

Monitoring Teachers' Complex Thinking while Engaging in Philosophical Inquiry with Web 2.0

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Abstract. The purpose of this study was to examine how we can exploit new technologies to scaffold and monitor the development of teachers' complex thinking while engaging in philosophical inquiry. We set up an online learning environment using wiki and forum technologies and we organized the activity in four major steps to scaffold complex thinking for the teacher participants. In this article, we present the evolution of complex thinking of one group of teachers by studying their interactions in depth.

Keywords: complex thinking, critical thinking, creative thinking, caring thinking, philosophy for children, philosophical inquiry, technology integration, wiki, forum, WikiSplit.

1 Introduction

This study is an attempt to advance the current instructional design approaches in online and blended learning settings. Our approach was inspired by the principles of the “Philosophy for Children” (P4C) program [10] and exploited web 2.0 technologies to scaffold and monitor the development of teachers' complex thinking while engaging in philosophical inquiry.

Briefly, P4C aims to allow children to acquire complex thinking skills through play and the development of a community. Since its development [10], this program has been used successfully in many schools worldwide and a few scholars have discussed its success in promoting students' complex thinking [11]. To date, P4C has not been used with adult learners, such as pre-service or in-service teachers. Moreover, the role of technology in P4C has not been explored.

In this study we aimed to help in-service teachers develop complex thinking while they engage in philosophical inquiry using web 2.0 technologies. We first sought to understand how collaboration and critical thinking unfolds within a small group of teachers in our technologically mediated environment. We then examined their interactions, in more depth, in order to understand how their arguments evolved as they discussed a philosophical dilemma and wrote a, so called, thinking-story (e.g., an

essay) to be used as a springboard for debate in a classroom environment. Finally, we discuss how WikiSplit [7] – a combined wiki-forum tool -- assisted the development of complex thinking.

2 Theoretical Framework

The main purpose of the P4C program is to promote complex thinking by developing critical thinking, creative thinking and caring thinking. The philosophical dialogue helps children improve reasoning ability and acquire metacognitive skills, as is the awareness of how they think [8]. According to Lipman [1], critical thinking in the context of this program, is promoted by and as a result of interactions that occur in a community of inquiry. He argues that critical thinking is a complex process involving the development of personal and social experience [9]. During the development of this kind of thinking, an emphasis is put on the process (in contrast to the product) of philosophical debate in a community of inquiry. As Haynes points out, philosophical inquiry is not a ‘tool-kit’ approach to promoting independent thinking [5]. The process is dependent on the quality of interaction and dialogue engendered, rather than rigidly following a step-by-step procedure. The dialogue in its strict meaning as *dia-logos* is an active and critical method of communication [1]. Fisher [3] supports that dialogue leads to the development of thinking. Creating meanings is a dialogical process. Meaning does not have static identity. It is a result of different voices. It is important for children to be exposed and actively engage in inquiry where different voices, ideas and perspectives are present.

Children in the program have the opportunity to monitor the way their peers think and critically evaluate the various arguments. Therefore, they become more sensitive to the opinions of others and they engage in dialogue, rather than parallel monologue. Lipman defines this type of thinking as caring thinking [1]. As Haynes [5] points out “caring thinking involves caring enough to make the effort to hear what others are saying and developing the capacity to see the merits of each point of view[...] caring for self and others through learning detachment from the need to be right or certain about everything” (p. 46). Creative thinking is also encouraged in the p4C program. Philosophical - logical thinking is encouraged through creative activities and creativity is cultivated through reasoning ability.

Fostering the above types of thinking in the P4C program occurs by means of praxis [1]. To enable this praxis, Lipman developed seven novels with accompanying manuals. The novels serve as springboards for debate [9]. Their central characters learn to resolve their problems through their powers of reasoning. The story is presented and the children take time to think of their own questions. Then, these questions are discussed briefly before one is selected for more extensive discussion. The presentation of different positions gives the opportunity for all participants to share their thoughts and collectively judge which of these sites are dominant and which are not, by developing arguments. The argumentation ability is an important objective of the P4C program. Children are encouraged to support their positions reasonably and recognize whether their opinions are valid and reliable. Also they are

asked to correct possible flaws, seeking more evidence to substantiate their opinions, especially when they contradict. Alternative stimulus materials have evolved since Lipman's original materials. In the UK, Fisher [2] has produced a series of books. In general, P4C involves students and their teacher sharing a short story that stimulates thinking. In our study we use the term thinking-story to refer to this type of story. To date, P4C has not been used with adult learners, such as pre-service or in-service teachers, even though there is a great need for teachers to understand the importance of complex thinking and how it can evolve through collaboration within a community of inquiry. In this study, we examine the discourse of a group of teachers in order to understand how arguments evolve while engaging in a debate and collaborative writing of a thinking-story.

