

Article

Developing Creative Potential in School Children through Museums as Cultural Institutions: A Case Study in Madrid, Spain

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Abstract: This study has the aim of providing a theoretical–methodological strategy for the design and implementation of educational programs that favor the development of children’s creative potential in the context of museums as cultural institutions. It was carried out in two schools with the collaboration of the National Museum of Natural Sciences and the Royal Botanical Garden in Madrid, Spain, during an entire academic year. The emphasis of the procedure is based on multi-stakeholder participation and a multidisciplinary approach through workshops based on a collaborative methodology that promotes communication between the school as an institution, the teachers, and the museum facilitators, during the various phases of the intervention. The work with the children is supported by the creative problem-solving (CPS) methodology through the development of workshops in the museums, where the children were able to be the protagonists and manage their own learning process. The obtained results show the relevance of assuming a set of methodological principles and resources that can be replicated in future intervention programs, among which the school–museum collaborative communication, creative problem solving, the use of activity records, and the role of games and fantasy as mediators in the stimulation of creativity stand out.

Keywords: creativity; education; communication; dialogue; children; schools; museums; Spain



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1. Introduction

Throughout history there have been countless references to the term creativity and how to stimulate this process but it was not until the mid-twentieth century that this topic began to be of concern and the object of study of the social and human sciences. This happened at first because it was understood as an exclusive phenomenon related to a group of people who had to meet certain extraordinary qualities to be considered as “creative subjects”. This notion has penetrated the social and scientific mindsets, initially from the hypotheses of the divine gift, passing through the no less divine hypothesis of the “innate hereditary gift”, until reaching the current dogma of genetics [1–3]. However, studies from cultural psychology and other related branches have shown the opposite [4].

From these perspectives, creativity is a complex psychological configuration with deep historical, cultural, and social roots, in which multiple systems of influence in relation come into play. Therefore, this is not a closed or finished process, since it implies the dimension of learning, a skill that is by definition infinite and is only limited by the physical disappearance of the individual. Until their very end, human beings are capable of learning, developing, and articulating creative processes. This explains the strong

educational component that the skills and competencies associated with creativity have, not as a result, but as a cultural process in constant formation and development [5,6].

Based on these theoretical references, this study intends to transcend reductionist approaches that tend to simplify creativity by understanding it as a concept and/or product. The processual nature of the phenomenon under study is emphasized in its capacity for formation and development, which leads to the central concept of this research: the development of creative potential, where children acquire a unique value [7].

One of the most suitable scenarios to implement a possible strategy for the development of creative potential in children is undoubtedly the museum scenario [8]. Museums around the world today have an educational department from which activities aimed at children are promoted. But the existing gap between school educational programs, the programs offered by museums, and the needs of children, means that the profitability of this type of activity is often inadequate. Many of these programs do not transcend the dimension of leisure and amusement, without generating real learning in children [8].

It is from this issue and in favor of the educational and socializing mission of a museum that this research tries to move forward, with the aim of proposing a deep reflection on those fundamental dimensions to be taken into account when intending to articulate a project for the development of the creative potential in children, from the museum as a communicative scenario in relation to the school context.

The intention is to provide a theoretical–methodological strategy to stimulate the creative potential in childhood, based on the recognition of children as the center and protagonists of the process. The idea is to reinforce the need to complement educational actions from other scenarios that have the capacity to promote complex and multidisciplinary efforts to address creativity in all its dimensions. We insist that both schools and museums, indistinctly, can generate creativity-enhancing actions. But the interaction between the two, projected in an educational strategy, offers unexplored options that facilitate the collaborative process, learning through the communication of heritage, interdisciplinary and multi-stakeholder dialogue, and other premises that are developers of the creative process themselves.

The novelty of the proposal in promoting inter-institutional school–museum communication for the construction of a theoretical–methodological strategy that stimulates the creative potential of children is thus highlighted. The research we present is part of a much broader project on the subject, which has been continuously in progress. The purpose of this work is the development of a critical and reflective exercise, which does not seek to demonstrate a finished strategy but rather to provide a set of distinctive characteristics to be taken into account when articulating a strategy for the stimulation of creative potential in children. Therefore, the intervention was carried out in a real environment, with its problems and conditioning factors and without interfering in the variables that could affect its results, in order to contribute to a very fertile field of knowledge with great possibilities of becoming a practice in the future.

2. Method and Sample

The objective of this study was focused on developing a theoretical–methodological strategy for the design and implementation of educational programs that favor the development of children’s creative potential in the context of museums.

