A socio-cultural perspective of creativity for the design of educational environments

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Summary
Creativity has long been a topic of interest and a subject of study for psychologists, who analyse it from several perspectives. From the cognitive perspective, researchers attempt to identify the specific processes and structures which contribute to creative acts, whilst from the socio-cultural perspective they try to demonstrate that artistic innovations emerge from joint thinking and exchanges among people. According to the latter, creativity indeed does not happen only inside our heads: the interaction between people’s thoughts and a socio-cultural context is fundamental.

In this paper we argue that the socio-cultural perspective makes it possible to define a sound and articulated vision which allows to consider specific social aspects of creative activity in relation to the design of artefacts. Firstly we present the MANC++, a model of narrative and creative activity which constitutes a theoretical basis to understand the process and the conditions that elicit individual and social creativity. Secondly we present two vignettes taken from our researches that encapsulate the potentiality of the MANC++ to develop formal and informal learning environments as well as educative artefacts to support the creative process. The first vignette concerns the design of "active tools" to enhance children's creativity in formal educational environments. The second vignette deals with artefacts supporting informal joint creative activities for community development. Further on we discuss the relevance of this approach considering new forms of social activities and the development of a participatory culture which is rapidly evolving due to the use of new technologies.

In Gauntlett’s words, we are moving from a "sit-back-and-be-told culture to a making-and-doing culture". The socio-cultural perspective allows us to rethink how technologies should be used by people to share, build on, be inspired or transform their productions in order to create new products.

Keywords: Creativity, informal learning, educational artefacts, creative activity, educational environments, new technologies in education, MANC++, creative model

1 Introduction

Creativity has long been a topic of interests and has been a subject of study by psychologists. Several perspectives emerge from a scientific study of creativity. On one hand the study of creativity is viewed under the angle of creative cognition (Finke, Ward & Smith, 1992), on the other hand creativity is seen as a socio-cultural process where social transactions are at the core of creativity (Vygotsky, 1930/1983, Bennis & Biederman, 1997; John-Steiner, 2000). With the cognitive perspective, researchers attempt to identify the specific cognitive processes and structures that contribute to creative acts. Creativity is conceived as a product of two different types of mental processes. First some processes are used in the generation of cognitive structures (memory retrieval, association, mental synthesis, mental transformation, analogical transfer and categorical reduction). The second type of processes cover those used to explore the creative implications of the structures (attribute finding, conceptual interpretation, functional...
inference, contextual shifting, hypothesis testing and searching for limitations). According to the socio-cultural perspective, understanding creative people and objects demonstrates that artistic innovations emerge from joint thinking, exchanges among people, which emphasizes the role of social dimension of creativity (John-Steiner, 2000).

The difference can also be seen at the level of the conditions under which creativity and innovations are likely to occur. For the first perspective, even if creativity is not entirely predictable, researchers are convinced that “people can learn how to think in ways that maximize the opportunity for creative insight” (Finke et al. 1992). In the socio-cultural perspective creativity relies on experience, needs and interests in which needs are expressed. If it is clear that imagination relies on a combinatory capacity, it also depends on technical and material capacities and on creative models that influence the individual. Hence a less visible factor is the one of the surrounding ambiance. In this second perspective, creativity cannot only be represented as an internal activity independent of external conditions, which also provide material for imagination to grow. Indeed the socio-cultural perspective considers that every inventor is always a creature of his/her time and of his/her environment. His/her creative capacities arise from needs formed before him and rest on the possibilities that exist outside him. No discovery or scientific invention appears before the material and psychological conditions necessary for its birth build up themselves.

