DIWiki – A tool for Collaborative Learning Support

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Abstract — Wikis have become an important collaborative tool. However, some collaborative activities have a visual component that is key to the communication process. DIWiki extends the benefits wikis bring to collaborative group work, giving users the possibility to create, edit and administrate visual content, in the same environment they use for text, by introducing digital ink into the wiki environment.

Key Words — Wiki, Digital Ink, Collaborative Learning.

I. INTRODUCTION

Collaborative Learning is a technique used in problem or task resolution where learning occurs through the exchange of knowledge between students, and between students and teachers [6][1].

There are several collaborative content environments available for use in the Internet. These include blogs, forums, discussion lists and wikis. In these systems, users express collaboration effectively through writing. However, there are many collaborative activities that are totally dependent on a visual environment.

These activities, which include sketches, diagrams and technical designs, are not well adapted to traditional collaborative environments, where information is basically in text form. Even when figures are inserted, they are not easily manipulated by the other members. The introduction of digital ink into the environment gives users greater expression freedom, allowing them to exchange ideas in a more creative and natural way, facilitating communication.

The main objective of this paper is to describe a tool for collaborative learning support that enhances a Wiki environment with Digital Ink. DIWiki presents characteristics of interactivity and expressivity by allowing the use of notes, sketches, diagrams and tracing as means for exchanging ideas, instead of limiting communication to writing. It extends the benefits wikis bring to collaborative group work, giving users the possibility to create, edit and administrate visual content, in the same environment used for text.

II. RELEVANCE OF SKETCHES IN COLLABORATIVE WORK

Sketches are important communication instruments. A drawing implies in a more advanced domain knowledge representation state.

The most significant register of a sketch is maybe in the form of simple and immediate notations, specially those initial study notes or representations. In the learning context, students make sketches, emphasizing intentions that will later be refined in the final representation. At this stage, the drawings are just scribbles, not necessarily proportional.

Drawings/sketches can be used in the learning process to develop the habit of observation, the spirit of analysis, and the taste for precision. It would also be through drawings that purity of imagination is reactivated and the gift of invention enabled [3].

The use of digital ink in wikis transforms some collaborative work difficulties in facilities. The drawing process, associated to digital ink, offers the users benefits such as:

- It is fast. Adequate to the short memory capacity.
- It is implicit. Does not require a sequential form. No special structure.
- Serves for analysis, verification and simulation.
- It is inexact and abstract, avoiding the need to include unnecessary details.

Collaborative work implies, therefore, in the development of interactionist processes that aim to encourage the subjects to act together towards the construction of different knowledges, emphasizing co-authorship [4].

III. BENEFITS OF DIGITAL INK

Digital ink is a technology that represents drawings, sketches, and handwriting in its natural form. The effect is similar to using a pen with liquid ink on paper. It is a new data entry device to a system that is able to interpret it, and has the same data value as any another fact inserted by traditional methods (keyboard, mouse, etc.).

The use of digital ink is interesting because it allows for free expression, preserving the personality context of the person who writes. There is no restriction to a predefined structure, not even the need to write inside lines. This technology will be useful in the definition of new applications, joining the naturality of writing with the power of drawing. Through writing recognition processes users can convert the data written by hand in text, or preserve it in ink format without losing any of its functionalities. Digital annotations can persist along the document’s lifetime.
By exploring the digital environment, educators and students will be able to pass to a new, mightier and more efficient paradigm of learning [2]. Due to technology advancements, there are today several devices with native resources for digital ink. Among them: tablet PC, cellular phones, PDAs and others.

IV. THE DIWIKI TOOL

The DIWiki structure is based on Wiki collaborative systems, whose objective is to produce an advanced application within the Web architecture that offers interactivity and expressiveness.

With this tool it is possible to share ideas in a more natural way. In this case a student can present a drawing / sketch as an image (BMP) in the Wiki. Another student can then modify the previous proposal, using the original drawing, editing the image using digital ink resources.

The tool also makes the correction activity easy. By using digital ink users (teacher / students) will be able to annotate by handwriting, texts inserted in the Wiki.

To write annotations or comments on paper documents is an activity so common in many situations it is considered essential. These annotations or comments are reminders what we add to the documents to signal information or to highlight items of interest for subsequent reference. DIWiki (Fig. 1) offers basic annotation resources that allow users to mark, underline, emphasize, circle words in a sentence, draw or make notations in the edge. Advanced resources include Sticky Notes. This functionality offers flexibility in order to include several types of content in a document, for example, digital text, handwritten notes, "paint" aspects, or Web links.

The environment has two ink tool bars: Drawing, which can be used to draw and to write, and Ink Annotations. Both include a series of ballpoint pens, felt-tip pens and highlights to personalize the color and the width of the ink. It is possible to use the Drawing tool bar to insert diagrams, maps or images in the document being published.

Data storage in the tool is done using the Ink Serialized Format (ISF), a file format specific for ink serialization that is compact, with high quality representation. Furthermore, the tool is able to recognize and generate ink objects in different file formats like GIF and bitmap. This extensibility characteristic allows ink objects to be accessed through one or more interfaces. Data can be represented using marking languages like HTML, XML, XAML and others, in such a way that they can be seen as an image in applications that do not recognize digital ink.

DIWiki offers a favorable environment for the knowledge construction process between students and students and teachers, allowing collaborative learning through data sharing in several connectivity environments, such as wired and wireless networks, mobile devices, guaranteeing users real time access to the relevant information.

The tool has portability, of operating system and of devices, such as tablet PC, PDAs, cell phones and other similar devices, that allow fulfilling tasks once available only in more traditional devices.

V. CONCLUSION

The objective of this work was to describe DIWiki, a collaborative learning support tool that presents important solutions for collaborative work by integrating digital ink in a wiki. This allows for a more free and creative environment, adapted to situations that require visual interactions, such as technical drawings and sketches.

In this context, this work presented concepts, forms of interaction, main characteristics, aim and functionalities of proposed tool.

REFERENCES