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RELATÓRIO DE ESTÁGIO

INTERNSHIP REPORT

Mercados de quadros interactivos em Portugal, França e Polónia.

Markets for interactive whiteboards in Portugal, France and Poland.

Relatório de estágio apresentado à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Línguas e Relações Empresariais, realizado sob a orientação científica do Doutor Anthony David Barker, Professor Associado do Departamento de Línguas e Culturas da Universidade de Aveiro

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palavras-chave tecnologias, quadros interactivos, educação, mercado, marketing, tradução

resumo

Este relatório visa sumarizar o meu estágio curricular efectuado na empresa de investigação e desenvolvimento Ubiwhere. A empresa concentra as suas actividades na área das mais novas tecnologias, dando particular ênfase em redes e telecomunicações. Entre os seus muitos projectos, a empresa Ubiwhere cria software para as mais novas soluções tecnológicas para educação - quadros interactivos. Durante o desenvolvimento do programa pelos engenheiros de software da Ubiwhere, a empresa precisava de uma pessoa responsável pela pesquisa de mercado e preparação do plano de marketing deste produto. Estando a ser planeada para o futuro a expansão nos mercados estrangeiros, a empresa precisará de internacionalização e tradução do seu software para novas línguas. Estas eram, portanto, as minhas responsabilidades efectuadas durante os cinco meses de estágio nesta empresa. Essas responsabilidades são descritas em detalhe na primeira parte do relatório. A segunda parte deste relatório está direccionada para o mercado dos quadros interactivos. Esta tecnologia está a transformar os mercados da educação em todo o mundo devido ao seu impacto excepcional na qualidade do ensino. Portugal é um dos líderes europeus em relação à introdução dos quadros interactivos nas escolas, enquanto nos mercados polaco e francês esses produtos são ainda uma novidade. Pesquisas nesses três mercados, junto com a tentativa de encontrar semelhanças e diferenças entre eles, estão incluídas na segunda parte.

keywords technologies, interactive whiteboards, education, market, marketing, translation

abstract This report aims to summarize my internship carried out in a research and development enterprise Ubiwhere. The enterprise concentrates its activities in the area of the newest technologies, putting particular emphasis on networks and telecommunications. Among its many projects, Ubiwhere creates software for the newest technological solution for education- interactive whiteboards. While the software was being written by Ubiwhere's software engineers, the company needed a person who would be responsible for the market research and preparations of the marketing plan for this product. Planning to start the activity in foreign markets in the future, Ubiwhere will require internalization and localization of its software into new languages. These were, therefore, my main responsibilities during my five months internship in this company. These responsibilities are described in detail in the first part of this report. The second part of this report is devoted to the market of interactive whiteboards. This technology is transforming educational markets all over the world due to its exceptional impact on the quality of teaching. Portugal is one of the European leaders with regard to introducing interactive whiteboards into schools, whereas in the Polish and French markets these products are still a novelty. Research into these three markets, together with an attempt to find similarities and differences between them, is included in the second part.

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I. Introduction

We are arguably witnessing nowadays the greatest technological progress in the human history. Surrounded by new technologies we are facing completely new challenges and opportunities. Electronic devices are omnipresent in everybody's life and they are progressively expanding to new areas. New technologies have brought changes also to educational institutions where the process of teaching no longer resembles the "traditional" methods of education. The fact of having access to any information, encyclopedia or dictionary online, the use of computers in science, learning platforms facilitating contacts between students and teachers, remote studying; none of this would have been possible some decades ago. Schools had to adopt new technologies to move with the times and find new ways to teach the new "digital" generation of children.

This report aims to summarize my internship carried out in the last semester of my master degree studies of Languages in Business Relations at the University of Aveiro. This five-month internship was completed in Ubiwhere Lda., a company whose main activities are research and development in the area of software, ubiquitous technologies and heterogeneous networks. My main responsibilities were related to the market research and translation of the software for interactive whiteboards written by this company. These educational devices are gaining popularity all over the world serving as a new effective tool in modern teaching. To take advantage of my language skills and put them into practice, I decided to do some research on and to analyze in details three markets for interactive whiteboards: in Portugal, Poland and France. The results of this analysis together with a comparison drawn between these markets will be described in the second part of this study.

