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Teaching material and its contribution to educational practice: From theory to application in Music Education

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FOSTERING COLLABORATIVE CREATIVITY AND META-COGNITIVE AWARENESS IN e-LEARNING FRAMEWORK: THE CASE OF HYBRID SYNERGY TAG TOOL

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Abstract

Nowadays, after the Web 2.0 explosion, the importance attached to socio-cultural learning and collaborative creativity is evident in current educational research. Accordingly, there is a need for in-depth research as regards the associated pedagogical approaches, research methodologies as well as tools. However, in technology enhanced learning, and e-learning in particular, there is no extended research on the techniques for collaborative creativity. In our on-going research in this specific field, we experimented with a collaborative creativity tool on one case study within a workshop of Greek Association of Primary Music Education Teachers (GAPMET). Based on our Hybrid Synergy collaborative creativity analytical framework, we developed a tool called HySynTag. The tool allows the discussion participants to attach qualitative metadata to their posts based on a specific cognitive model and thus visualise their cognitive levels. This visualisation can occur on three levels, the discussion, the posts and the overall threaded view. The results suggested that such a tool can enhance collaborative creativity and awareness of participants' cognitive levels towards new idea and knowledge construction. It was also evident that further research is needed on the attributes of the tool, multilingual support as well as specific visualisation using icons.

Keywords: e-learning, collaborative creativity, Hybrid Synergy analytical framework, HySynTag tool, idea management, metacognition

1. INTRODUCTION

Socio-cultural learning (e.g. Vygotsky, 1981) and collaborative creativity (e.g. Miell & Littleton, 2004) are

subjects under investigation in current educational research. In this paper, we present our ongoing research on socio-cultural learning and collaborative creativity in the framework of teachers e-training.

Using new technologies for remote collaboration from U.K., Finland, and Greece we developed our own *Hybrid Synergy* analytical framework (Lambropoulos, N., Kampylis, P., Papadimitriou, S., Gkikas, A., M., V., Minaoglou, N., et al., 2008). This analytical framework proved effective not only for the enhancement of collaborative e-learning but also of collaborative creativity (Lambropoulos et al., 2008). The latter is a concept that has been widely investigated yet.

More specific, this paper will discuss collaborative creativity and the need for new tools and techniques to enhance it in e-learning environments. Then it will present the suggested Hybrid Synergy analytical framework and a case study with regard to the testing phase of the associated Hybrid Synergy Tag tool. We will also present the conclusions and future trends suggesting the need for further research and development for the Hybrid Synergy analytical framework and the associated tools for technology enhanced collaborative creativity in e-learning context.

2. COLLABORATIVE CREATIVITY

According to Berners-Lee (2007), the Internet is not only a technological means but also a social phenomenon. The *Internet* itself is a network of individual creative contributions. In the new Web 2.0 collaborative era (Berners-Lee, 2007), collaborative creativity is a promising area.

Several researchers (e.g. Mamykina, Candy & Edmonds, 2002) have emphasized that within the creative industries the most creative pursuits involve interdisciplinary teams working together to co-create tangible or intangible product(s) that cannot be created by a single individual alone (Sawyer, 2006). Moreover, in many cases the interdisciplinary teams constituted by individuals with diverse sociocultural, technological, and educational backgrounds. It is also evident that there are

noteworthy differences between individual and collaborative creativity (e.g. Mamykina et al., 2002) that should be investigated, such as the role of individuals, the contexts, the processes, the products, and the team dynamics. Therefore, the emerged question for anyone who aspires to study collaborative creativity is *"What environments, tools, and methodologies can support collaborative creativity of multicultural and interdisciplinary teams?"*

Our research in GAPMET Moodle e-learning environment (http://e-learning.primarymusic.gr) is primarily concerned with the collaborative creativity implemented in the Greek teachers' e-training. The research on creativity applied in e-learning, and especially on collaborative creativity within e-teams, is still in very early stages. In technology enhanced learning, and e-learning in particular, there is no extended research on the techniques for collaborative creativity.

For this reason, we developed a new analytical framework for the fostering of collaborative creativity in e-learning environments. Based on two pre-existing frameworks, *Collaborative e-Learning* (Lambropoulos, 2008) and *Six Thinking Hats* (de Bono, 1986) we developed a new analytical framework with an internal structure that can facilitate collaborative creativity in e-learning environments. We call the new analytical framework *Hybrid Synergy* (Lambropoulos et. al., 2008; Daskolia, Lambropoulos & Kampylis, 2009). In the next section, we present Hybrid Synergy analytical framework in more detail.

