Collaborative learning using Microworld and WebMapQuest

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Abstract: The intention of this paper is to show relevant issues (resulting from theoretical and empiric research) about how Microworld can be used to elicit the building of knowledge and to encourage collaborative learning. For that purpose, we have been investigating how to manage information overflow and develop incentives to collaborative learning using Microworld through WebMapQuest - projects of investigation with virtual maps. In this paper, a brief conceptual approach is discussed, major contributions difficulties and future trends are presented. Keywords : WebMapQuest – Projects of investigation – Cyberspace – Collaboration

Introduction

Few years ago, at the beginning of a project at the elementary school, we asked our students if they would like to use the software Microworld to build a collective history . Then, one of them said "I prefer to use other software. Microworld is very difficult".

Although one of the great advantages about that software is developing logical and rational thought, creative work and perceptive learning in order to solve challenges, the students revealed that such abilities comes at the price of intensive interactions, great difficulty to organize syntaxes and a heavy time investment.

Due to the rapid growing of online learning and the incredible increase of information in the web, it has become quite essential to elicit better collaborative strategies(Reeves, Herrington & Oliver,. 2002), relying on new methodologies for building knowledge collectively (Machado, 2000) and articulating what is meaningful (Papert, 1980). For that purpose, we have been investigating how to manage information overflow, how to become more involved to use Microworld and how to develop incentives to collaborative learning through projects in the cyberspace .

Overview

In the beginning of this year we developed a collective project - build a virtual museum about Mondrian, with students from elementary school – third cycle, nine years pupils. The intention of this project was investigating how Microworld can be used to involve students to develop their abilities and to encourage collaborative learning. The students developed the whole project during six classes – almost in one month.

Objectives and methodologies used

WebMapQuest, is a challenge based on authentic activities published in Internet. The purpose is encouraging students to develop their projects through researches and resources available in the cyberspace and they can use diverse software to elaborate their conclusions. The intention is to promote the reconstruction of information from the context of the students. For that purpose, students can select just what is relevant, re-arrange the content creating new objects: documents, links, annotations, images, tours, histories. We realized that webmapquest encourages users to reflect on their interactions with an information space, to discuss those interactions with annotations, to collaborate with others through collective projects, and to apply their creativity to solve challenges.

Since the year 2000, some WebMapQuest based on virtual maps manipulation have been organized in Brasil at elementary and high school to promote educational activities and projetcs for investigation. The aim of those WebMapQuest is to develop projects with peers and to go deeper into the subjects researched and the resources available in Internet. It was observed that WebMapQuest can help the users represent information, discuss and organize ideas by combining words, symbols and various objects using different softwares including Microworld.

Some authors (Machado 2000, Moraes 1999) emphasize the importance of a new way to build knowledge as a net of meanings. Web of knowledge and knowledge in network are constructs that result from the flexibility, plasticity, interactivity, adaptability, cooperation, sharing, support and self-organization that characterize the knowledge building process. (Moraes, 1999).

The net metaphor seems to be the key to the emergence of knowledge as a new interdisciplinar work. To understand is to apprehend the meaning, by seeing the relations among things. The more relations can be established between one topic and other areas of knowledge, the closer that topic will be to its thorough meaning, to its "completeness". Such relations connect different topics in a non-linear way. In other words, the meaning of a topic "X" can be apprehended through multiple relation established among "X" and other topics "A", "B","Y","M","G", those being or not the references in the topic that is studied. (Machado, 2000).

For that purpose, instead of suggesting problems to solve using Microworld, we have been investigating how to involve students considering their contexts and great interests in Internet and develop incentives to collaborative learning through Microworld Projects using WebMapQuest.

"Building a Virtual Museum of Mondrian" is an example of WebMapQuest developed at Dante Alighieri school – third cycle, by students with around nine years old in the beginning of this Year. They investigated and selected information using the WebMapQuest. And then, they used the software Microworld to create their paintings.

The Microworld is a programming environment in which pupils can explore visual unfolding representations, linked and controlled through the symbolic and analytic procedural code - Logo. Through this programming language, it is possible to represent the instructions and to use the constructionism concept; in other words, learning by constructing through programming.

Constructionism concept is focuses particularly on the use of computer to support students working on design and construction of solutions and projects through the cycle description–execution–reflection–debugging (Valente, 1993).

About the challenges of Mondrian WebMapQuest were :

1- Elaborate questions and discover who Mondrian was
2- Know his paintings
3- Realize similar aspects in his paintings (color, kind of drawing, trace, figures…)
4- Create new paintings
5- Publish in the Internet
6- Write something and dedicate the painting to a relative (father, mother, ….)

