Introducing interactive whiteboards in the schools: an experience report

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Key words: *Interactive Whiteboard*

Abstract:

We report the findings of a project aimed at introducing Interactive Whiteboards in schools (both primary and secondary). We focussed on the early phases (installation, introduction, training, first use). We find that there are indeed problems that need to be tackled before one can hope to obtain the good results that are promised by the marketing hype.

1 Introduction

Interactive whiteboards (IWB) are one important tool aimed at innovate teaching in the school. Such interactive devices behave like a huge touchpad and allow interacting with a computer whose screen is projected on the board itself. Moreover, through a software layer, they allow using virtual ink to write on top of the computer screen. Whatever is produced can also be saved and printed.

Although IWB were first commercially introduced in the early '90s, they started becoming popular in the last five years. They achieved a large diffusion in UK, where research on their use took off in the same period (see e.g. [1-5]). There is a wide agreement that such tools can effectively improve teaching and students' response. Vendors have diffused a strong hype on the tools, that in any case are really fascinating devices. The simple fact that they act as Trojan horses to bring computers (and Internet!) at the centre of the classroom obviously offers an interesting opportunity.

However all that glitters is not gold: so we decided to investigate the problems that arise in the first phase of introduction of the IWBs. The present paper reports our findings,that are based on the implementation of a large-scale regional project.

The local government of the Italian Trento Province, though its Servizio per lo Sviluppo e l'Innovazione del Sistema Scolastico e Formativo, has started a large-scale project for introducing IWB in the schools of the province. The province is well known for being one of the top performers in teaching in Italy, as shown by the recent results of the Programme for International Student Assessment (PISA 2003). In reading literacy, mathematical literacy e scientifical literacy the average regional score is comparable to the one of the top performers in the world – Finland and Hong Kong – and almost 20% better than the Italian national average result. (See http://pisacountry.acer.edu.au/).

The project of installing IWBs started in 2007 by delivering 225 boards to various institutes, and will continue in 2008 with an equal amount.

However just giving the boards to the schools is not enough: it is necessary to help teachers understand their potential and become familiar with them. Therefore we started a (smaller) project to support the introduction of the IWBs.

1.1 The structure of the support project

We identified 7 Schools: 5 high schools and 2 so-called "comprehensive institutes" composed by primary schools (grades 1 to 5) and middle schools (grades 6 to 8). The institutes were geographically distributed (four in the main town, three in the province). In the comprehensive institutes we choose teachers of all disciplines. Two high schools (one in town and one in a secondary valley) had teachers of scientific disciplines, from different classes. A similar couple had teachers of humanistic disciplines, also from different classes. The last school had teachers of the same class and of all disciplines. We chose to have a geographically distributed sample because we wanted to have the opportunity to experiment with electronic collaborative tools, and we intended to minimize the possibility that they would interact in physical meetings.
The project involved over 50 teachers over a three months period. All the work was done in small groups to foster interaction among the participants and the presenters. It was centred on 4 meetings: in the first one the IWB was introduced, its working model was discussed, and several examples of possible applications were presented. During the second meeting all participants were strongly encouraged to try to use the board and were helped solving the problems they encountered. The third meeting was focused on pedagogical issues, especially concerning the transition to an interactive, group centred teaching. The last one had the structure of focus groups. The goal was to validate the structure of the projects and its effectiveness, to gather the teachers' feelings about the IWB and to discuss the problems they encountered. The present paper reports on the results of these focus groups, and aims at highlighting the issues that should be considered when introducing IWBs.

2 Teacher perceptions of the IWB

We asked the participating teachers to outline the aspects that they considered being the most positive and negative elements in the use of the IWB.

2.1 Positive aspects

1) Support for handicapped students. A strong positive point is the support of handicapped pupils. The ability to print a paper copy of whatever is done on the whiteboard helps those students who, due to certain forms of handicap, cannot take notes. Wireless mouse and keyboard can allow a student unable to walk or to virtually stand up and go to the whiteboard, increasing her/his participation to class work.
2) Time saving in certain class activities. Sometimes there are preliminary actions that, when performed on a traditional blackboard, may take a long time and do not have a didactic value. For instance, when analysing a portion of text, the text has to be written on the common resource (the blackboard). Such text can be prepared before the lecture, and instantly project on an interactive whiteboard. Similar cases might be complex drawings that are needed before touching the core of an issue (e.g. in the demonstration of some procedures in technical drawing).
3) Fascination of the tool. There is no doubt that the IWB has a magic halo, that wakes any activity centred on it more interesting than it would be without the tool. Such fascination is believed to have a beneficial impact on the attention level and on students' motivation and involvement, although it is feared that such effect might be transient. Some teacher reported benefit when working even with the most difficult kids.