II. Presentation of the company

Ubiwhere is a hi-tech company established in 2007 in Aveiro. Its founders: André Oliveira, Nuno Ribeiro and Rui A.Costa are graduates of University of Aveiro who after three years of research work in the Institute of Telecommunications in Aveiro, decided to create their own business; a business which would move with the times and make its own contribution to the rapid technological progress we are witnessing nowadays. Ubiwhere's headquarters are located in Aveiro, while its second office is in São João da Madeira. Ubiwhere concentrates its efforts on the area of research and development of the newest technologies, placing special emphasis on networks and telecommunications. Ubiwhere maintains close cooperation with the university environment mainly through its internship programs. Among seventeen employees of the enterprise, students and graduates of major Portuguese universities (University of Aveiro, University of Coimbra and University of Porto) constitute a large number.

When it comes to the installations of the enterprise, the office in Aveiro is situated in the newly built district of Aveiro called Mirador Business Center. It occupies the space of about 40 m^2 on each of its two floors and a surface of 15 m^2 in the basement. The building considered by its Portuguese constructors as a loft, is far from being similar to the type intended by the original use of this word. The surface is quite small but it ensures good communication between the employees and it improves team cooperation. The room in the basement serves as a conference / meeting room, while two upper floors are used as working space with a small waiting room for guests and a kitchen. The office is equipped with all the technologies needed for the activities of the enterprise: computers, monitors for all employees, projectors, two interactive whiteboards, mobile devices, iPods, one iPad and one kinect sensor. The office in São Jõao da Madeira has 40 m^2 and it is not yet developed and put into service.

1. Mirador Business Center

2.1. Mission statement

The mission of Ubiwhere is "to facilitate everyone's use of technology. Ubiwhere also establishes a symbiotic relation between technology developers and their clients, providing them with competitive advantages"[1].

The company's *raison d'être* is to promote the use of technologies in everyday life. Projects currently developed by the enterprise concern many different areas like education, science, tourism or business. Ubiwhere creates the software thanks to which users can take a better advantage of the newest hardware systems (interactive whiteboards, iPads, mobile devices etc.) as well as of new technologies like heterogeneous networks or pervasive systems.

2.2. Vision

The vision of Ubiwhere is to become "a point of reference in the area of ubiquitous computing applied in Tourism as well as to be recognized as experts in Next Generation Networks"[2].

Ubiwhere would also like to contribute in the development of education technologies by becoming a reputable interactive whiteboard software provider and by creating a successful learning platform online. Moreover, the company wants to join the market of teleconference collaborative software by proposing a competitive alternative to present technologies.

[1] Ubiwhere, *Manual de Acolhimento,* 2010, 5.
[2] Ibid.

2.3. Values

Ubiwhere has established a set of values and priorities that reflect its approach to their work and to customers. Ubiwhere values "ambition when setting the objectives, the innovation and creativity in creating the value, the responsibility for the company, co-workers, clients and partners. Ubiwhere acts in accordance with the rule of sustainable development and with the respect for the environment"[3].

2.4. Activities

Ubiwhere provides services of consulting and software development in the area of heterogeneous networks and next generation networks. Below, you may find definitions of these notions:

> Heterogeneous network is "a type of network consisting of dissimilar devices that run dissimilar protocols and, in many cases, support dissimilar functions or applications."[4]

> The main objectives of next-generation networks are to efficiently provide adequate network quality to multimedia applications with high bandwidth and strict QoS [quality of service] requirements and to seamlessly integrate mobile and fixed architectures.[5]

Ubiwhere's activities are also concentrated on ubiquitous computing and pervasive services, particularly through context-aware services for mobile devices.

> Ubiquitous computing is not a specific technology, but a scenario in which computers become more numerous and fade into background, providing information to human users and embedding intelligence and computing capabilities in seemingly everyday objects.[6]

> Context-aware computing is a system that has information about the circumstances under which it is operating and can react /make assumptions accordingly.[7]

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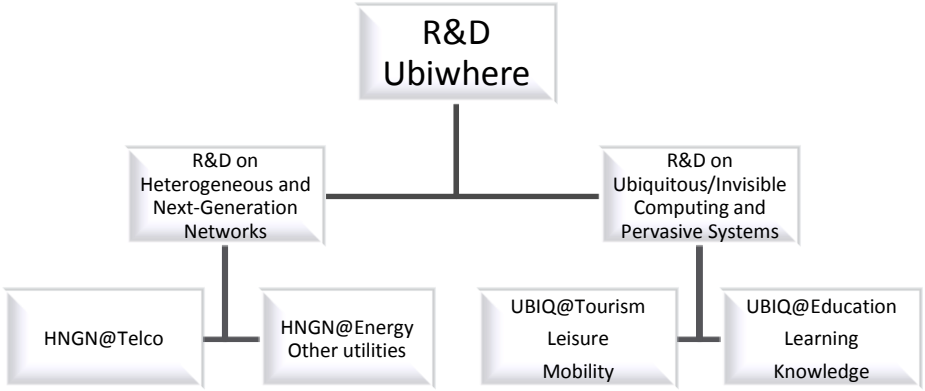
[3] Ibid.