The study design was longitudinal and experimental. It was carried out during an entire school year in two schools in the city of Madrid: the Ciudad Educativa Municipal Hipatia and the El Valle II School. Adding both institutions together, the total sample consisted of 200 students in the 5th school year, between 9 and 11 years old. In the case of the Hipatia School, the sample was divided into two experimental groups and one control group, while in El Valle, the sample was divided into two experimental groups and three control groups. The National Museum of Natural Sciences (MNCN) and the Royal Botanical Garden (RJB) collaborated in the study.

The emphasis of the procedure was based on multi-stakeholder participation and a multidisciplinary approach. To this end, workshops were designed based on a participatory methodology that promoted the collaboration of the school as an institution, the teachers, and the museum facilitators, during the various phases of the intervention.

The work with children is supported by the creative problem solving (CPS) methodology, which is constituted from a six-step model that teaches critical and creative thinking, problem solving, and decision making [9]. For this purpose, the proposal developed by the Torrance Center for Creativity and Talent Development of the University of Georgia was followed.

The management process with museums and schools and the workshops with facilitators and teachers took place within a period of approximately three months, while the intervention with the groups of children was carried out in five months, with a total of 20 work sessions.

For the evaluation of the intervention process, the Children's Creativity Test [10] was used; following a test-retest model, a first measurement was taken before starting the work with the children and another was taken at the end of the experience. The objective was to study the extent to which the stimulation of creative potential had been influenced. It is a figurative type test, where the child's abilities in the creative process of problem solving are explored. The fixed values to be considered were sex, modality, and program, whereas the dependent variables are associated with the dimensions of the domain of creativity practices that will be described below. The present study is based on the triangulation method in which qualitative and quantitative procedures are considered for both the design and the process of analyzing the results.

The delimitation of these variables has been carried out following the criteria of experts in the three main areas covered by the research, highlighting the area of practice where the conceptual elements are interwoven as shown in the following table. The criteria of choice are the number of impact publications and their influence in the professional field and the provenance in terms of institutions and contexts in which we have worked and extended the present project.

In turn, we triangulated the results from the expert criteria with an in-depth and very extensive documentary review of articles from journals indexed in databases with a high level of impact from systematic review articles on the field.

Our conceptual scheme is structured around two explanatory categories: creativity and creative potential.

The present study is based on the triangulation method in which qualitative and quantitative procedures are considered for both the design and the process of analyzing the results. Our proposal belongs to the mixed research paradigm but with a strong participatory component. See Table 1.

Table 1. Distribution of study groups, procedures, and techniques used.

Moments of the Process	Institutions	Stakeholders	Intervention Procedure	Evaluation Procedure
1	Museum	Facilitators	Workshop on the topic of creativity and how to consider its inclusion in the activities that are developed.	Guidelines for the elaboration of the workshops, assessed by experts on the subject of museum education and creativity.
2	School	Teachers	Workshop for the presentation of the project together with the museum and its intervention proposals.	Presentation of the school project based on the application of the CPS methodology with their groups in the school.
Evaluation of creativity in children prior to intervention.				
Adequacy of the joint project to be undertaken by the museum based on the proposal presented by the teachers.				
3	Museum and School	Facilitators, teachers, and children	Visits, workshops, etc., in the museum.	Children's feedback from the experience. Narrative procedure.
4	School	Teachers and children	The groups continue to work on their project based on the intervention in the museum.	Proposed solutions as a project.
Evaluation of creativity in children at the end of the intervention (test–retest and control group).				

Source: Author's own elaboration.

Creativity is defined as an action or a set of singular actions carried out by a subject (person, group, organization, etc.) with singular characteristics, which results in obtaining a product that is considered new and valuable, both by the microsocial and macrosocial context.

The creative potential is assumed as the particular form of creativity expression, which involves part of the child's previous experience in terms of vividness, which is connected with a concrete real event in the here-and-now, which has a strong emotional implication and imprints a personal meaning that is enough to appear in terms of subjective representation, capable of guiding the child's efforts and behavior towards certain goals.

Based on these categories, three domains or dimensions of analysis that are closely related to each other are deployed.

- Culture domain: It is structured from the conceptions about creativity that exist in the macro-context and by the academic conceptions that the context of reference manages;
- Institutional domain: Relationship established between the educational management of the institutions, the conceptions about creativity that are handled when thinking about the educational dimension, and the existing theoretical references;
- Practice domain: It is structured on the basis of the methodological strategies and actions implemented in the different educational activities that integrate the institutional agenda.