3 Method

Participants. The community of inquiry under investigation was composed of seven students (mean age 25 years old) attending a graduate course on Learning Theory at a private university in Southeastern Europe. In addition to the domain-expert instructor, the course was tutored by an instructor of philosophy and a learning technologist. Students within the community of inquiry were randomly separated in two smaller groups (3 vs. 4 students) to engage in an online debate on a philosophical dilemma. Each group was randomly assigned to support one of the two aspects presented in the dilemma: "The phenomenon of euthanasia to people in cases of severe illness is completely unacceptable" vs. "The phenomenon of euthanasia is acceptable to the people in case of severe illness" [12]. The goal of each group was to produce a thinking-story, which could be used as a springboard for a debate on the topic of euthanasia in the K-12 classroom.

The figure displays two side-by-side screenshots of the WikiSplit interface. The left screenshot shows a forum thread titled "Απάντηση: Step 1 [Εναρκτήρια θέση]" by Agni Stylianou, dated Thursday, 1 March 2012, 06:13 PM. The thread content discusses the need to edit a post and mentions a "History" button. The right screenshot shows a wiki page titled "Step 1 [Εναρκτήρια θέση]" with the heading "ΕΥΘΑΝΑΣΙΑ: ΕΠΙΧΕΙΡΗΜΑΤΟΛΟΓΙΑ". The text on the right discusses the ethical and practical aspects of euthanasia, mentioning the "Bowling" concept and the importance of a community. The interface includes navigation buttons like "View", "Edit", "Comments", "History", "Map", and "Files" at the top of the wiki page.

Fig. 1. WikiSplit (forum on the left, wiki on the right)

Research Context. The online debate was supported by WikiSplit [7] – a combined wiki-forum tool which aimed to facilitate students’ discussion during the debate as well as their collaborative writing of the thinking-story. In forum-mode group members discussed the dilemma. In wiki-mode the position of the group was recorded as a result of their negotiation in forum-mode.

In WikiSplit, the activity was organized in four major steps to scaffold students’ complex thinking. Three steps involved the argumentation process and one step involved the collaborative writing of the thinking-story.

In step 1, each group was asked to discuss initial arguments and list initial ideas for the support of their assigned aspect of the dilemma.

In step 2, the position of the group was reconstructed based on arguments offered by the other group.

In step 3, both groups attended a lecture on critical thinking and were asked to improve their arguments and synthesize their final position as a group.

In step 4, participants were asked to collaborate in writing a thinking-story using the key arguments of their group.

Each of the argumentation steps lasted a week whereas the final step (step 4) of collaborative writing of the thinking-story lasted two weeks. The discussion that occurred during each step within each group in forum-mode (within-group interaction) and the position of each group in wiki-mode was not visible to the opponent group until the end of each step. At the end of each step, the positions of the two groups were revealed in order to allow for across group interactions.

Data sources. Data sources included the group’s discourse from the forum mode and the group texts from the wiki-mode during the four steps (3 steps of argumentation and 1 step of collaborative writing of the thinking-story). We also videotaped a 2-hour reflection session of the argumentation process that took place in a class meeting face-to-face. The reflective session was organized by the instructor of the course in collaboration with the mentor / researcher in the field of philosophy. Students had access to the discussions from the forum-mode and positions written in the wiki-forum and used the think-aloud technique to reflect on the within group (and across group interactions) while engaging in the argumentation process. Finally, participants were asked to provide written feedback about their experience using WikiSplit and explain how the technology assisted the development of complex thinking (critical thinking, creative thinking and caring thinking).

4 Data Analysis and Results

In this section, we present the evolution of complex thinking of one group of teachers by studying their interactions, in depth. We chose to focus on the group that had to support the position against the euthanasia phenomenon. This decision was made based on the fact that most of the literature that was available to students supports this position. Therefore, we were interested to study how the arguments of the group would evolve throughout the three steps of the argumentation process.