[4] www.javvin.com, *Network Dictionary*. http://books.google.com/books?id=On_Hh23IXDUC&printsec=frontcover&dq=javvin+dictionary&hl=en&ei=CGfpTdKhDsegOvznybMB&sa=X&oi=book_result&ct=result&resnum=1&ved=0CC0Q6AEwAA#v=onepage&q&f=false.

[5] Iniewski Krzysztof, *Convergence of Mobile and Stationary Next-Generation Networks* (Hoboken: John Wiley & Sons, Inc., 2010), iX.

[6] Organization for Economic Co-operation and Development, *OECD Glossary of Statistical Terms* (OECD, 2008), 561.



2. Areas of activity

At the moment, three projects are being developed by Ubiwhere. The first one is software for mobile phones designed for ornithologists and fans of ornithology. Thanks to its context-aware function, a precise map of birds' location in Portugal will be created. The second targeted market is the United States where the fans of birds can be counted in millions. Depending on the first results, the product may be introduced in the future into other markets and the map of birds' habitats will be expanded to more countries.

The second team is working on software which uses the technology of context-aware pervasive systems. This software will be the travel guide of the new generation. Depending on the localization of user, the program will be able to suggest the best tourist attractions offered in the neighborhood. Nowadays, as mobile phones have become a can't-live-without accessory of many of us, this kind of technology has a bright future ahead.

The third project of Ubiwhere is software for interactive whiteboards, which at present are impacting educational markets all over the world. As my responsibilities in the company were related to this project, I will try to present it in a more thorough way.

III. Presentation of UbiStudio software

[7] Khosrowpour Mehdi, *Dictionary of Information Science and Technology* (Hershey: Idea Group Inc., 2007), 130.

The last decade has brought into educational environments tremendous progress in the area of educational technologies. Interactive whiteboards are changing the face of education, taking into consideration the fact that their predecessors have reigned in classroom already for 200 years.[8] Traditional blackboards had become a symbol of teaching for many years and their presence in the classrooms is still guaranteed in the modern perception of school. But this way of perception is very likely to change soon:

> Because of their capacity to become an embedded part of any classroom, the IWB may just serve to be the catalyst that finally moves schools away from traditional paper-based model towards a more integrated digital mode of operation. The traditional paper-based school has existed in more or less the same form literally for centuries, but we are starting to see the beginnings of a shift as schools all over the world start to look for ways to maximize the potential of digital learning and take advantage of the evolving and exciting educational opportunities this world brings with.[9]

The speed with which these products "flood" the educational market nowadays is surprisingly high. But schools are not the only customers of interactive whiteboards. The corporate world has also noticed the benefits flowing from this solution. Interactive whiteboards became a useful tool for enterprises to make their presentations more appealing, to work in groups more efficiently or even to reduce the costs of travelling thanks to its application as a collaborative conference tool.

However, the benefits of these interactive products are related to the whiteboards themselves only in a small part. The most important element which makes the greatest difference between interactive whiteboards of different producers is their software. The software on the market offer various interesting features like for example the possibility of annotation on the documents of different kind (Microsoft Word, Excel and PowerPoint, images and even movies), the recognition of handwriting, the recognition of shapes and the possibility of recording all screen activities. However, as interactive whiteboards were becoming more and more popular, an important question has arisen. Schools were often buying devices of different manufactures ignoring the fact that their software systems

[8] Betcher Chris and Lee Mal, *The Interactive Whiteboard Revolution: Teaching with IWBs* (Victoria: ACER Press, 2009), 1.
[9] Betcher Chris and Lee Mal, *The Interactive Whiteboard Revolution: Teaching with IWBs* (Victoria: ACER Press, 2009), 1.

were incompatible with each other. There was a niche in the market for software which could work with any brand of interactive whiteboards and this opportunity was seized upon by Ubiwhere to create its program called UbiStudio.