4) Complementary aspects with respect to a multimedia classroom (i.e. a classroom with a PC per student). In a traditional PC-equipped classroom the activity is often individual, and it is difficult to show one student's work to the others. The presence of an IWB is perceived as a mean to either show one student's screen to all others (e.g. via simple and free tools like VNC). Alternatively, the activity can be a group activity focused on the big screen (the IWB) instead of being an individual activity centred on each own screen.

2.2 Negative aspects

Interestingly, the first two points perceived as positive aspects have an opposite side of the coin.
1) Induced laziness. While the ability to save and print all activities performed on the IWB has some positive aspects, it is also perceived as an invitation to the students to be „lazy": not taking notes might decrease the attention level, and deprive students of the stimulus to learn an activity that is very important from a cognitive point of view.
2) Time lost in class activity. While the IWB can save time in some activity, there is he fear that problems while using it or when using some software might end up in a stall that might eat precious time resources.

Also other negative factors are reported:
3) The time needed to prepare a lecture that makes use of the IWB and of other ICT resources is seen as a big hurdle. Although such activity is considered to be an investment for the future, most teachers think that only a limited amount of such investment is realistically possible.
4) Doubts about the suitability of the tool to certain disciplines and age ranges. While almost all the primary school teachers involved in our project were very enthusiastic about the potential of the IWB applied to their daily teaching, some high-school professors seemed to think that the kind of activity that can be done on a IWB is unsuited to the kinds of activities performed in their school (especially for humanistic disciplines). Some mentioned that they have strong institutional constraint on the syllabus to be covered, so that no space is left for alternative activities or alternative ways of teaching.
5) Precision and naturalness of the virtual writing was also considered not to be fully satisfactory. Although part of the problem might have arisen from insufficient familiarity with the alignment procedures, even at with the most accurate alignment the feedback from the virtual pen was not as natural as it is from the real ones. In particular, precision is also negatively affected by the speed of writing.

3 Problems and issues

A number of practical issues arose. In first place, the placement of the devices was suboptimal. An apparently trivial task like correctly mounting the device encountered a series of problems. Logistic placement in an existing classroom necessarily needs to perform some trade-off. Sometimes it is necessary to violate some of the recommendations (in terms of location, lighting etc.). Although instruction manual generally provide suggestions, it is important to give explicit indications on which constraints can be released and which ones cannot be ignored.

A less obvious fact is that the decision of where to put the whiteboard is a "political" one. By choosing to install it in a certain class, one can encounter resistance from some teacher working in that class and refractory to ICT or innovation. At the same time, teachers not involved in that class might undergo the "why not me" syndrome, even if they are not enthusiastic about the tool. Also, parents of pupils of a parallel class would probably complain

with the school's manager for having their sons excluded from experimentation that uses advanced teaching tools. Facing such issues, most school managers opt for a neutral decision by putting the IWB in a multifunctional room that can be used by many classes. Although this might seem an excellent idea because it also maximized the number of potentially involved teachers, in practice it has some strong contraindication. Most teachers in fact reported that in such situation they would go to the "special" classroom only when they decided to use the IWB. At that point though, they feel obliged to use the IWB during the whole lecture. A first result is that the lecture becomes centred on the tool, rather than having the tool at the service of the lecture. A second effect is that the usage of the IWB becomes an "exceptional event" instead of being the daily practice. In such situations, teachers do not have the possibility to consolidate their relationship to the instrument and to reach the level of familiarity that allows using it in a natural and seamless way like the traditional blackboard is used. In such way also some of the abilities acquired in the "hands on" sessions are lost and forgotten.

Although the IWB is nothing more than an I/O device, most people consider it as an autonomous system. Very frequent questions address the issue of what can actually be done with the IWB, overlooking the fact that whatever you can do with the PC, can also be done on the IWB. Familiarity of teachers with a PC is therefore an essential enabling factor. The set of teachers that participated to the project thinks that only 50% of their colleagues has the needed level of know how with a PC.

