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Creativity in the Era of Social Networking: A case study at Tertiary Education in the Greek Context

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Abstract. This paper investigates the utilization of a social network tool in order to promote creativity in higher education. Buddypress was selected as a social network tool and de Bono's "6 thinking hats" as a creativity strategy. The participants were 17 undergraduate students from a case study in a University in Greece in the field of social sciences. Creativity was defined by Torrance & Ball's [25] factors and the results were analyzed using authentic assessment and a questionnaire. The findings show that the research process was beneficial to students' creativity and that social network tools can be utilized successfully with such a focus. These findings should be treated carefully in terms of generalizing them, as they were derived from a case study. This research could be useful to educators and researchers as a pioneering approach in all levels of education.

Keywords: Creativity, social network tools, 6 thinking hats, higher education

1 Introduction

Creativity is a very important element of the educational process at all levels. This is even more important in tertiary education where students are trained to develop their professional and academic skills for the rest of their lives.

The Web 2.0 tools offer substantial and remarkable features that can be used beneficially in education and their interface can promote creativity [5], [13]. Social Network Tools (SNT) are some of the most popular Web 2.0 tools that according to Zhou et al. [29], provide the opportunity to promote creativity because there is common ground between them. It is worth mentioning that SNT enable users to participate actively and exchange information through a creative collaboration without a specialized knowledge.

So far, researchers have focused on the utilization of SNT in students' cognitive development [18], [16], [22], [26]. There are a lot of arguments that SNT can be used to promote creativity but there is limited, if any, research with such a focus. Therefore there is a need to investigate further this aspect.

This piece of research aims to investigate the utilization of a Social Network Tool to promote creativity in Undergraduate students. Creativity was defined according to the 4 factors that were suggested by Torrance & Ball [25] and these are: Fluency, Flexibility, Elaborate any ideas identified and Originality. The research question and sub-questions are:

1. Can the application of a SNT, which utilizes de Bono's "6 thinking hats", promote creativity?
   (a) What are the effects on students' fluency through this strategy in a SNT?
   (b) What are the effects on students' flexibility through this strategy in a SNT?
   (c) What are the effects on students' elaboration of any ideas identified through this strategy in a SNT?
   (d) What are the effects on students' originality through this strategy in a SNT?

2 Literature Review on Creativity and Social Network Tools

According to Dewey [9, p.167), students' active involvement is the cornerstone of the learning process especially in order to acquire new knowledge. Web 2.0 tools offer opportunities for active involvement but, by comparing some of them, it becomes obvious that SNT provide more features to users (Table 1).

Table 1. Comparison of Web 2.0 tools

	Web 2.0 Tools		
Features	**SNT**	**Blogs**	**Wikis**
Forum	✓	✓	✓
Chat	✓		
Tagging	✓	✓	✓
Groups	✓		
Friends	✓		
Profile pages	✓	✓	✓
File Sharing	✓	✓	✓
Real time activities	✓		
Post/Publish	✓	✓	✓
Build Virtual Communities of Practice	✓	✓	

There are a lot of definitions regarding Social Network Tools [1, 2], [14], [27] but all of them agree that they are tools that provide an electronic and online socialization and interaction among users through the creation of their personal profile. There are a lot of researchers that investigate the effects of SNT on teaching and learning at different levels of education and they all agree on their beneficial outcomes. Bowers-Campbell [1] verify that SNT have positive effects on students' self-efficacy and self-regulation. One year later, Sturgeon & Walker [22] note that SNT make students feel more comfortable as there is an environment of open discussion and some years later, Walker [26] and Reid [19] concluded that SNT contribute positively to students' cognitive development. On the other hand, there are researchers [10], [15] that think differently about the usage of SNT in the educational process as they stressed that SNT might be popular but this does not necessarily mean that they have an educational focus. So, for this purpose SNT need to be used with specific educational techniques.

Similar to this discussion, the research concerning creativity in education has been a main topic of discussion in social sciences. The development of creativity is very important to the advancement of science and society [24]. Creativity is the mental process or activities which include the generation of

new concepts or theories, or association among them [23]. It is also the ability to generate many unique ideas that solve a problematic situation [17].

There are a lot of creativity strategies that have been suggested with specific steps that can be used at a practical level in order to promote creativity. The "6 Thinking Hats" is a creativity strategy that was put forward by de Bono [6, 7, 8] for the development of creative solutions in a problematic situation. Each hat has a different color and represents a different kind of thinking (see Table 2).