The latter category was analyzed on the following subcategories:

- Fluency: This is related to the fertility of ideas or responses generated in a given situation. It is the ability of these workshops to trigger and provide the opportunity for a sufficient variety of ideas to appear, in terms of quantity;
- Flexibility: The ability to adapt, redefine, reinterpret, or adopt a new tactic to arrive to a solution. It is the number of alternative ideas it produces to the original idea that is being worked on;
- Originality: It is the ability or willingness to produce rare, remote, ingenious, or novel responses in unusual ways. It refers to the opportunities provided by the design of the workshops for the emergence of these new ideas;
- Elaboration: Richness of content and arguments that define the idea provided;

- Motivation: Personal involvement of the student in the task he/she wishes to perform. It is about the intrinsic motivation to the educational activity, that is, to participate and develop the activity for their own pleasure, pleasure, satisfaction, and interest that it generates;
- Future Projection: Whether the workshop project we are evaluating considers the possible consequences of its application for the future or whether it enhances a set of skills associated with creativity and diverse learning processes.

The study was carried out in a natural context, trying to interfere as little as possible in it, which also made it possible to clarify a set of variables that influence the stimulation of the creative potential, such as the gender role of the facilitator of the activity, the previous training of the mediating actors, and the educational character and modality of the school.

3. Results

3.1. *Projection of the Intervention from a Multistakeholder and Multidisciplinary Dialogue*

In the development of the strategy, a participatory approach was assumed where the school as an institution, teachers, and museum facilitators were the key figures. To achieve this assumption, a procedure was developed to promote dialogue, negotiation, and sharing on the topics of creativity. This procedure was intended to achieve several objectives. First, to develop a design that would not hinder the dynamics of the scenarios where the workshops would take place. In this regard, a shared agenda was drawn up to reconcile the availability of schedules and premises of both institutions. It also sought the involvement and commitment of the stakeholders that would be involved as mediators of the activities. Finally, the intention was to explore the cultural and institutional domains held by both teachers and facilitators on creativity, in order to subsequently build a shared conceptual framework based on the theoretical assumptions of the research.

Another implicit objective of this planning stage was for the school institutions to legitimize and recognize the need for the project. It is assumed that any educational strategy, especially in the field of creativity, which is thought from informal learning spaces, must consider the school educational project when designing or thinking about actions in this regard. This meant an initial negotiation process in which the schools decided on the intervention modality according to their objectives and principles. The Hipatia School proposed to articulate the procedure as an intervention system mediated by the teacher, so that in this school the teachers were the direct stakeholders. The role of the researchers was focused on supervising and guiding the activities. However, in the El Valle School, the project was understood as a system of direct actions to be carried out by a professional, so their teachers would only have a support and a dialogue bridge role towards the students.

Subsequently, workshops were held with the teachers to decide on the topic to be worked on with the students, to frame the activities, and to build a conceptual framework on creativity, coherent with the assumptions of the research. In both schools, the teachers proposed to approach the stimulation of the creative potential from the interpersonal relationships within the group. These were teachers who had a long trajectory with their groups and pointed out that intra-group relationships were one of the elements they found most difficult to approach.

Once the theme was selected, the work proceeded with the facilitators of the museums where the workshops would be developed with the children. It was necessary to project a design as close as possible to the characteristics of these institutions. The design was flexible in concept and necessity, since the dynamics of the museum, the layout of the spaces, and the number of visitors demanded it. As a result of this process, five workshops were designed: at the MNCN the "Dinosaurs in action" and "With all the senses" were developed whereas at the RJB "The fruits", "Classify in green", and "Explorer for a day" were developed.

An important result in this first stage was to delve deeper into the cultural and institutional domains on creativity, both of teachers and museum facilitators. At this point, conceptions associated with creativity as a talent were found, related to artistic production,

free expression, and leisure. Theoretical references on the subject were almost nonexistent. In fact, at the beginning, the project was conceived for working with groups of students on a theme linked to the profile of museums: the environment. But the teachers' hegemonic conception of creativity did not allow moving in that direction. On this subject, one of the actors stated: "Creativity is the capacity to give free reign to the imagination, to create new contents, to write, to paint or to have new innovative ideas" [...] "Yes, look, I do not create the contents, I am not a professional at that level, but yes, because what is promoted is not to put a barrier to what the children do, we always let them make, let them explore, let them work at their own pace, and then put it in common and share it among all of us" (interview with the institutional manager/facilitator).