The creativity, said to us Vygotsky (1930/1983), is a cumulative historic process in which every shape to come is conditioned by the previous ones. So any creation, even individual, always includes a social coefficient. In this sense, it will never be possible to have a strictly personal invention; it will always wear something of the anonymous collaboration of the others. Observing young children, Vygotsky considers the centrality of the psychological processes of creativity and imagination in the educational process. For Vygotsky, imagination is present in all the aspects of the cultural life and makes possible the artistic, scientific and technical creativity. Imagination is not psychologically opposed to reality but intimately dependent. Reality and imagination are correlated according to Vygotsky by at least four relations: 1) The creativity activity of imagination directly depends on the richness and variety of previous experience, because fantasy constructions are composed of the material supplied by experience. The richer the experience, the more the individual will have materials to build his imagination; Fantasy is supported by memory in the sense that imagination disposes traces of events in new forms. 2) The social practices and experiences’ exchanges with our pairs feed imagination. Historical and social experiences of others are objects that also feed our own imagination by contributing to build representations and memories of the reality; 3) Emotions, the feelings influence imagination and vice versa. The feelings and emotions influence imagination because they act as a filter that selects thoughts and mental images corresponding to that specific mood. Then, these mental images representing a common emotional sign will tend to combine, though these elements linked to a similar emotion are actually isolated in reality. Oppositely, fantasy constructions can also determine emotions, which are experienced for real; 4) The crystallisation of imagination in external and shared objects become part of reality and affect it. Any machine is a good example of it: Formed through the creative imagination of man, it doesn’t fit any other existing model but has an actual and practical link to reality. Once crystallised, it turns back to reality becoming a new active force, transformative of this same reality.

The goal of this paper is to show that the socio-cultural perspective makes it possible to define a sound and articulated vision that allow to consider specific social aspects nature of creative activity including collective, intersubjective dimensions. With this aim in mind we will present MANC++, a model of narrative and creative activity (In French: Modèle de l’Activité Narrative et Créative - Decortis, Rizzo & Saudelli, 2003; Decortis, 2008), which constitutes a theoretical basis to understand the creative process and the conditions that elicit individual and social creativity. After a description of the model, we present two vignettes taken from our researches that best encapsulate the potentiality of the MANC++ to develop formal and informal learning environments, as well as educative tools, that support the creative process.
2 A model of creative activity: the MANC++

In our researches we found empirical evidences that the cycle of creative imagination proposed by Vygotsky (1983, 1998) as a psychological process could be used to rethink the shape of creative activity, as a cyclic process of which the different phases are interdependent. The model that emerges from this perspective has four phases, namely exploration, inspiration, production and sharing (figure 1): The MANC++ (Decortis, Rizzo, Saudelli, 2003; Decortis, 2008) describes how the individual experiences the external world, elaborates the received impressions, assembles them in a novel way and shares this production with others.

Figure 1. MANC++, a model of narrative and creative activity

**Exploration** consists of the interactions with the real world, which can be either direct or mediated by social relations. The sensory experiences constitute the starting point: what the individual has seen, heard, touched or encountered in various experiences, with the support of objects and people, feed its imaginative world. Exploration can occur through different modalities: it can be sensorial or analytic, be carried out individually or collectively, it can be free or done with the guidance of a more experienced person.

**Inspiration** is a phase of reflection on and analysis of the experience related to exploration. It can be concomitant or consecutive to the exploration phase. The individual think about the previous experience, discuss it and sort out the elements gathered, in order to highlight the more relevant aspects of the experience. For Vygotsky (1930/1983), this mechanism of dissociation is an individual process. Though, in this model, we propose that this phase can also be collective. Confronting one’s impressions to those of the others can help the re-elaboration of the experienced elements and favour intersubjectivity (Bruner, 1990): knowing and understanding other’s representations of the world, their feelings on how they experience it, helps defining a more complete and rich personal representation. The role of other persons in this phase can also be to guide the process of dissociation, although reflection and analysis can be spontaneous.

**Production** corresponds to the recombination of the elements dissociated and transformed during the previous phase. The chosen elements are associated in original way to achieve a new production, an external result (whether is it a poem, a software, a music, a solution to mathematical problem, etc.). The externalization can be individual or social when it is an external expression of socially constructed and shared understanding.

**Sharing**. This is the phase in which the externalized productions start to exist in the social world and affect it. The person presents the result of the production and verifies the effects of this production on the others. This last phase of the model close the cycle started in the first phase: From reality to imagination going back to the real world, becoming -when shared- object of experiences for others.
3  Designing active tools to support children creativity: POGO

The most important achievement of our research on children creativity in relation to technology has been the development and design of an educational tool called POGO (developed within the European program I3 - Intelligent Information Interfaces, "Exploring New Learning Futures for Children"). This educational environment supports the entire cycle of creative imagination, letting it evolve as a never-ending creative process (Decortis, Rizzo & Saudelli, 2003; Rizzo, Marti, Decortis, Rutgers & Thursfield, 2003). POGO's challenge was to design innovative technologies for children that should be equally attractive, fun, long lasting and yet offering sound pedagogical learning opportunities to be seamlessly integrated in the current context of European schools.