2.1. The Hybrid Synergy

Hybrid Synergy is a five-levels non-linear collaborative creativity analytical framework that facilitates and enhances the e-learners' metacognitive awareness (Fig. 1). Initially, we used Hybrid Synergy analytical framework to collectively share information for knowledge building and make decisions mediated by synchronous and asynchronous social software technology.
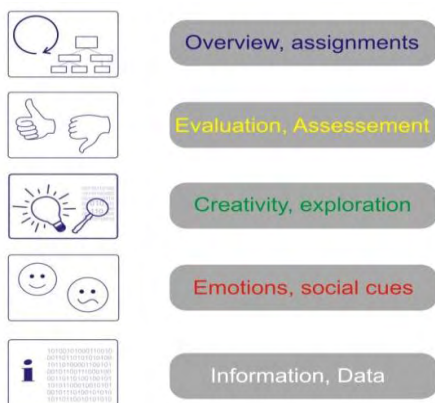

The first level of Hybrid synergy refers to mere information provision; the second to the social aspect of collaborative learning; the third to the exploration of ideas; the fourth to their evaluation and assessment; and lastly the fifth level to a meta-cognitive aspect with overviews, summaries and task allocations. We should note here, that these levels are not predetermined and each e-team of knowledge workers can use Hybrid Synergy levels in many different sequences depending on the issue at hand.

Based on the aforementioned analytical framework, we created thereafter a tool to depict the collaborative creativity levels.

2.1.1. The Hybrid Synergy Tool

In our on-going research in this specific field, we experimented with a new collaborative creativity tool on a pilot study as part of a workshop organized by GAPMET in the framework of a DaVinci project (http://primarymusicenglish.primarymusic.gr/primarymusicenglish/). Based on the abovementioned Hybrid Synergy analytical framework, we designed, developed and tested a new tool called *Hybrid Synergy Tag* (HySynTag). This new tool took stock in Lambropoulos (2008) Ph.D. research on Computer-Supported Collaborative Learning argumentation. The model derived from this research was developed further and extended, anchored in Kampylis Ph.D. research on creativity in primary education framework (Kampylis, Fokides & Theodorakopoulou, 2007; Kampylis, 2008; Kampylis & Argyriou, 2008; Kampylis, Berki & Saariluoma, 2009). The two research fields were found not only compatible but also complementary to each other.

The tool was embedded in Moodle Learning Management System (LMS). Moodle LMS is based on socio-constructivist theories (http://docs.moodle.org/en/Philosophy) and "social constructionist pedagogy" in particular. The design and development of Moodle LMS is guided by a particular philosophy of learning, a way of thinking that you may see referred to in shorthand as "social constructionist pedagogy". Despite the fact that the Moodle developers built on sound pedagogical approaches and offer tools for synchronous and asynchronous communication, there are no specific tools to facilitate and enhance e-learners' collaborative creativity.

Therefore, the main aim was to create a tool to support collaborative creativity so to have a positive impact on the e-learners. A second aim was to enable the e-learners to work on the operational definitions and implementation of Hybrid Synergy analytical framework as well as use the associated tool in the provided discussion forums.

More specific, HySynTag tool allows the discussion participants to attach qualitative metadata to their posts based on a specific cognitive model and thus visualise

their cognitive levels. This visualisation can occur on three levels: the discussion, the posts, and the overall threaded view.

The learning and research aim was to use the tool in order to control, support, analyse and measure the creative collaboration between the participants as it is expressed in the related discussion forums.

Through HySynTag the e-learners can tag their messages in online discussion forums according to the type and level of argumentation and thinking they express in their posts. Figure 2 shows how the Hybrid Synergy levels adjusted and labelled for web use as the more 'scientific' definitions have been found not to function in everyday use (Lambropoulos, 2008). Based on the research by Kirschner and colleagues (2008) about the three levels from free use of tools to obligatory use, the authors decided to stay on the first level; the e-learners were not obliged, but encouraged to use the tool.

More specifically, they have the opportunity to tag their post in accordance with the Hybrid Synergy levels: Inform, Feel, Explore-Idea, Evaluate, Summarise (see Fig. 2). Moreover, they have the opportunity to tag their post with the tag "Other" when the five levels of Hybrid Synergy seems that they do not cover their argumentation. Finally, they have the opportunity to post something without tagging (see Figure 2, first option, [-]) either because the available tags are not suitable or because they do not to do so.
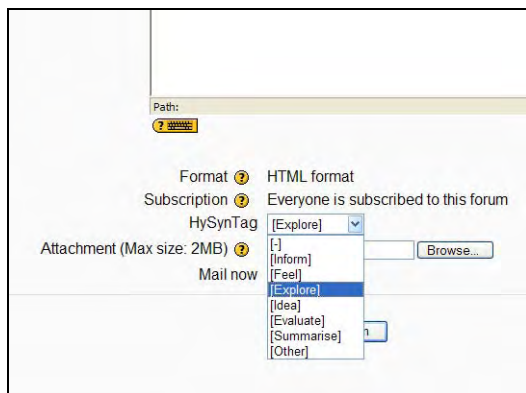