The notion of "learning object" seems to be a frightening one. According to the IEEE standard [5], a learning object is defined as any entity, digital or non-digital, that may be used for learning, education or training. However, the term has often been used as a jargon for initiated people. Moreover, in the last few years the term has been overloaded with meanings and expectations. For instance, publishers have been distributing books with attached CD-ROMS with "learning objects", often in the form of self-learning patterns (e.g. paced sequences with teaching material and evaluations, sometimes packaged according to the SCORM sequencing standard. As a result, when teachers are told that they should/could be using learning objects in connection with the IWB, they are disoriented, intimidated and sometimes feel that all this brings rigidity to the lectures. It takes time and effort to correct their perception and reassure them.

Most teachers saw with great favour the perspective of having some technically skilled people helping them to create their own new learning material. Much fewer of them were interested in being helped to retrieve existing material that could be potentially suitable for their teaching. We interpreted this fact as the emergence of the NIH syndrome ("Not Invented Here") that is a well-known problem in the case of software reuse [6]. Such danger should be monitored and contrasted, as it results in a failure in scaling and in saving time and valuable resources.

Teachers also feel another sort of pressure: the perception of the IWB as a sort of magic and power tool clashes with their inability to exploit the full potential. They see the tool as a great opportunity to make their teaching more effective and stimulating, but when they actually start trying they find themselves using traditional paradigms, or using the IWB just as a screen on which to project PowerPoint slides. Moreover the marketing hype strongly suggests the IWB allows a transition to a more interactive teaching style. Research, while confirming it, suggests that it might take two or three years of experience to fully exploit the benefits of the tool: however teacher report the difficulty of understanding how the potential of interactivity can be unleashed, which leaves them with a sense of inadequateness.

4 Hurdles

Although it is perceived that working in a group would be the best way to produce learning material, be able to reuse it, and validate the didactic approach, there are some obstacles to pass. In first place, teachers are busy people – they have already a lot of activities doing on, finding the space for another one is not trivial. Moreover, in remote places, there might not be a critical ass to actually start the work. On the other hand, only very fey teachers seem to be ready to use electronic tools for remote cooperation (like e.g. forums). We tried to use a wiki across the project, but the time we had was too short to actually get the participant used to the idea. Moreover, often such communities need to start in a face-to-face way and then evolve toward a blended approach.

The fear of lack of timely and efficient support is another problem. Everybody calls for the availability of local support, in the form of a skilled technician or experienced colleagues. A partial help could be the presence of self-teaching tools, like beginner's guides and especially some material organized in the form of easily searchable FAQ collections.

To overcome the "white paper syndrome" the availability of a possibly reach collection of examples for the various disciplines and ages is recommended. Some people reported some disappointment with the material they could find over the Internet: many images, that looked like very interesting assets, were good only at low resolution but almost unusable when enlarged on the IWB.
Although it is not yet a problem, most teachers think that a good system for archiving and retrieval of learning material will be needed in future. It is probably not a trivial task because it should be able to perform semantic search rather than traditional keyword-based or full text search.

A very complex issue is the one of finding the ways to recognize and remunerate any extra work done on the job. This issue involves global parameter like national contract and relations with the labour unions, and goes beyond the power of the school managers. On the other hand, it is felt as very important by part of the teachers.

5 Conclusions

IWBs are fascinating devices that can be very valuable tools in a classroom. However, just pushing a technological solution is not a good practice. Therefore we worked with 50 teachers to introduce them to the technology, and we monitored the problems, the expectations and the reactions. While the existing literature mostly puts the emphasis on the medium term advantages, we focussed on the (many) problems that can be encountered in an early phase. We believe that knowing them in advance can be very valuable for actually reaching the Promised Land where (hopefully) all the benefits will emerge.

6 Acknowledgments

This work would have been impossible without the help and cooperation of the "Servizio per lo. sviluppo e l'innovazione del sistema scolastico e formativo della Provincia Autonoma di Trento". Special thanks to Dr. Paolo Renna and Dr. Daniela Ceccato.
We are also grateful to the "Servizio Organizzazione e Informatica della Provincia Autonoma di Trento" (Dr. Sergio Bettotti) for financial support of the project and encouragement.

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