As can be observed, they refer to the fact that creativity is mostly an empirical and spontaneous production that draws heavily from the artistry. The vision of the process is completely absent, which is coherent with the way in which the educational agenda and the objectives to be achieved are organized. There is also no reflection on the creative subject and on the process of education, training, and development that he/she must necessarily undergo in order to develop his/her creative potential. This issue directly influenced the intervention modality of the strategy, since in the case of the El Valle School, the teachers chose to work from the creation of stories, while in the Hipatia School, they chose to work with plastic arts.

It is worth remembering that a process of theoretical and methodological preparation was carried out with the teachers, where the creativity category was developed according to the assumptions of the study. However, throughout the intervention, it was found that the conceptions did not yield easily, both in the cultural and institutional domains.

As previously mentioned, the work with the groups of children is based on the creativity problem-solving methodology [11], adapting it to our objectives.

Based on all of the above and being clear that we would intervene from the group's potential to influence its shortcomings (intra-group relations), we set ourselves the task of developing an activity that would serve as a guiding basis for the achievement of our objectives. In the case of the El Valle II School, the activity chosen was to create a collective story. In the case of Hipatia School, we opted for a journey through various artistic manifestations where the children had the opportunity to express themselves and relate to each other as a group.

They remained at an immovable point during the whole process, which had an effect on the way they conceived, designed, and implemented any project on creativity, including the current. This did not imply any problem, since it was a matter of studying and investigating a process in its natural context, trying to interfere as little as possible in it, so it was assumed as just another result.

3.2. Methodological Design of Museum Workshops

As explained above in the methodological section, the workshops with the children were developed based on the creativity problem-solving methodology. However, the elaboration of the design was a more complex process of articulation and balance between the theme demanded by the schools, the content provided by the museums, and the dimensions associated with the stimulation of creativity. The collective and multidisciplinary approach made the formation of a set of principles and methodological resources possible that, in general terms, served as a framework for the development of the activity.

Among these principles, the work of the workshops with children in the exhibition hall, in direct interrelation with the museum's heritage, stands out. This strategy is an important element to be considered when it comes to stimulating children's creative potential, as opposed to the typical classroom–museum format of many educational and cultural initiatives. In addition, it offers the possibility for the child to bring his or her experiences of being and living in the museum, giving the activity a greater symbolic value.

Another principle that was considered in the design was to emphasize playing as a space for education and training. The game becomes the mediator for excellence in the

stimulation of creativity in children, whenever it is assumed as a learning resource and not as a naïve act or pure amusement. Thus, this refers to the game that respects the contents but gives the child the possibility of expression and participation in the workshop and makes it something close to him/her.

On the other hand, keeping records of the activity as a process was considered a very useful practice since it allows the child to return again and again to the activity as a process and not only as a product. It was noted that, in previous studies on creativity, the activities that were oriented only to the product (handicrafts and other making actions) failed to achieve the contents and ideas that they handled in the final product and were therefore lost.

Group work constituted another important principle for the stimulation of creativity in children, both at the level of elaboration and at the level of the management and solution process. In the workshops, the group is revealed as a fundamental element, enhancing all the dimensions associated with the creative process and activity, such as participation, communication, and social skills.

Finally, an emphasis was placed on a conception of the child as a singular individual and not as a developing subject. The child is considered as a person who learns and teaches, is active in the construction of his or her experience, and puts his or her experiences to use as a learning resource. This conception allows the design of an activity that is much closer to the stimulation of creativity, conceiving the roles involved (facilitator, child, and teacher) as agents of inter-influence that enhance each other for learning. Based on this principle, flexible workshops were designed, combining dynamic visits to the museum and group work sessions, where the children would be active agents and managers of the activities.

The construction of the design of the activities was intended to favor important dimensions within the creative process at the level of mastery of the practices. To this end, motivation was considered as the cornerstone and gateway to enhance the rest: flexibility, fluency, elaboration, originality, and future projection. From the theoretical–methodological elaboration, it was assumed as a fact that motivation would be the least problematic resource to work on during the workshops. The contents provided by the museum are very favorable for this. For example, in the workshop “Dinosaurs in action”, living in a room with fossils and interactive materials about dinosaurs is very motivating.