UbiStudio is software for interactive whiteboards which can be used in many different contexts, e.g. in schools (primary, secondary or university), tutoring centers, in different kind of institutions (like interactive museums etc.) as well as in the corporate world, where it serves to make business meeting more engaging, to make better presentations and facilitating long distance collaboration for virtual teams. UbiStudio offers the following advantages:

1) Interoperability

UbiStudio software can be used with all types of IWBs. In this way the interoperability between interactive whiteboards of different producers is ensured. Thanks to this feature, teachers who work in more than one school or who use in their school the IWBs of different brands can use the same documents to prepare lessons. They also do not need to learn how to use software of various producers. In this way teachers don't waste their time and schools don't waste their money on unnecessary training.

2) Tool for distant collaboration

UbiStudio has developed a new-generation collaboration tool which allows up to 20 distant users to work on the same content at the same time remotely. This tool may bring big changes to the educational and corporate world. First of all, the possibility of following the classes remotely can be a great opportunity for students who for some reason cannot be present in classes, e.g. for disabled people. This tool allows students to work in teams more efficiently, both in classes and at home. It brings a completely new solution for private tutors who would have an opportunity to teach remotely individual students or other groups.

Cooperation is even more important in the corporate environment. This tool can significantly increase the effectiveness of any team work. Work groups from all over the world can follow the progress of projects, communicate better and intervene at the right

moment. Enterprises can and will reduce in this way the costs of travelling. Even the training of employees can be done remotely and again a significant amount of money would be saved. In times of financial restrictions, it is a perfect solution for enterprises.

3) Set of interactive tools

UbiStudio offers a set of interactive tools which make teaching and presenting much more interesting for viewers. Magnifying glass, clock, curtain tool, spotlight, handwriting recognition, shapes recognition; these are only some of these tools which will attract the attention of learners for a much longer time, which in the case of youngest children can be the key to successful teaching.

4) Set of advanced tools for mathematics

UbiStudio offers a set of tools that are essential in teaching mathematics: interactive rulers, protractor and compass. This set can be enhanced in the future with new tools e.g. measurement tools that allow us to measure lines, segments and angles or prisms and pyramid creators. Users will certainly appreciate the possibility of inserting graphs, or drawing pie charts and the younger user will enjoy playing educational games like memory games or Sudoku.

5) Recording tool

The recording tool brings one simple solution to many problems of learning. Many times students have problems with listening when taking notes of what is written on the board. The recording tool allows teachers to record all the activities on the board together with sound. Recordings of lessons create a great opportunity for learners to revise and study at home. They are also a good solution for remote studies.

6) Intuitive toolbar

The software for interactive whiteboards may have a lot of attractive tools, but if it is not easy to use, it will not convince the client. People who don’t deal with technological devices in their everyday lives may quickly get discouraged when dealing with a

complicated program. Ubiwhere tried to overcome this problem by creating software that can be learnt in 10 minutes.

UbiStudio may bring the answer to many problems which arise in the teaching scenario. First of all, it helps to keep students focused during a much longer time. Interactive tools attract the attention of learners with their greater ease of use, especially when be being used by teachers who know how to use them. Secondly, UbiStudio can be adapted to the individual needs of users. Its mobile toolbar can be moved down the screen so that the smallest users can reach it without difficulty. The software offers different colors of page backgrounds. It is a very important feature taking into consideration the fact that it is proven that children with autism, Attention Deficit Disorder or other learning disabilities get stimulated by colors. Some colors may increase their energy, other relax and keep them more focused. The collaboration tool will help students work in teams after classes, while the recording tool will give a new opportunity to disabled learners. Thirdly, the results of numerous studies all over the world show that children taught with interactive whiteboards improve their achievements significantly. This is probably the most important argument in favor of this technology.

IV. Presentation of duties and responsibilities

During the five month of my internship in Ubiwhere I was assigned many different tasks and projects which were mainly related to marketing and translations. In this way I was able to use the skills that I acquired through my language studies as well as those from the area of business relations.

4.1. Translations

The expansion of UbiStudio into new markets entails the need for localization of this software. UbiStudio's biggest competitors are present already in many countries on various continents offering to their clients a full version of software and user guides in

local languages. To visualize the size of markets to explore, we can examine the number of language version offered by competitors. The global leader, Smart Technology with its global market share of 53% (in 2008), is present in 43 countries and has resources available in 20 languages[10]. Promethean's ActivInspire software, in second place in the global market, is active in 27 languages[11]. Wizteach, the best known software containing a set of separate interactive tools for different disciplines, is available already in 36 languages[12]. These numbers may indicate the future objectives of Ubiwhere. At the moment, UbiStudio is available in 3 languages (Portuguese, English and Spanish). My assignment was to translate the software into Polish and French. An example of these technical translations can be found in the appendix.