Coding the discourse. The analysis focused on coding occurrences of the evolution of the quality of arguments within the group's discourse. Table 1 presents the first coding scheme that was used in the study. While studying group's discourse, the arguments used were assigned a code based on their nature. Ethical arguments that are used to support why the phenomenon of euthanasia is unacceptable were coded as arguments "1, 1.0.1, 1.0.1.1 and 1.1". Arguments that relate with medical science ethics and the legal and political aspects of the euthanasia phenomenon were coded as "2, 2.0.1, 2.1, 2.1.1, 2.2". Finally, the theological argument supporting the value of life as a gift provided by God was coded as argument "3". As we observe from the numbers in Table 1, group members focused on the main categories of each type of argument (1, 2, 3) during the argumentation process (step 1-3). We also observe that in step 2 there was a lot of discussion regarding the theological argument. This was the main argument that was used by the group. Another interesting observation is that during the collaborative writing of the thinking-story (step 4), the group focused on fewer arguments: the ethical and the theological argument supporting the value of life even at the presence of pain. A reason to explain this finding is that the participants, being in-service teachers, chose to focus on arguments that would be easier to discuss with children when addressing the euthanasia phenomenon.

Table 1. Number of Messages for Each Type of Argument During the Steps of Philosophical Inquiry

Argument Code	Type of Argument	Debate: Step1 (forum-mode)	Debate: Step2 (forum-mode)	Debate: Step3 (forum-mode)	Thinking-Story Step 4 (forum-mode)
1	Ethical argument: the value of life	1	8	17	3
1.0.1	Ethics of pain		2	2	4
1.0.1.1	Ethics of pain using examples			1	
1.1	Human weakness- disability of arguing for the value of life due to illness	4	13	5	5
2	Selfishness vs ethics of medical science vs science ethics	2	11	14	
2.0.1	Patient's life beyond medicine: possibility of improving patience's health			2	1
2.1	Law prohibiting euthanasia to doctors	2	5	8	
2.1.1	Selfish financial incentives of doctors			5	
2.2	Legal and political dimension of euthanasia			3	
3	Theological argument: the value of life	5	15	7	3

Analysis of chronological visuals. To understand more about the process of collaboration we examined visual representations of the group’s coded discourse in chronological order by generating an Excel scatter-plot– see Figure 2. The time of the contribution runs at the top of the diagram for the duration of the activity (5 weeks) and each time-point on the visual represents a collaborator and his/her contribution in the thinking process. The visual presents the four steps of the activity (Step1-3 of the argumentation process and the step of collaborative writing of the thinking-story), as well as the concurrent use of the wiki and forum modes of WikiSplit. These visuals were inspired by the CORDTRA visualization technique [6]. The visual of Figure 2 was first inspected for general patterns of arguments of philosophical inquiry, across steps 1-3 and the groups’ thinking-story. Then, the collaboration process was examined in more depth by going back and forth between each visual and the group’s discourse. That is, we needed to zoom into the group’s discourse and wiki activity, while using the CORDTRA as a pointer to interesting patterns. This in depth analysis revealed that the design and scaffolding of the activity (in four steps), as well as the affordances of WikiSplit for collaboration (i.e. hiding the within-group interactions at each step), facilitated the discussion during the debate and the process of the collaborative writing of the thinking-story. In particular, the discussed arguments around the philosophical dilemma (forum-mode) were summarized in wiki-mode and were then well integrated into the thinking-story ‘resulting in a creative product that was a group effort and outcome of all participants’ input and negotiation. This provides evidence that creative thinking was cultivated through reasoning ability.

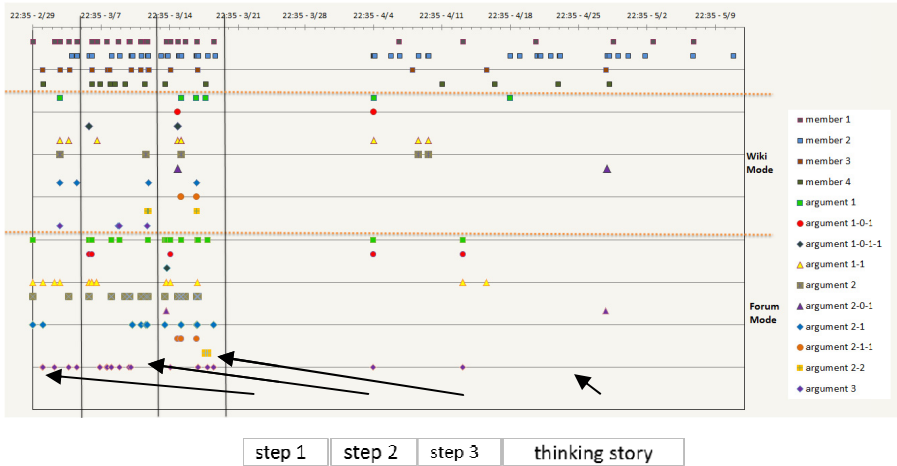


Fig. 2. Chronological Visual of Discourse Activity- Arguments

Critical thinking in collaborative argumentation. After identifying the nature of the arguments used during the collaborative interaction of the group members, we aimed to understand the development of critical thinking during collaborative argumentation. As shown in Table 2, we focused on studying six critical thinking skills: interpretation, analysis, evaluation, inference, explanation and self-regulation.