However, the difficulty assessed was due to the articulation between motivation and elaboration (contents), in order to promote originality and contextualization of the activity, thus stimulating the most complex variable: future projection. In this case, the solution found was for the children to describe the dinosaurs not only with names but also with everyday attitudes taken from their characteristics as a group. In this way, we were able to take advantage of the activity in terms of the objective: to favor interpersonal relationships among the members of the group and, at the same time, to stimulate dimensions of creativity. An important resource for the promotion of motivation was humor as a tool to stimulate personal reflection on the process they were experiencing. In addition, a work format was designed in subgroups where everyone could participate and contribute with their ideas.

Another relevant element was the emphasis on the relationship agents: the teachers. During the development of the activities, the teachers became part of the team of facilitators with a very specific function: to adapt the knowledge to the particular context of their group. It was decided that at least two facilitators per group should participate in each session. In this way, it was possible to stimulate and guide the various group and individual dynamics that generally occur during this kind of intervention.

The work materials resulted in valuable resources that served as an orientation base for the child. They were presented with notebooks, handicraft instruments, and interactive suitcases, among others. As implicit in this section, no tool or resource used in the workshop was left to spontaneity, so each material had to give the child the possibility of obtaining several solutions when executing the task. This was intended to influence the variables of originality, motivation, and elaboration.

3.3. Intervention Experience with Children from the Museum: Strengths and Weaknesses

The summary of the preparation, negotiation, and design process concluded in the workshops' general objective of stimulating creativity as a mediator of intra-group relations. In this sense, the important thing was not the product but the construction of a process that would progressively favor the child's relational links with himself, his/her peers, and his/her environment. Within this framework, museum activities would be inscribed as scenarios with ample resources to enter into the symbolic universe of children.

In general terms, it was noted that throughout the process, the children recognized positive experiences about the advantages of teamwork, relationships with their peers, acceptance of differences, and companionship, among other virtues. Other dimensions were also strengthened, such as the ability to communicate, to make critical and reflective judgments on certain topics, tolerance of different ideas, and collaborative learning.

At the same time, the stimulus to motivation fulfilled its function of favorably enhancing fluency and flexibility. On the way to the creative solution of problems or conflicts, the children had to find several alternative answers using a whole network of symbolic resources such as storytelling, drawings, and role-playing, among others. The museum's heritage also served as a material of high symbolic value to generate changes in the children's perceptions of their context of reference.

One of the most impactful resources for stimulating creative potential was the relationship between the dynamic visits and the workshops in the exhibition halls. One child commented on these activities: "I remember that there were a lot of stuffed birds, mammals and oviparous animals, even butterflies. There were also minerals, quartz and fossils of all kinds and even snails and seashells".

An example of this is this fragment of a script from one of the stories written by the participants. It shows how the script develops reflecting the basic problem and takes elements from the workshops but does not manage to transcend the initial problematic dimension due to the difficulty of stimulating the second level variables as we have shown in this research (originality, elaboration, and future projection).

"Normal, ordinary story.

Bad things and good things happen in a classroom.

- Hey man! I've seen your backpack and you haven't brought your English book (male subject shouted).
- Oh my God, I hate homework, language, maths. . . and English. . . what a brown thing.
- It was a trick. . . (male subject replied) . . . I mean, a joke, you brought everything. I've joked for the twentieth time. . . hahahahaha.
- You're. . .! I almost had a brain attack. . .! Grrrr! you're a fool, super dumb. . .I hate you! Then he started hitting him. (Excerpt from a script developed to conduct the story)".

In this narrative, it is possible to appreciate a kind of integration of contents in the children's experience. The reference to the butterfly and the fossils comes from the workshop on insects in which subjects participated in the RJB and the rest belongs to the dynamic visit that complemented it. This type of response reflects that the work of stimulating motivation, aimed at stimulating fluency and flexibility, has positive results in the mid-term, as it ensures that the child retains significant experiences capable of influencing their creative potential.

This can be seen in this script, which is based on a well-known work of art. In contrast to the previous example, we see a much more elaborate solution to the basic problem.

"The tree of wisdom.

Once upon a time, in a very small village far from civilization, there was a tree that provided wisdom to the inhabitants of the village. One day, two girls went to ask it for a favor, but when they arrived. . . The tree was dry!

When the girls saw the tree so dry and so sad, they could not hold back their tears. The girls ran as fast as they could to a lake to fetch water for the tree. On the way back they

met an old man who was passing by. The girls desperately asked the man for help. But by the time they arrived it was too late, and the girls began to cry. And thanks to the tears of the girls, the tree grew back in the evening". (Story about Klimt's painting).

"Have you come back with your parents, friends or anyone else to this museum?