Figure 2: Hybrid Synergy Tag tool (HySynTag)

The tool, placed at the bottom of the "Reply" message, can also aid metacognition. The overall view of the thinking levels in one discussion can enhance the spiral and non-linear creativity mobility allowing the "Aha!" experience to occur. The next sections present the implementation and evaluation of the tool in one workshop of GAPMET. The tool also provided real-time thematic analysis for the collaborative creativity framework.

3. METHODOLOGY & CASE STUDY

3.1. Methodology

Ethnotechnology was found to be the appropriate methodology for testing the HySynTag tool. The

ethnotechnological perspective suggests that the properties of a context cannot necessarily be accurately understood independently of each other. The ethnotechnologist is interested in how people make their actions intelligible to themselves and others (Guribye & Wasson, 2002).

The overall research framework consisted of observation notes, quantitative (questionnaires) and quantitative analysis (thematic analysis; Boyatzis, 1998) as well as Social Network Analysis[1] (SNA; Bakharia, 2008). In addition, row data from the HySynTag tool was acquired and analysed. Here we will present only the first pilot case study and only data acquired from questionnaires and the HySynTag tool as an example. In addition, only the collaborative creativity levels are going to be discussed and analysed.

The study presented here was the pilot case study to acquire initial feedback for the tools as well as test the methodological approaches for triangulation.

3.2. The Case Study

The pilot case study was conducted in the framework of a DaVinci workshop took place in London (January 2009). The GAPMET blended learning workshop was in English, hosted at Northumberland Community School in London. Some observation notes, the post-questionnaire responses, the qualitative analysis and the results from the HySynTag tool are going to be discussed next.

3.3 Participants

There were 11 participants in the case study, eight female and three male (see Table 1). Eight participants were eight between 20 and 40 years old and three between 50 and 60 years old. Four were from Greece, two from Lithuania, two from Estonia, one from Bulgaria, one from UK, and one from Cyprus. There were four teachers, two IT and Music teacher and three consultants.

Age	20-30	30-40	40-50	50-60
	4	4	1	2
Sex	F	M		
	8	2		
Originality	Lithuania	2		
	Estonia	2		
	Bulgaria	1		
	Greece	4		
	Cyprus	1		
	UK	1		

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[1] SNA is a technique used to map and measure the interaction that occurs between participants within a network. Bakharia found a process of acquiring data for SNA software without being resource intensive; however, analysis of these results is not presented here.

Occupation	Teacher	4			
	IT teacher	2			
	Music teacher	2			
	Consultant	3			

Table 1. Demographic information of participants

3.4 Limitations

The limitations were similar with those reported in other case studies (e.g. Lambropoulos, et al, 2008). The first limitation was that the participants constituted a small sample of e-learners. Therefore, we need more research, with bigger samples in order to verify the effectiveness of our propositions. Another limitation was that even though the sample consisted of participants with various sociocultural, technical, and educational backgrounds (see Table 1) it was not a representative one. Therefore, we need to further research and test the proposed analytical framework and the associated tools. Other limitations were that the online nature of an e-course through Moodle LMS was combined to onsite participation in the workshop, and the correlative time pressure.

3.5. Data Analysis

The pre-questionnaire showed that the participants found with limited knowledge of creativity techniques and only one participant suggested that she knew such a technique. However, all participants reported that creativity techniques are of great importance in the everyday educational practice.

Researchers' observation notes suggested that the participants had different levels of familiarity with ICT and especially Moodle LMS. For example, the more experienced in ICT participants (Lithuanian and Bulgarian) had to wait for the other to register. The delays during registration process resulting in the limited time for participating in the discussion forums. However, all participants suggested that online teachers' training has great potential if properly conducted and supported by the e-learning stakeholders.

The 1-5 Likert scale responses on participants' online training, and Moodle in particular, were on collaboration and creativity and they are presented in the following Table 2.