Table 2. The 6 thinking hats of de Bono

Hat	Thinking
White hat	Known information, facts, data
Red hat	Emotions, Hunches, Feelings
Black hat	Difficulties, problems
Yellow hat	Positive, values, benefits
Green hat	Possibilities, ideas, solutions, alternatives
Blue hat	Overview, Decision, next steps

This creativity strategy is very popular among researchers at all levels of education. De bono's "6 thinking hats" reinforce active involvement, collaboration and open discussion among the members of the team [11, 12], [18], [20, 21]. It is obvious that this creativity strategy has some common characteristics with SNT, as they both promote open discussion, cooperation and active involvement. Therefore, their combination in a research procedure is an interesting topic to investigate.

3 Research Methodology

This research is a case study in the Greek context which uses a SNT for the development of students' creativity through de Bono's "6 thinking hats". The sample consisted of 17 undergraduate students from a University in Greece in social sciences. A comparison was conducted among different SNT and Buddypress [3] was selected as it was free of charge and had the most features (see Table 3).

Table 3. Comparison of Social Network Tools

	Social Network Tools			
Features	BuddyPress	Ning	Facebook	Diigo
Free	✓		✓	✓
Safety concerns	✓	✓		✓

Server-free		✓	✓	✓
Educational focus	✓	✓		
Users create forum	✓	✓	✓	✓
Forum	✓	✓	✓	✓
Chat	✓	✓	✓	
Messages	✓	✓	✓	✓
Group formation	✓	✓	✓	✓
Upload any kind of file	✓	✓		
Select the characteristics	✓			

It was uploaded to the University's website and access was allowed only to the participants/users. There were 3 types of users with different permissions (Creator, Manager/Teacher, Student) and only the Creator and the Manager/Teacher could invite members to the SNT. Students were divided into 4 groups and they decided the name and the logo of the group. Following this, 4 private groups were formed in the SNT and named after the students' groups. There was, also, one common group "The creativity group" in which the teaching material was. Students were assigned with a real life case scenario in their profession and they had to use the SNT and de Bono's "6 thinking hats" in order to find a solution. Following this they had to submit their proposal as a comic book. Being more specific there were 4 different periods for the students:

1. Induction, groups, presentation of SNT, 6 thinking hats strategy and the case scenario
2. Teacher announces the beginning of each hat, students discuss in the SNT to find a solution according to the thinking of each hat that de Bono suggests (for example in the white hat students were discussing the general information of the allocated problem, while, in the green hat students were suggesting possible solutions to the problem etc).
3. Students present their ideas in a comic book
4. Assessment and evaluation

To measure the outcomes of the procedure we used authentic assessment and a questionnaire. Authentic assessment is the measurement of real abilities, capabilities and knowledge in procedures that can be applied in real situations [28]. The comic book and the discussions in the SNT were evaluated based on the 4 creativity factors using Choon-Keong et al.'s [4] methodology. This methodology takes qualitative data and categorizes it (see table 4). In addition, at the end of the research procedure, students completed a questionnaire that was based on Ziogkou & Dimitriadis's [30] research in order to evaluate their experience through the SNT.

Table 4. Methodology for the evaluation of creativity

Creativity factors	Scoring criteria	Score awarded
Fluency	The number of different ideas that one can produce	1 point for each idea
Flexibility	The number of categories of ideas that one produces	1 point for each category
Elaboration	The number of categories of ideas that one produces	1 point for each creative elaboration
Originality	The uniqueness of ideas that one produces as compared to the whole sample of ideas suggested	Between 1% & 5%= 1 Point. If 1%=2 points

For the assessment of originality, we need to measure the ideas of each group and divide them with the total number of all ideas. The outcome is multiplied by 100. If the resulting number is less or equal to 1% then originality is scored with 2 points. If it is greater than 1% and less than 5%, originality is scored with 1 point, while if it is greater or equal to 5% it receives 0 points.

Following this and according to the total score of each team, there is a categorization of the teams in 3 different creativity groups (creative, moderate creative and less creative). These 3 creativity groups are formed by dividing the highest total score by 3.