In this research, creativity has been investigated in relation to narrative activity. Through the narrative activity, the children build and investigate fantastic worlds, develop their creativity, learn to confront with the others, enrich their experiences and develop their language abilities. The researches on this form of expression show how, by the narrative activity, we build hypotheses on the human and social sphere, and we learn to give a sense to our experiences and to share them with the others (Bruner, 1990; Bamberg, 1997).

Indeed POGO enables children to compose their own stories. The environment was designed to bridge a virtual story-world with the physical world, as the POGO “active tools” enable the creation and manipulation of story elements through physical experience. Said otherwise, a virtual world incorporates everyday objects via digital media, and relies on the child’s physical environment and sensory modalities. The functionality of the tools span over many areas: gestural (live performances), visual (images and drawings), aural (sounds and atmospheres), manipulative (physical feedback) and material (physical objects). Although the system is computer-based, the standard interface of keyboard, screen and mouse has been replaced with a far more intuitive one.

We showed that the POGO tools allow for rich sensorial interaction where physical and virtual elements of children’s reality can be explored, analyzed, decomposed, and recombined in new ways. The existing objects or the new one produced by working with the different POGO tools can be captured by children and edited in real time. What a child builds or brings as a part of the personal experience can be combined with the products of other children in a continuous negotiation process. The evolution of transformations of the objects is recorded and the movement along this process of meaning construction can be used as a way to understand the other’s points of view. Moreover the physical objects that are produced in this iterative and combinatory activity remain live features of the process and can be used as a starting point for a future creative activity.
Regarding the cycle of creative imagination our results showed several interesting features (Decortis et al, 2003; Rizzo et al, 2003). With regard to Exploration, we found that it is crucial that any environment supports the transition from everyday life experiences to the fantastic world of narration by affording the collection of media such as physical objects that are personally meaningful for children. Then, the transformation of these physical objects into virtual objects allows the children to create a rich repository of elements useful for the story. Tools that enable the user to import a virtual version of any sort of object particularly stimulate children to store an experience represented by the object itself. Concerning Inspiration, the technology should be used to encourage children to rethink an experience, to analyze its constituent parts and to express it orally or by drawing. The tools support personal reflection, collective comparison and meaning negotiation. In our studies, we showed that using POGO, the Production phase was one of the most surprising in terms of creative constructions made by the children. They made new connections among contents just by manipulating the tools. They explored the flexibility of the tools in representing and structuring the contents. Finally it was clear that POGO tools could be used to amplify and enhance collective Sharing of the children's production: both the creative process and the product of the narrative activity. This meta-level of sharing stimulates meta-cognition, meaning construction and negotiation.

With the POGO system, learning how to build a narrative becomes a fun experience. School becomes a space for game and discovery. The system encourages communication and cooperation among the children, which are necessary for an effective coordination of all the story's elements that are simultaneously present. The system encourages the inspiration and production phases with a wide range of possibilities, allowing the children to discover different narration styles and ways to construct their stories. The utilisation of the POGO tools enhances the collective dimension of the creative process so that children must learn to communicate their ideas and negotiate the different points of view in order to efficiently collaborate with others. The system also allows for diversification of roles and participation styles (content producers and/or technicians). Finally, the system supports the children in structuring their stories in order to produce richer narratives (Decortis & Rizzo, 2002). The produced narratives are well structured, coherent, with clearly defined beginning, middle and end.