4.2. End-User License Agreement

The EULA (End-User License Agreement) is a contract which protects the copyright of owners and establishes the rules for the use of software. There are two types of EULA agreements. First is called a "shrink-wrap license" as the user agrees to it by breaking the box's shrink-wrap.

> Shrink-wrap licenses derive their name from the practice of containing them on (or currently in) a shrink-wrap package that also contains the software and documentation. The license is visible through the cellophane packaging and usually provides that the purchaser is bound by the terms of the license upon opening the shrink-wrap.[13]

In the case of software, we usually talk about "click-wrap agreements" since the user gives his consent by clicking "accept" to the conditions of the agreement. I was asked to analyze license agreements of competitors and to prepare the first draft of such license for UbiStudio. It is important to know and to clearly specify in the agreement that users

[10] Smart Technology. "Quick Facts and Stats." http://smarttech.com/us/About+SMART/About+SMART/Newsroom/Quick+facts+and+stats.
[11] Promethean. "ActivInspire 1.4 - Now Available." http://community.prometheanplanet.com/en/developers/b/development_news/archive/2010/05/16/activinspire-1-4-now-available.aspx.
[12] Wizteach. "Main features." http://www.wizteach.com/about/.
[13] Classen H. Ward, *A Practical Guide to Software Licensing for Licensees and Licensors* (Chicago: American Bar Association, 2007), 149.

do not have any intellectual rights over the software. The software is never sold, only licensed. It is also extremely important to clarify that the user cannot redistribute, try to reverse engineering or modify the program. This license also contains the disclaimer of warranty which regulates the liability of the producer in case of any malfunctioning. The EULA specifies as well conditions of use of software, in particular: on how many computers and for how long the software can be used, what is the return policy, if there are any back-up restrictions, etc. From the linguistic point of view, the author of such agreement should write it in a precise, transparent way to avoid any possibility of invalidation of the contract. It is also important to avoid using over-difficult, legal vocabulary (wherever it is possible) so that the agreement is easy to understand by any user.

4.3. Market research

My main assignment during the first three months of the internship was to do research on the market of interactive whiteboards and to prepare a marketing plan for UbiStudio. To do so, I first needed to thoroughly examine competitors. The market of interactive whiteboards is highly competitive due to the high demand for this product. As people increasingly notice the need for software which could work with any type of board, the market for independent software becomes more and more competitive as well. To compare the advantages and disadvantages of competing products I compared the features of sixteen software packages, taking into consideration the presence/absence of 24 features, like: the ability to work on any operative system (Microsoft, Linux, Mac), the presence of different page backgrounds like lined paper or grid paper, the presence of tools like compasses, curtain effects, spotlights, etc. Then I concentrated on business models of competitors to examine how they create value for customers and how they capture it. My conclusions were that the software itself is only one part of companies' value proposition[14]. In the case of software for educational

[14] A Value Proposition, according to Alexander Osterwalder, the author of *The Business Model Ontology. A Proposition in a Design Approach*, is an overall view of a company's bundle of products and services that are value to the customer.

institutions, teachers value the most the resources provided by producers. These materials can significantly facilitate the job of teachers by providing them with ready-to-use lessons, interesting animations and useful movies and images. Many companies establish and coordinate interactive virtual communities for teachers which allow them to share educational resources, opinions as well as to give technical advices to each others. The biggest community called Promethean Planet has already almost 100,000 members. The two remaining elements of any value proposition are training and support. The producers of software and IWBs are aware of the fact that to master a new program a lot of time and patience may be required. For this reason they should offer exhaustive, easy to understand user guides and tutoring videos on their websites. The distributors of some brands of interactive whiteboards are responsible for the trainings in schools. In this way, they make sure that purchased whiteboards will not serve in classrooms just as decoration or as a traditional marker-whiteboard, but they will be used with success by teachers. A good technical support service constitutes the last important element of any value proposition. Clients need to be sure that in case of any problem, they will be provided with professional assistance which will quickly address and resolve their problem.

This research helped me to understand which activities should be developed in the future by Ubiwhere so that they could introduce into the market their fully competitive product.

4.4. Marketing Plan

To successfully introduce UbiStudio into the market, Ubiwhere needed a marketing plan which would thoroughly analyze the situation in the market, the advantages and disadvantages of competitors, the internal resources of the company and possible opportunities and threats for the product. It was also crucial to establish the company's strategy: to identify targeted clients and market sources, define all the elements of value proposition, distribution channels and the promotion plan. The marketing plan is a very important tool which serves not only to set the objectives of the company, but also to

monitor to what extent these objectives can be implemented in the future and with what success. Below you may find main findings of this plan.

