi.org/10.1080/00048670802277271

24. Morgan, A. (2007). Experiences of a gifted and talented enrichment cluster for pupils aged five to seven. *British Journal of Special Education,* 34(3), pp. 144-153. https://doi.org/10.1111/j.1467-8578.2007.00470.x

25. Mumford, M. D. (2003) Where have we been, where are we going? Taking stock in creativity research. *Creativity Research Journal*, 15(2-3), pp. 107-120. https://doi.org/10.1080/10400419.2003.9651403

26. Nemiro, J., Larriva, C., & Jawaharlal, M. (2015). Developing creative behavior in elementary school students with robotics. *The Journal of Creative Behavior,* 51(1), pp. 70-90. https://doi.org/10.1002/jocb.87

27. Newton, D. P. (2012). Moods, emotions and creative thinking: A framework for teaching. *Thinking Skills and Creativity.* On-line first. https://doi.org/10.1016/j.tsc.2012.05.006

28. Piffer, D. (2012). Can creativity be measured? An attempt to clarify the notion of creativity and general directions for future research. *Thinking skills and creativity,* 7(3)*,* pp. 258-264. https://doi.org/10.1016/j.tsc.2012.04.009

29. Plucker, J. A., & Callahan, C. M. (2014). Research on giftednnes and gifted education: Status of the field and considerations for the future. *Exceptional Children,* 80(4), pp. 390-406. https://doi.org/10.1177/0014402914527244

30. Reis, S. M., & Renzulli, J. S. (2004). Current research in the social and emotional development of gifted and talented students: Good news and future possibilities. *Psychology in the Schools,* 41 (1), pp. 119-130. https://doi.org/10.1002/pits.10144

31. Renzulli, J. S. (2002). Emerging conceptions of giftedness: Building a bridge to the new century. *Excepcionality,* 10(2), pp. 67-65. https://doi.org/10.1207/S15327035EX1002_2

32. Renzulli, J. S. (1978). What makes giftedness: Reexamining a definition. *Phi Delta Kappa,* 60, pp. 180-184.

33. Runco, M. A. (1993). Divergent Thinking, Creativity, and Giftedness. *Gifted Child Quarterly,* 37(1), pp. 16-22. https://doi.org/10.1177/001698629303700103

34. Rusk, N., Resnick, M., & Cooke, S. (2009). Origins and Guiding Principles of the Computer Clubhouse. In Y. Kafai, K. Peppler, & R. Chapman, (Ed.), *The Computer*

Clubhouse: Constructionism and Creativity in Youth Communities. New York: Teachers College Press.

35. Shavinina, L. V. (2009). High intellectual and creative educational multimedia technologies for the gifted. In L.V. Shavivina (Ed.), *International Handbook on Giftedness* (pp. 1181-1202). Netherlands: Springer. https://doi.org/10.1007/978-1-4020-6162-2