	1	2	3	4	5
Collaboration can be enhanced through online training		1	2	5	3
Creativity can be enhanced through online training		1	2	2	6
Moodle LMS and its tools can facilitate e-learners' collaboration				5	6
Moodle LMS and its tools can facilitate e-learners' creativity			2	3	6

Table 2. Participants' responses on collaboration and creativity through online training

It appears that all participants agree more or less that online training in collaboration and creativity is necessary. Moreover, their opinions are more coherent and more than average on the 1-5 Likert scale with regard to the use of Moodle LMS to facilitate collaboration and creativity.
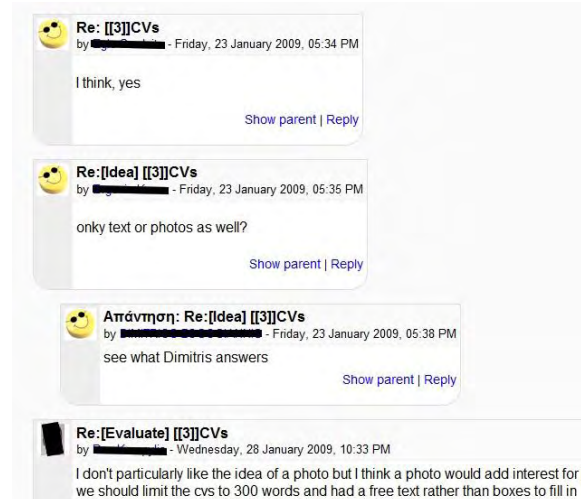

Figure 3. Sample discussion in nested form

The above Figure 3 depicts the extended forum view of the messages in one discussion forum about the use of partners' CV for the project website.
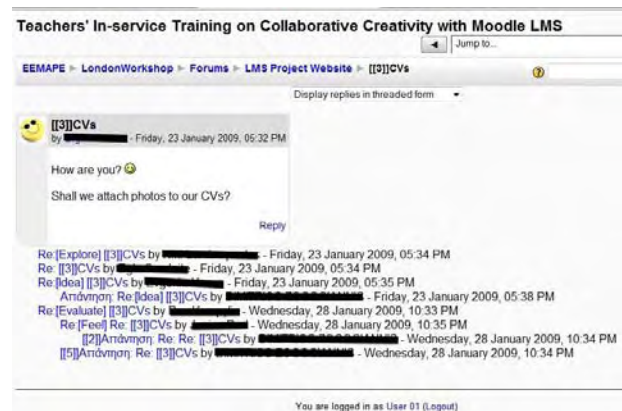

Figure 4 Sample discussion in threaded form

The above threaded view (Fig. 4) of the discussion provides an overview of the previous discussion. It is evident that selection 3 (Explore) is used with only one idea suggestion in this discussion. This indicates that might participants did not know what to include in the project website and they were investigating different solutions.

Feedback from this first pilot study was used to redesign the tool. One change was found necessary, the 'Feel' tag need to become 'Social'. This was found necessary in order to enhance understanding of the functionality of the attributes of the tool.

3.3. Discussion

Designing e-learning tools to influence Hybrid Synergy has methodological advantages. For example, such tools can give explicit control of the process for both the e-tutors and e-learners, and support the type of interactions that were expected to promote it. Lack of those tools results in lack of understanding collaborative e-learning and vice versa as they can capture the collaborative learning cognitive and meta-cognitive distinction. For example, tagging messaging based on Hybrid Synergy five levels can explore and verify solutions as well as provide a distinction between task and communication. The latter is referred to as dialogue management and conversation models drawing from linguistics (for example, argumentation, speech types, managing turn taking or making relevant contributions).

4. CONCLUSIONS & FUTURE TRENDS

Web 2.0 suggests that e-learners who work together can achieve outcomes they could not accomplish independently (Salmons & Wilson, 2008). The same assumption lies behind collaborative creativity (e.g. Sawyer, 2006). In this way, specific techniques and methodologies can enhance technology enabled learning; collaborative creativity has the potential to be one of them.

As for the future, our aim is to establish a culture of creative collaboration between the participants through active Communities of Practice (Lave & Wenger, 1991). Further implementation, evaluation and improvement are suggested for the Hybrid Synergy Model as well as the HySynTag tool. In addition, new tools and interfaces to support collaborative creativity within e-teams are needed. Our continuing research includes the use of iconic instead of textual representation. Furthermore, we are going to introduce HySyntag tool in two different educational contexts: to music education (in the framework of an e-course organized by GAMPET) as well as to environmental education teachers (in the framework of an e-course organized by the National and Capodistrian University of Athens; see Daskolia, Lambropoulos & Kampylis, 2009). In addition, there is a need for further evaluation in different cultural as well as in multicultural contexts.

Research on collaborative creativity and metacognitive awareness in e-learning environments is a broad and promising field that attracts researchers from different fields. New tools for the e-learning environments can create conditions to enhance not only the collaborative creative process but also the knowledge about our own cognitive processes.

5. ACKNOWLEDGMENTS

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