No, but I would like to go because it is a museum where you can learn a lot. . ." (Final questionnaire fragment. MNCN, 2012).

However, any intervention strategy that takes place in natural environments faces the interference of variables that affect the desired results. In this sense, it was confirmed that children who came from schools that did not encourage participation in their educational model had greater difficulties in actively managing the activities, which generated significant problems for the achievement of the workshop objectives.

Another relevant result was the influence of the cultural and institutional domains of teachers and facilitators on some dimensions of children's creativity to the detriment of others. In other words, the dimensions that were conceptually rooted and elaborated by these stakeholders had a more significant stimulus, namely motivation, fluency, and flexibility. However, originality, elaboration, and future projection were the least associated with their conceptions of creativity, so they did not receive the same level of stimulus as the previous ones.

It was not possible to stimulate the children's abilities to argue ideas within large volumes of information with the same level of intensity, as well as their capacity for synthesis and information processing. The effects of these formative weaknesses were more visible in the sustainability of the project in the medium and long term. It was found that the symbolic production that occurred as a process during the workshops (debate, reflections, critical analysis, etc.) was higher than that recorded as a product at the end of the project.

On the other hand, it was observed that the level of stimulation of the dimensions of the mastery of practices was also related to the type of artistic activity developed in the workshops. Those associated with the traditions and cultural values of the children's context of reference, such as plastic and visual arts, led to better results than others that were more distant, such as dance.

We should bear in mind that we are working with a figurative test [10] that explores the child's skills in the creative process of problem solving. It is made up of a series of variables that are grouped into the two phases of the process that the test evaluates. In the first phase (formulation of the idea), it is explored from the originality variable and partly by the set of indicators that are included in the process-product variable. The conceptual definition of originality, as we have seen previously, is operationally defined by the typology of figures that the child uses in the drawing project to be carried out. In the case of the process-product variable, a series of indicators are included, which nominate both the process of formulating the idea and its solution. Here, we will find atypical manipulation (infrequent use of figures in the project); change in material (diversity of materials used in the execution of the activity); interaction (relationship between the elements worked on in the drawing); verbal elements (presence of textual resources in the drawing); and distancing from the model (differentiation between the project and the execution of the activity).

The analysis of the problem-solving phase is completed with the variable added invented figures (figurative resources that are used in the drawing but do not appear in the model on which the latter is based).

The test ends with the computation of these three variables, providing us with a total test score that serves as a basis for assessing the child's creative potential; in our case, it serves as a measure to assess the extent to which our intervention had an effect on the sample worked on.

For the processing and analysis of the results, we used the statistical program SPSS, version 21. First, we analyzed the overall results according to the observed effects in an

analysis of variance model (ANOVA) of pre- and post-test and then we performed an analysis of covariance (ANCOVA) where we used the pre-test as a covariate.

In both procedures, we used the same analysis system. The interpretations take the detection of significantly higher-order effects as a starting point and then move on to simple effects, relative to the independent variable. This analysis procedure shows its advantages when making appropriate interpretations in complex designs [12].

The traditional ANOVA analysis shows the measures in the scores more clearly than using an ANCOVA model. But the literature highlights the relevance of using the latter model for cases of studies where the groups are not balanced in their trajectories before arriving at the pre and which have not been chosen randomly either [13]. This is the case of our study, where the groups were already formed prior to our intervention, so their members were neither chosen at random, nor could we guarantee their balanced trajectory in the subject of creativity, in terms of training, before applying the pre-test. In these cases, the literature argues how the ANCOVA procedure gives possibilities for better management of the information obtained, as well as greater statistical power to the results [13]. It may even be the case that we have significant differences in our ANOVA analyses but when balancing the differences in the sample and its scores by means of the proposed procedure, using the ANCOVA model, such difference disappears. This is the reason why we are only going to present the final analysis of this whole interpretation process using the results obtained by ANCOVA.

These results, which have been presented in the form of a qualitative interpretation, were put in dialogue with the quantitative analysis of this intervention based on the results obtained in the evaluation of the children's creativity test.

3.4. Evaluation of the Experience

The overall test scores indicate that the modality of intervention and sex are the variables of greatest influence and importance on the children's creative potential. The results of the variance analysis offer a triple marginal significance in the interaction of these variables ($F(1,40) = 3.01, p = 0.85$). Also, they revealed a significant relationship in the interaction of the total score variable with the program modality ($p = 0.001$) and with the sex modality- ($p = 0.018$). See Table 2.