Table 2. Critical Thinking Skills Coding Scheme [5]

Critical Thinking Skill	Description
Interpretation <ul style="list-style-type: none"> • categorization • decoding significance • clarifying meaning 	To comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules procedures, or criteria. The three sub-skills of interpretation are categorization, decoding significance, and clarifying meaning.
Analysis <ul style="list-style-type: none"> • examining ideas • detecting arguments • analysing arguments 	To identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions. The three sub-skills of analysis are examining ideas, detecting arguments, and analyzing arguments.
Evaluation	To assess the credibility of statements or other representations which are accounts or descriptions of a persons, perception, experience, situation, judgment, belief, or opinion; and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions or other forms of representation.
Inference <ul style="list-style-type: none"> • querying evidence • conjecturing alternatives • drawing conclusions 	To identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to deduce the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation. The three sub-skills of inference are querying evidence, conjecturing alternatives, and drawing conclusions.
Explanation <ul style="list-style-type: none"> • stating results • justifying procedures • presenting arguments 	To state the results of one's reasoning; to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological, and contextual considerations upon which one's results were based; and to present one's reasoning in the form of cogent arguments. The sub-skills under explanation are stating results, justifying procedures, and presenting arguments.
Self-Regulation <ul style="list-style-type: none"> • self-examination • self-correction 	To self-consciously monitor one's cognitive activities, the elements used in those activities, and the results deduced, particularly by applying skills in analysis and evaluation to one's own inferential judgments with a view toward questioning, confirming, validating, or correcting either one's reasoning or one's results. The two sub-skills of self-regulations are self-examination and self-correction.

Table 3 addresses the occurrences of critical thinking skills during the three steps of argumentation. Overall, Interpretation and Analysis are the most dominant skills applied during the discourse while Explanation and Self-Regulation are the less frequent skills. Therefore, there was not a progressive development of more sophisticated levels of critical thinking throughout the three steps of argumentation. However, the fact that “Interpretation” and “Analysis” are more frequent in step 2 compared to step 1, implies the development of caring thinking due to across group-interactions. Group members tried to comprehend, decode the significance, clarify the meaning and analyze the arguments of the opponent group. Within the framework of P4C, we can assume that the group members cared enough to make the effort to interpret and analyze what the opponent group was saying (arguments presented in the text appearing in wiki mode). Therefore, caring enough to develop the opponent group’s thinking resulted in development of their own critical thinking.

Table 3. Critical thinking skills in group’s discourse during debate

Critical Thinking Skill	Debate: Step1 (forum-mode)	Debate: Step2 (forum-mode)	Debate: Step3 (forum-mode)	Total
Interpretation	2	18	13	33
Analysis	6	21	21	48
Evaluation	3	6	7	10
Inference	2	3	5	16
Explanation	0	1	5	6
Self-Regulation	1	2	3	6

The role of the technology was important during the development of caring and critical thinking, since hiding the discourse of the opponent group during each step and revealing their position at the end of the step forced the group members to identify more arguments, and evolve their thinking regarding the phenomenon of euthanasia.

5 Discussion and Conclusions

A community of philosophical inquiry evolves as it matures. In our study, we noticed that through praxis, in-service teachers were empowered to engage in reasoning, demonstrating a better understanding not only of their thoughts regarding the phenomenon of euthanasia but the thoughts of the other members in their group as well as the broader community of inquiry that was created within WikiSplit. Reasoning is hardly touched upon in school education. Therefore, most teachers are not trained to be aware of patterns of reasoning, and often have difficulty in determining whose patterns are valid or fallacious. We suggest that if teachers learn how to reason and monitor how their own thinking evolves within a community of inquiry, they will be able to guide their students to develop complex thinking when P4C is applied in a school setting. We also provided teachers the opportunity to engage in the process of writing a thinking-story instead of applying a ready-made story or manual.

Our research used a variety of methods to explore the development of complex thinking (consideration of participation, interaction visualization). The results of the data analysis show that there are interesting observations pertaining to the collaborative processes that occur and technology can be used to monitor the evolution of the thinking process. Web 2.0 technologies can mediate the development of complex thinking as defined in the P4C program. We are aware that our results are tentative and require replication. Although firm conclusions cannot be drawn solely based on a case study, the currently presented work can indicate future research paths in terms of how to best integrate tools and structure to promote the development of complex thinking within a community of inquiry framework.

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