

Fostering creativity in online collaborative learning environments

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Abstract. The present contribution tackles the issue of creativity in educational contexts and in particular in online collaborative learning environments. The contribution proposes a model to evaluate collaborative learning activities oriented to the development of skills and attitudes underpinning the creative expression. The model is used in this study to evaluate two real online activities, based on two different collaborative techniques (namely the Role Play and the Discussion), so that it is possible to make some considerations about the two techniques and their ability to foster those skills and attitudes underpinning creativity.

Keywords: creativity, cognitive, affective, meta-cognitive, online learning context, collaborative technique, Role Play, Discussion, evaluation.

1 Introduction

The debate around the concept of creativity is quite recent and has even recently received a new impulse given the fact that 2009 has been declared Year of Creativity¹. Usually, when one considers the “creative act”, one thinks at ideas or discoveries which have had an impact on the human history. Shneiderman (2000) refers to such kinds of episodes by defining them as “revolutionary” and in doing this he stresses the extemporaneousness of the creative act, as well as the unpredictability of the innovative discovery. Nonetheless, Shneiderman refers also to another kind of creativity, namely an “evolutionary” act resulting from the re-elaboration of existing parts/data into a new, coherent whole. Obviously, this latter kind of creativity may spring out of a single mind, but – even more frequently – may stems out from interactions among people while working together, sharing paradigms and know-how (Fischer, 2005; Fischer et al., 2005). Thus, nowadays there is a growing tendency to consider creativity also as a result of a social activity, by recognizing that the creative process may well take place thanks to the interactions of an individual with the environment and with others as well. Thus the complex concept of creativity can be placed in between evolutionary and revolutionary creativity, individual and social creativity, where all these terms should not

¹ <http://www.create2009.europa.eu/>

be considered dichotomies, but rather they are components of a multi-facet system, where one component may support and strengthen the other ones. Sternberg (2005) even argues that there is not only one creativity, but rather we should talk of a number of “creativities”.

While on the one hand such a debate on creativity definition is still ongoing, on the other one the concept is very often associated with that of *innovation* (Markkula, 2006). Innovation, as it is defined by the Council of the European Parliament², is the follow up of the creative process, something which stems from the application of new, creative ideas into concrete and specific contexts and which is explicitly recognized as valuable by the society (Fischer, 2005).

Starting from these considerations and thanks to some research studies (Nickerson, 1999; Csikszentmihalyi, 1997; Torrance et al., 1989), creativity has started being increasingly looked at as something that can be *potentially* stimulated through adequate learning tools and methods (UNESCO, 1972); at the same time – if one assumes that creativity is something that must have an impact on society and brings some kind of innovation - it is evident that it would be a non-sense to try to evaluate creativity in an educational context, as here - while it may well happen that students produce *original* artifacts – it is far less probable that they are able to *create* something which will impact on our society. What might alternatively be pursued (and thus evaluated) is the ability of students to combine ideas, links concepts, their curiosity and positive attitude towards new solutions and finally their capacity to look at what they are doing, judge it and find out suitable (re)actions. In other terms, in order to understand whether and to what extent an educational activity is able to cultivate students’ creativity, one should look at the process along the learning activity itself (Burlinson, 2005; Edmonds & Candy, 2002) and keep under control the development of a set of skills and attitudes that might lead to the creative expression.

This paper, after proposing a model for the evaluation of learning activities oriented to creativity, illustrates the results obtained by the application of such a model in two real online collaborative activities, based respectively on a Role Play and a Discussion, with the aim of reflecting on the ability of each of the two collaborative techniques to develop those abilities and attitudes that may constitute the background of creativity.

2 Towards a model to evaluate learning activities oriented to creativity

In order to tackle the issue of evaluating TEL experiences aimed at developing skills and attitudes oriented to creativity, one should start from the substantial

²[http://db.formez.it/FontiNor.nsf/b3f0568a004094c0c1256f57003b7fa1/F18BCC24BAECCE91C125742C004A61B2/\\$file/Anno%20europeo%202009.pdf](http://db.formez.it/FontiNor.nsf/b3f0568a004094c0c1256f57003b7fa1/F18BCC24BAECCE91C125742C004A61B2/$file/Anno%20europeo%202009.pdf)

agreement that seems to exist among researchers (Amabile, 1996; Sternberg, 1999; Torrance et al., 1989) that creativity is grounded on *cognitive* capacities (understanding and building knowledge), on *meta-cognitive* abilities (i.e. the capacity of perceiving and elaborating weaknesses and strengths of own reasoning and/or actions), and also on an *affective* involvement in the tasks to be performed (which implies positively accepting the task and actively work to reach the intended goal).

As to the *cognitive aspects*, three fundamental indicators have been identified by referring to the New Taxonomy of the Educational Objectives proposed by Krathwohl (2002), where creativity (defined as the ability of “putting elements together to form a novel coherent whole or make an original product”) is considered the top educational objective to be met. Following the arguments put forward by these authors, in fact, the three cognitive indicators of creativity are:

- o *Generating*, a process which involves the mental representation of the problem at hand (whatever it could be), in all its aspects and details, possibly making comparison with other problems/situations (instantiated by actions such as: combine, estimate, compare, state...).
- o *Planning*, namely the process of figuring out and mentally designing problem solutions or even defining methods and plans to achieve a goal (instantiated by actions such as: predict, infer, hypothesize, design, define...).
- o *Producing*, that is the process which deals with the actual enactment of what was generated and then planned and that may give rise to the creative act or product (instantiated by actions such as: build, enact, apply, test, verify...).