Table 2. Analysis of mean values. ANCOVA. Total score–modality–sex interaction.

School	Sex	Mean	Type Err.	Trust Interval 95%	
				Lower Limit	Upper Limit
El Valle	Female	4440	0.287	3872	5008
	Male	4281	0.256	3775	4786
Hipatia	Female	3659	0.372	2923	4395
	Male	4620	0.357	3914	5326

Source: Author's own elaboration.

This information indicates that in El Valle School, the mean scores are higher for girls than for boys, while in the Hipatia School, the opposite occurs. It is possible to interpret these results by the influence of the facilitator's gender role, since in the Hipatia School, the teachers involved were female and in El Valle the researcher involved was male. See Table 3.

Table 3. Analysis of mean values. ANCOVA. Total score–program–modality interaction.

Program	School	Mean	Type Err.	Trust Interval 95%	
				Lower Limit	Upper Limit
Experimental	El Valle	4700	0.213	4278	Experimental
	Hipatia	5583	0.348	4894	4786
Control	El Valle	4651	0.231	4195	Control
	Hipatia	4269	0.235	3804	5326

Source: Author's own elaboration.

In general, the test results indicate that the program influences and stimulates creative potential ($M_{ge} = 5.142$; $M_{gc} = 4.460$) but not enough to do so significantly. Data show that the mean score in the experimental group in Hipatia is higher than the mean score in the experimental group in El Valle. It is true that the difference is not significant ($p > 0.05$) but it suggests the hypothesis of the influence of the facilitator's gender in stimulating children's creativity once again, a variable that is stronger than the methodological design of the workshop itself. In any case, it is a hypothesis that needs further study.

In relation to the dimensions of practice proficiency, the results indicate that the strategy had an impact on only part of the process (motivation, fluency, flexibility, and originality) but in the cases of elaboration and future projection, it did not have the same effect. It is precisely these last two dimensions that depend most on the starting point of the participants and which also guarantee a greater permanence of the stimulus over time. Moreover, they are the ones that are least worked on in creativity stimulus programs. But let us take a step further in this approach.

When analyzing the originality variable, it was observed that there are no significant quadruple or triple interactions but there are simple interactions. There is significance in originality-sex ($F(1,140) = 5.75$, $p = 0.018$) and in originality-modality ($F(1,140) = 15.83$, $p < 0.001$). The variables' modality and sex emerged again as significant. In terms of modality, El Valle School obtained a higher mean score than the Hipatia School. See Table 4.

Table 4. Analysis of mean values. ANCOVA. Originality–modality interaction.

School	Mean	Type Err.	Trust Interval 95%	
			Lower Limit	Upper Limit
El Valle	0.686	0.011	0.664	0.709
	0.608	0.015	0.578	0.639
Hipatia	0.686	0.011	0.664	0.709
	0.608	0.015	0.578	0.639

Source: Author's own elaboration.

This behavior is the opposite of the originality variable, which points to the incidence of two important factors: the training of the facilitator (direct intervention modality) and the role assigned to him/her by the group. One possible interpretation of this assumption is related to the multidisciplinary work, in which the intervention modalities were different. In the case of El Valle School, the work was based on diverse referents but focused on the development of the same activity: the creation of a story. However, in Hipatia School, the resources developed did not have the same level of content integration. This shows the value of the multidisciplinary approach as an unavoidable resource for creativity stimulation but always with a space that guarantees the synthesis and adequacy of these stimuli so that they can truly encourage the children's creative potential.

As in the case of the total test score, in originality, it is seen that the mean score of the experimental group ($M_{ge} = 0.652$) is higher than that of the control group ($M_{gc} = 0.643$). Similar to the previous case, the interaction with the independent variable (program) is not

significant ($p > 0.05$). Therefore, there is a stimulus to the creative potential but not enough to have a significant impact, especially when talking about the dimensions that favor the long-term prevalence of the stimulus. See Table 5.

Table 5. Analysis of mean values. ANCOVA. Originality–sex interaction.

Sex	Mean	Type Err.	Trust Interval 95%	
			Lower Limit	Upper Limit
Female	0.622	0.015	0.593	0.651
Male	0.672	0.013	0.646	0.699

Source: Author’s own elaboration.

On this last line of thought, there is significance in the originality–gender interaction ($F(1,140) = 5.75, p = 0.018$). During the course of the intervention, no sufficient elements or data were found that would point to a significant difference with respect to the stimulus, according to the gender role of the participants. Therefore, this result can be attributed to the possible mediation of the gender role of the activity facilitator and the training of the latter in terms of cultural and institutional domains. The rest of the test variables show a view of the process, where the lead role is the significant relationship between modality and the dependent variables. See Table 6.