4 Informal joint creative activities, participatory culture and community development

Our second vignette illustrates our research on technologies to support informal joint creative activities for community development (Decortis & Lentini, 2008). By joint creative activity, we mean creative activities that reunite participants from different generations and socio-cultural backgrounds to do something together, drawing folks who wouldn’t otherwise meet to do things they couldn’t otherwise dream of (Ackermann et al, 2006). In the frame of European project PUENTE1, we have studied activities where children, teenagers, adults and elders are invited to individually and collectively discover and tell stories about their quarter, neighbourhood, habits, living space, cultural differences by producing pinhole images and narratives. Sorts of hands-on laboratory, these workshops let participants build their own artefacts, pinholes2, from inexpensive and readily available materials.

Figure 3 represents the different steps composing the joint creative activities. Participants are invited to build their camera, observe their environments, explore their ideas, shoot, develop the photographs and create narratives on the issue of Territory. The photos and narratives activities were held in parallel. These activities were characterized by important sharing moments at all steps and led to the production of artistic creations: the photos and narratives, which were shown in a public exhibition and edited in several books.

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1 www.puente.it
2 Pinholes are rudimentary camera following the principle of a camera obscura: small boxes pierced by a very little hole that allows light to come inside, they capture the reality just like the eyes do. On the surface that is opposed to the hole, an inverted image of the subject is formed and captured by a photo-sensible paper (such as photographic paper).
Figure 3. Joint creative activities exploring spaces using pinholes. For the photo activity, participants are invited to get actively involved in different steps. They build their camera from plastic and cardboard. They observe their environments by walking around, in order to find a subject for their picture. They explore their ideas and choose the correct parameters to shoot (time of exposition to the light, placing of the camera). Finally, the participants develop their pictures in the photo lab.

The pinhole is an “open” artefact: participants are physically involved in the different steps of the process leading from the camera to the photography. Present at every step of the process, the participants are made responsible for the result. Each step, to be successfully completed, requires that the participants involve themselves in the activity, and implies a reflection before to act.

The MANC++ allows us to identify learning and benefits gained by participants through the different phases of the creative activity, and to understand the conditions for their birth.

**Exploration.** The first loop: from the building of the pinhole to the first obtained picture, act as an exploration phase. The participants discover their environment but also how the pinhole mediates their relationship to the environment. They appreciate its physical and sensorial properties and discover their surroundings. They figure out how the things they see can be transformed by the action of taking picture: they take a castle in picture but the obtained photo look like a firefly! **Inspiration.** Thanks to their first picture, they can reflect on, and share with other, the feelings and meanings related to this first experience. As some participants explained, it is like if they had “new eyeglasses”. The dissociation is mediated and facilitated by objects. The image, the photograph obtained, and the "ceremony" which surrounds the discovery of the image (developing photos in the darkroom, to put the photograph to be dried, act as many moments of exchanges with the others) makes it possible to reconsider the feelings, the impressions related to the use of the pinhole. The **production** phase really arises through the iteration of the loop: Through multiple experiences of the environment and of the whole photo process, the participants plan their production. They spontaneously choose to use the pinhole differently (e.g. superposing images), and to express particular things through their photo (e.g. how I feel today). **Sharing.** The moments when the photos are shared represent great opportunities to interact. The participants discuss about their respective pictures, give their opinion, congratulate each other, ask questions about how the picture was taken or where it was taken. It favours the improvement of the pinhole camera’s use and helps each participant to increase his/her knowledge of the pinhole technique. The pinhole, as an externalizable tool (Bruner, 1996), favours learning because it provides external results that can be shared and discussed among the participants (figure 4).
Sharing pictures are opportunities to appreciate each other’s work. Positive comments made about the pictures inside the group, and the fact that the photos (as well as narratives) are considered as “oeuvres” that worth to be publicly exposed, brings to the participants a feeling of recognition of their work, and consequently, of their personal value. Confronting the external results to other’s appreciation give pride and enhance the participants feeling of self-worth. Finally, externalizing such joint products into “oeuvres”, that are shared in the group and then outside the group through a public exhibition, produce and sustain group solidarity and help making a community of mutual learners (Bruner, 1996). The final photographs and narratives were compiled in books and have been part of an exhibition in the frame of the city Photography Biennale3 under the title “Territories and Identities” (see figure 2). The oeuvres were exhibited for two months. The participants were empowered to exhibit their oeuvres side by side with recognized artists. The exhibition was designed in order for each of the participating groups to have a dedicated space. The photographs were also assembled into a collective fresco within the form of a tree in order to symbolize the relationships of men in their territory.