The students accessed the Mondrian WebMapQuest, discovered the challenges and navigated in the map visiting some Virtual Museum with paintings of Mondrian. They created portfolios in which they collected information about the paintings and Mondrian.

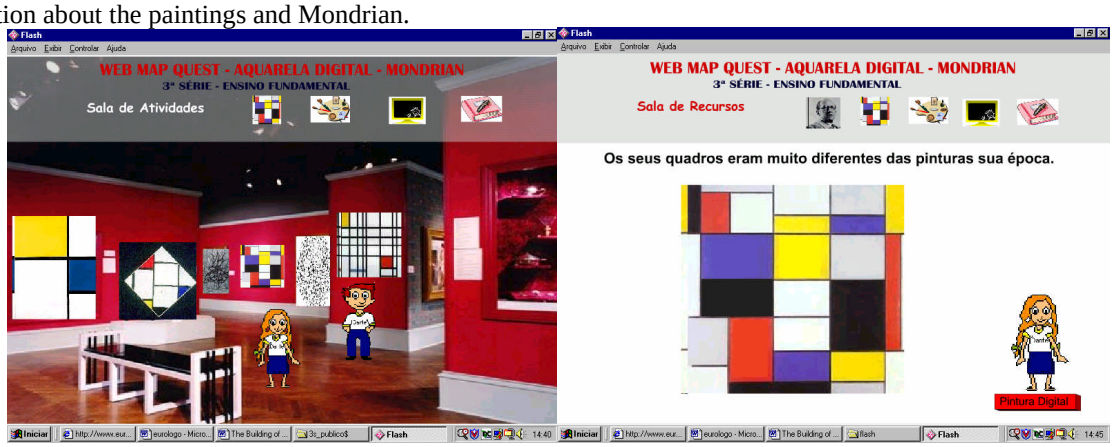


Figure 1: WebMapQuest – Building a Virtual Museum of Mondrian
http://www.dantealighieri.com.br/WebQuest/Mondrian/mondrianfinal.html

Through the portfolio design, and after observation and systematic reflection on the process, pupils could develop pleasure of thinking and organizing syntaxes to create the painting by themselves.