Table 6. Analysis of mean values. ANCOVA. Interaction between modality and process-related test-dependent variables.

	Interaction	Verbal Elements	Model Distancing	Manipulation	Change in Material	Added Figures
Significance	0.030	<0.001	<0.001	<0.001	<0.001	<0.001
Mean El Valle	0.141	0.687	0.387	0.248	0.300	0.148
Mean Hipatia	0.026	0.131	0.086	0.671	0.647	0.412

Source: Author’s own elaboration.

Indeed, the nature of the activity and how it is structured also affect the process of stimulating creativity, beyond its principles and categories. In other words, our intervention, in its conception as a strategy to stimulate children’s creative potential, had the same structure in both schools but the nature of the activity and its final integration were different. In this sense, it was observed that during the intervention developed in El Valle, the variables related to the central activity of storytelling (interaction, verbal elements, and moving away from the model) were better stimulated, while in the Hipatia educational center the variables related to the artistic activity (manipulation and change in material and added figures) were the ones that were better stimulated. Once again, these results may be related to the role and training of the facilitators involved in each educational center and to the students’ previous training levels, as well as to the specifics of the school’s educational projects.

One last element to be emphasized is that no significant relationship is observed when analyzing the product variable, which refers to the total score of the test, where the previous variables are included. These data suggest that there is a stimulus to creativity in these groups of children but not in a significant way. It is not enough to ensure that this stimulus is sufficiently articulated and guarantees the development of long-term creative potential.

4. Discussion and Conclusions

The design and elaboration of the methodological strategy to stimulate creative potential in children through the museum made it possible to identify the resources that

helped the process as well as the variables connected to the practice that interfered with the expected results.

In general terms, the results show how the stimulation of creative potential in children can be produced at two levels. The first level will be characterized by the stimulation of the basic processes of creativity (fluency, flexibility, and motivation), whereas the second level of greater depth and complexity will be characterized by the sustainability of the same in the long term (originality, elaboration, and future projection). In this sense, a much broader strategy, developed over time, is needed to anchor the stimulus of the dimensions of the second level in the long term.

The latter is in line with numerous studies that point out that there are few longitudinal studies that show the permanence over time of the effects of fostering creativity and therefore the need to especially stimulate second-order processes in the long term [1,4,7].

Prior preparation of the task, mobilization, and training of mediation resources (teachers, museum facilitators, etc.) is not enough; it is a systematic work that must transcend a specific project in order to be sustained over time [14,15].

However, during the process, a set of principles and resources that show their relevance when designing and dealing with the different moments of the creative process are approached and submitted for discussion. The multidisciplinary dialogue, participatory design, creative problem solving in the group context, using material registers for recovery and subsequent incorporation into group dynamics, and play and fantasy as mediators in the stimulation of creativity are highlighted [16,17].

From the culture domain, it is also important to adapt the activity to the cultural context of reference of the children as well as to consider a set of variables that intervene in the process: the gender role of the facilitator of the activity, the previous training of the mediating agents on creativity, and the nature and educational modality of the school project where the children are socialized.

In relation to the preceding, it is necessary to work in a modality where the teachers themselves are directly involved in the project, with previous training in the subject and a strong anchoring of the project design with the curriculum and the educational project of the center as the main route to favor the second level processes in the stimulation of creativity. The relationship between the facilitator's gender role and the development of the students' creative potential is also highlighted. This is a process of training, education, and development, where the latter must be taken into account.

It should be noted that the results presented in this work have served to better organize the educational agendas in the field of creativity in the participating schools, the collaborating museum entities, and a greater link between both types of institutions for the development of children's creativity.

The results of this research have served as a basis for the development of transfer projects, where programs for the development of creativity are located, for example in the National Museum of Natural Sciences, Madrid, Spain, project "The creative naturalist", among others.

Finally, the experience of intervention for the stimulation of creative potential through the relationship between the school and the museum shows that the multidisciplinary approach is a key or imperative resource. The museum offers the opportunity to integrate multiple stimuli that, articulated to the educational project, are susceptible to provoke significant learning from the symbolic culture system to which the child belongs. As has been shown, it is a matter of promoting participatory, committed, and, above all, motivational learning spaces, where the child progressively acquires a set of skills that are decisive for the further development of his or her creativity.

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