4 Data Analysis and Discussion

For the authentic assessment, the data from the comic book and the discussion in the SNT were used in order to evaluate creativity. Regarding the data analysis of the discussion of the SNT of the 4 teams, the highest creativity score in the sample of proposed ideas (N=379) was 646. Regarding the data analysis of the comic book of the 4 teams, the highest creativity score in the sample of proposed ideas (N=36) was 63. The data from all teams were successfully related to the creativity factors and there were very interesting and pioneering ideas. However, the last two teams had significantly higher scores than the first two in both measurements (see Table 5).

Table 5. Creativity scores

Creativity scores from the discussion of SNT					
Team	**Fluency**	**Flexibility**	**Elaboration**	**Originality**	**Total score**
Powerpuff girls	48	24	39	83	194
Sailormoon	61	18	40	104	223
Bad Girls	78	45	155	290	568
Little explorers	192	46	86	322	646
Creativity scores from the comic book					
Powerpuff girls	4	4	1	8	17
Sailormoon	7	7	7	14	35
Bad Girls	11	10	11	22	54
Little explorers	14	12	13	22	61

Based on the total scores of all teams, the 3 different creativity groups were formed. The data analysis from both the discussion in the SNT and the comic book shows that the groups remained in the same creativity group with no significant decrease (see Table 6).

Table 6. Creativity groups

Greativity groups from the discussion in the SNT		
Creative	**Moderate Creative**	**Less creative**
431-646	216-430	0-215
Bad Girls (568) Little explorers (646)	Sailormoon (223)	Powerpuff girls (194)
Greativity groups from the Comic Book		
42-63	21-42	0-21
Bad girls (55) Little explorers (63)	Sailormoon (35)	Powerpuff girls (17)

After the authentic assessment, there was one more measurement regarding students' views of the research procedure and the use of the SNT. Data from the questionnaire was categorized in 4 factors regarding the SNT learning, usability, efficiency and utilization. Students had to express their views concerning 5-point Likert scale questions. The data analysis shows that the SNT and the research procedure was well received by students as most of them answered positively (see Fig. 1).

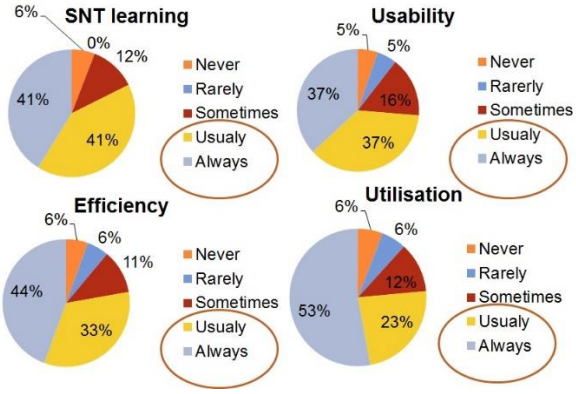

Fig. 1. Data from the questionnaire

Analyzing the data further, it can be argued that there are some very interesting results which can be verified by the existing literature. To answer the research question and sub-questions, the ideas from all teams covered successfully all creativity factors and there were very good examples that could be implemented in everyday practice in order to meet the upcoming challenges. SNT can offer direct and immediate interaction and this enables

communication among the members of the team. This was very important in the successful outcomes of the research procedure and it is also verified by researchers [1], [22] that conclude that SNT make learning more interesting as they offer an open discussion.

The teams displayed the same progress with no significant decrease in the creativity groups in both measurements with authentic assessment. This can be attributed to the fact that the SNT make students to become actively involved as they have attractive features. This is also verified by literature, as Na-songkhla [16] claims that SNT provides the opportunity to present the teaching material in a stimulating way to students. It has to be acknowledged that SNT are widely used in everyday life and thus participants were familiar with the research procedure.

As stated earlier, there are a lot of arguments supporting the idea that SNT can promote creativity but up to now, there is no, if any, research with such a focus. This piece of research shows positive outcomes in the beneficial use of SNT concerning students' creativity. However, the data should be treated carefully as it was from a case study and thus the sample size was limited. This research could be helpful to researchers and to those who seek pioneering approaches to all levels of education.

5 Conclusions

This research examined the use of a SNT to promote creativity in undergraduate students in a case study in a University in Greece. Buddypress was selected as a SNT, in which students utilized de Bono's "6 thinking hats". The data demonstrated the beneficial outcome of the research procedure and that the procedure in general was well received by the students. Findings should be treated carefully as they were derived from a case study and the sample size was small. It would be interesting to further investigate this in a bigger sample and with more Web 2.0 tools. This research could be beneficial to researchers and to those who seek innovative approaches to all levels of education.

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