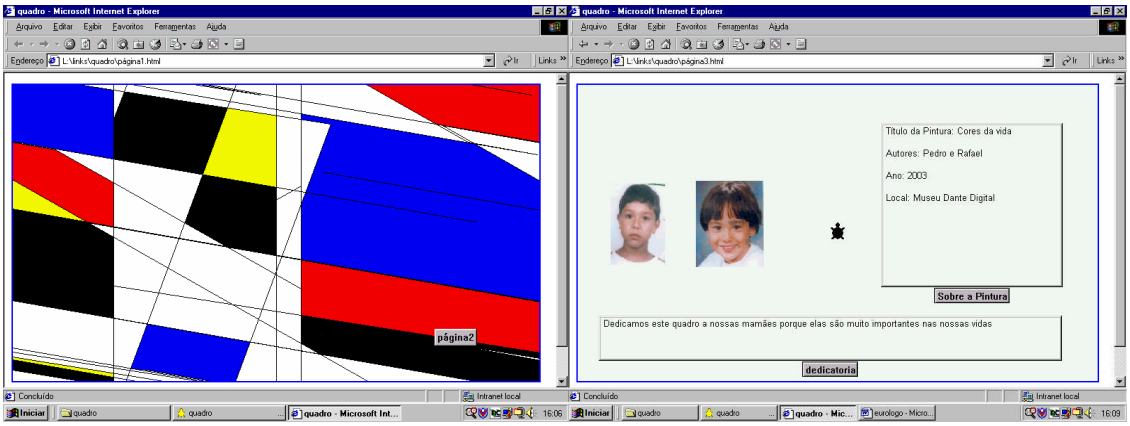


Figure 2. Digital Painting – programmed used Microworld – developed by students

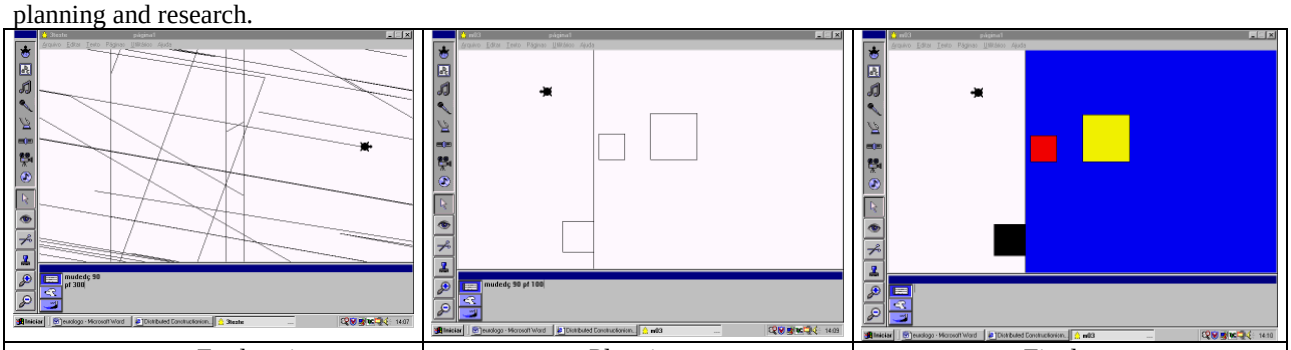
Observation and Reflections

About the elaboration of a virtual museum with their paintings, it could be noticed that interaction takes place at a high level due to collective activities and common purpose. The environment contents were dynamic and determined largely by individual and group needs. The knowledge built was the result of collaborative activities, discussions, consensual dialogue, joint assignments and common challenges by working in teams.

Working in small groups was a good way to discover easier and faster the mistakes, syntax structure, develop new ideas, selecting what was meaningful, discovering appropriate problem-solving, critical thinking arguments and consensus. These skills are essential to work together collaboratively: to listen, hear, understand, and finally accept the view point of fellow group members. (Crook, 1994)

During the WebMapQuest investigation, It could be noticed that pupils became more involved with the challenge. WebMapQuest could be useful through various aspects: graphic representation to facilitate navigation, visual bibliography with different references resources, map of the virtual learning environment, semantic hypertext with diverse signs, relevant information guide, theoretical and practical connections, way to organize information to facilitate writing.

About the projects of the pupils, they interconnected different components: images, texts, personal and public information. It could be noticed, the participants could get closer to each other. Creating the paintings through LOGO language was a meaningful strategy and to go deeper and discuss about the art of Mondrian. They could realize that creating a painting like Mondrian it is not simple as the first sight, it is necessary planning and research.



Exploration	Planning	Final art

Figure 3: Painting process inspired by Mondrian art

WebMapQuest were useful guides to navigate more easily, to select relevant information, and to establish meaningful connections. The challenge of creating a Virtual Museum and maps could involve the pupils. Students said that programming using LOGO language became easier . “We liked a lot to create our paintings and to dedicate it to someone who is important for us” …. “ I liked to build the museum with my colleagues and when it was finished, it was nice to visit all paintings”.

The collaborative learning was promoted by collective project. “Creating and publishing the paintings, writing a dedicatory were good opportunities to share the research and to enrich the whole group.

Some benefits of this collective Microworld project using WebMapQuest are:

- Clear insight and comprehension about the investigation process and organizational structure;
- Easy and practical way to seek relevant information in the Internet;
- Answering and generating questions to understand various aspects of the subject and the investigation;
- Cooperative learning, closer engagement in problem with peers --solving activities or sharing ideas;
- Using programming language to representing ideas and organizing the thought
- Discussing syntaxes to facilitate the depuration process – developing writing from organized information;
- Summarizing -integrating ideas, different elements and resources references;
- Sharing the productions, publishing it in the Internet, working values and feelings

Conclusion and future work

This study about elaboration and uses of Microworld and WebMapQuest has revealed the importance of interaction and meaningful context to encourage the students to develop their own project using Internet and the programming language Logo.

It could be observed that Microworld software allows students to construct and explore different types of representations – symbolic, visual, unfolding using movement and diverse ways to programme and to organize thought. The computer environment can be useful to construct symbolic representations through programming code and simultaneously integrating them with dynamic or "unfolding" visual and semantic representations. This is an important point: creating meanings through the involvement, pleasure and challenge.

Some difficulties observed were about methodologies to evaluate the process. What methodology can be used to evaluate the whole process: investigation, the programs and paintings built, the participations and involvement, mainly the cognitive development? That issue will be the focus of our next investigation study.

About collaborative learning, we could realize that collective Microworld project brought some contributions. It was a way to innovate, bring new alternatives in order to contribute to the process of organizing collectively a large information flow and better managing research time. It could be observed that knowledge cannot be defined just from theory, technology and informational resources, but in the attitude of the human beings when establishing "what, for whom, how and why" together. Therefore, it is essential to search and to propitiate a conscientious and critical look on the net to its positive aspects (construction) and negatives ones (limits and contradictions), making possible de-constructions and new re-constructions.

Perhaps the new challenge will be the building meaningful learning environments to provoke more involvement and pleasure to discuss, reflect, reconstruct and innovate instead of traditional abstract activities or problems without challenges and meaning.

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