As to the *affective aspects*, by referring to the existing research in the affective domain field (Bloom et al., 1956; Rovai et al. 2009), two indicators have been adopted, able to account for students’ attitudes towards:

- o *Receiving*, or paying attention to stimuli. This is denoted by involvement and immersion in learning activities and includes being curious, motivated, trying over and over...
- o *Responding*, or reacting to stimuli. This refers to the actual expression of positive/negative feelings: satisfaction, joy, disappointment, excitement, depression, fear....

As to the *meta-cognitive aspects*, following the recent works of both Kim et al. (2009) and Murphy (2008), three main indicators have been considered, namely those related to the students capabilities of:

- o *Monitoring* the enacted learning process, which implies the attitude and the ability of recalling and evaluating one’s own cognitive process, by also evidencing strengths and weaknesses.
- o *Regulating* one’s own behavior on the basis of the perception/understanding of previously performed actions (which also means reviewing, controlling and tuning the activities by carrying out possible improvements, etc.).
- o *Evaluating* one’s own activities/performance from the viewpoint of the final outcome; this implies acquiring the awareness of what has been done by cri-

ticizing single actions in the light of a comprehensive estimation / judgment of the results obtained.

3 Context and method of research

In recent years the Istituto Tecnologie Didattiche (ITD) – CNR has designed and run several editions of a blended course for the “SSIS”, which is the Italian institution providing initial training to secondary teachers. The courses commissioned to ITD are on the topic “Educational Technology” and their main educational goal is promoting the development of instructional design competence, with special focus on the evaluation and selection of learning strategies, techniques and tools and on the implementation of educational technology in the school context. The courses proposed by ITD are based on a CSCL (Computer Supported Collaborative Learning) approach. During online activities students are usually subdivided in groups (typically 20-25 persons per group) and they are engaged in tasks (discussing a topic, solving a problem, studying a case, etc.) with concrete outputs to produce, which act as catalysts of interaction and collaboration among peers. This paper reports on a particular edition of the course, namely the one run by ITD in Veneto in 2008. During that particular edition of the course students were 21 and were coordinated by a tutor. Interactions among students and with the tutor occurred within Moodle. During the course students were proposed, among the others, two online activities, lasting 3 weeks each, the former being based on a Role Play, the latter being based on a simple Discussion among peers. The total number of messages exchanged during the examined activities is 439 (209 messages exchanged during the Role Play, 230 exchanged during the Discussion).

In order to gather data within this study, content analysis techniques have been used to analyze the messages exchanged among students. The unit of analysis chosen was the “unit of meaning” (Henri, 1992) and a total of 1517 units were found in the selected messages (each unit could be assigned one indicator only)³.

4 Results and Discussion

The following Figure illustrates the main results obtained by the content analysis of the messages exchanged by the students during the two activities. In particular the Figure shows the number of units detected by the coders for each indicator of the model during the Role Play and the Discussion.

³ The inter-rater reliability between the two coders (i.e. the agreement between the two) was calculated on a sample of 140 messages (30% of the total messages), and resulted 0,87 (Holsti coefficient) and 0,82 (percent agreement).

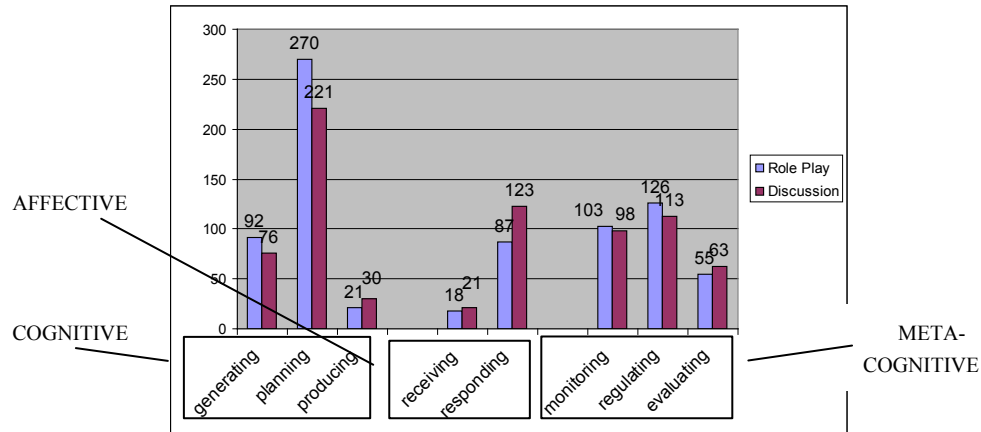


Figure 1 – indicators emerged during the Role Play and the Discussion

As one may note in Figure 1, indicators follow a similar trend during the two activities and the differences in values are not so evident. This may suggest that none of the two techniques is in principle better than the other as far as developing skills and attitudes oriented to creativity (at least not in our study). Still, some differences exist when looking at the various indicators of the model singularly. For example, the Role Play shows a better capacity to develop both Generating and Planning indicators (cognitive aspects), while the Producing indicator is rather low in both the activities. This can find a reason in the fact that none of the two techniques explicitly envisaged a phase of “application” of the solution negotiated by the students.

The Discussion reports higher values in the affective dimension (both for Receiving and Responding indicators) and this may be explained by the fact that, while during the Discussion students were let free to express themselves, during the Role Play students were instead asked to pretend a certain role and thus they may have not felt the need to express their feelings, attitudes or behaviors, that consequently remained tacit.

Finally, the meta-cognitive aspects are more triggered during the Role Play (Monitoring, Regulating and Evaluating indicators) than during the Discussion.

All in all, as one may expect, our data indicate the Role Play as more able to foster the cognitive and meta-cognitive skills, while the Discussion seems to be more effective as far as the affective sphere is concerned. This should be taken into account by the designer/teacher of the learning process, who may choose a technique or another depending on which creative-oriented skills and attitudes s/he wants to foster more.

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