In the observed creative activities, people learned about their local community, felt legitimized to express their views about it and to engage in its development. Participants learned about themselves and gained confidence, reinforcing their creative and participatory skills. They also gained empathy for other people’s aspirations, contributions, and human potential. Indeed, the activity provides opportunities for the participants to express themselves and give value to their opinions and feelings. The expression of each individual as equally valuable member of the community is promoted. It gives the same weight to all participants’ opinion and production, and empowers them, as complete citizen fully able to take actively and creatively part in the community life. It also fosters fruitful interactions between diverse populations, which develop a better knowledge of each other and the feeling of being part of the same community. Based on these observations, we formulate initial recommendations for the design of technological artefacts to be introduced in digitally augmented environments for social participation and community development. They should:

− Elicit interactions between groups from different ages and social backgrounds.
− Be simple to use so that interacting with it is a comfortable and joyful experience for any audience, users being empowered to express themselves and to discover their own creativity.
− Allow “externalization” and “responsabilization”, so that it develops self-esteem and feeling of self-worth for each individual as significant member of the community.

5 Discussions

With Web 2.0, people engage in new forms of social activities (Nardi, Schiano, Gumbrecht & Swartz, 2004) and develop a participatory culture (Jenkins, Clinton, Purushotmas, Robinson, & Wiegel, 2006) where they are not only passive consumers but active creators of content. As Gauntlett (2008) says, we are moving from a “sit-back-and-be-told culture to a making-and-doing culture”. Social platforms, bloggs, collaborative writing tools (as wikipedia for instance)
show that sharing their productions, people build on, are inspired by or transform the productions of one and another to create new products. Systemic rather than individual phenomenon (Csikszentmihalyi, 1997), creativity becomes social, as individual creativity arises from an “activity that take place in a social context in which interactions with other people and artefacts that embody knowledge are important contributors to the process” (Fischer, 2005). In turns, through the process of making and sharing, we feel more involved and more connected to the world (Gauntlett, 2008).

Following these orientations, the MANC++ (Decortis, 2008) highlights the socio-cultural and intersubjective dimensions of the creative process. We believe these dimensions are not taken with sufficient attention in the majority of research and design of technology for children and teens in the field of learning and Child-Computer Interaction.

Our research within POGO shows the learning benefits for children from their active participation in a collective process of narrative creation in a formal education context. The POGO environment built upon our socio-cultural vision of the creative process to provide children with tools that support the different phases of the creative imagination cycle, and offer the possibility of a never ending creative process. The functions, potentiality and forms of the tools enhance the collective and intersubjective aspects of the creative process. They facilitate the experimentation and comparison of different narrative solutions. The tools support both personal reflection and intersubjective comparison. The children’s production ideas, the monitoring of their own productions and of the productions of other children become a support for their reflection and group discussions. These affordances of the POGO tools impact on the acquisition of narrative skills. Children benefit from others’ interpretations and points of view to construct the content and the structure of their narratives (e.g. organize the chronology of the story, specify the causal links between different elements of the story).

Our study of joint creative activities in an informal learning environment highlights the conditions that may lead disparate audiences to discover their creative and participative potential, to express and share it. The creative process, as we describe it in our model MANC++, acts here as a support of the acquisition of social competences. The collective and intersubjective dimensions of the pinhole creative activity lead people to gain benefits and learning both at personal and interpersonal levels. While interacting with each others at the different steps of the process, the participants get to know each other better, to overcome prejudices related to a mutual lack of understanding and gain empathy for other people’s aspirations, contributions, and human potential. Taking part in this collaborative project, they can identify themselves as part of a same community, make their voice heard and feel empowered to be active citizens that participate to culture.

Hence we confronted the model to various types of creative activity (creation of narratives for children and self-expression through photographic production for intergenerational and intercultural groups), mediated by different types of artefacts and technologies, with diverse users’ groups. Consequently we believe the MANC++ stands for a fruitful basis to define recommendations to inform the design of formal or informal learning environments, and also to guide the design of tools or new media technologies that support the creative process, and the different learning benefits that can emerge from the engagement in a creative activity.

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