The first task that had to be undertaken was the diagnosis of the Portuguese market. To better analyze the realities of this market, I carried out a political, economic, social and technological (PEST) analysis the details of which are included in the second part of this report, describing the market for interactive whiteboards in Portugal. In this part of the report, I should mention that I concentrated my work on such aspects as: public expenditure on education, government policies, the financial crisis in Portugal, the influence of demographic factors and propensities to use technological devices.

I also tried to analyze the patterns of consumption of the software for interactive whiteboards: where, when, why clients use it and what psychological value it represents for them. My conclusions were that this kind of software can be used in any kind of educational institutions: primary, secondary or of higher education. It is also used in tutoring centers which nowadays become more and more numerous. Students and teachers use it in classes or at home to do exercises, prepare/do presentations, work in groups and interact between each other. In the case of corporate version of software, the companies use it to organize distant conferences and to work in teams more efficiently. What are the reasons for using this type of software? First of all, using the interactive whiteboards is just a very interesting way of teaching. The interactive features may attract for longer the attention of learners and allow them to cooperate better remotely while at home. Secondly, the use of this technology can be very entertaining not only for children but also for adults. Interactive tools, the base of images and animations, educational games which are often included in software; all of these features change lessons or simple presentations into a richer experience. Thirdly, nowadays the use of technology becomes more and more common, particularly among children. "A new virtual […] world has emerged out of the ether and become the focus of many of our kids' attention".[15] It is important to realize that the generation of "digital natives"[16] are not at

[15] Prensky Marc, *Teaching Digital Natives* (SAGE: Thousand Oaks, 2010), 1.
[16] Term coined by Marc Prensky in his work *Digital Natives, Digital Immigrants* in 2001.

all like the generation of their parents and even less like the generation of their grandparents:

> More and more young people are now deeply and permanently technologically enhanced, connected to their peers and the world in ways no generation has ever <been> before. Streams of information come at them 24/7. More and more of what they want and need is available in their pocket on demand.[17]

It is therefore more than probable that the new digital generation will respond better to this kind of technology and that interactive whiteboards will be progressively introduced to schools. Children no longer search for technology guided just by curiosity. They use it, because it is for them the most natural thing to do. The last question that needs to be answered is related to the psychological value that the software (together with an interactive whiteboard) represents for its users. In the case of children, the answer is not very difficult to provide. The youngest learners and teenagers are usually very excited to use this device and they consider it very entertaining and interesting. Their openness to this technology is probably caused by their "digitality"[18]. However, in case of teachers an unequivocal answer is more difficult to give. According to results from the questionnaire that I conducted, the majority of teachers admitted that IWBs were a useful tool to teach with. Some of them however think that it can distract students from the essential content and make a "show" out of the lesson. They acknowledged that when used properly, it can make their work simpler.

A crucial element of any marketing plan is to set both long-range and short-range objectives for the sale of the product. These objectives should be realistic, feasible and should take into account realities of the evolving market. Goals set in an excessively optimistic way may bring big losses to the company, whereas those set with too much pessimism or caution may discourage companies from acting. This is why after a thorough examination of the situation in the market, Ubiwhere decided to set following objectives: 1000 licenses for the software sold in 2011, 3000 in 2012 and 5000 in 2013. These targets

[17] Prensky Marc, *Teaching Digital Natives* (SAGE: Thousand Oaks, 2010), 2.
[18] The term coined by Nicholas Negroponte in this work *Being Digital* which mean the condition of living in a digital culture.

may seem quite optimistic, but taking into consideration the constant growth of this market, I consider them absolutely credible.

The next step was to make an analysis of the "Marketing Mix" of the product. According to *Principles of Marketing* by Philip Kotler and Gary Armstrong :

> The marketing mix is the set of controllable, tactical marketing tools that the firm blends to produce the response it wants in the target market. The marketing mix consists of everything the firm can do to influence the demand for its product. The many possibilities can be collected into four groups of variables known as "the four Ps": product, price, place [distribution], and promotion.[19]

Firstly, I prepared a comprehensive description of UbiStudio, taking into consideration not only its features, but also the whole bundle of offerings that should come together with the purchase of the software: the length of the guarantee, the access to updates (in case of any bug correction or any release of new feature), the user's guide and the access to tutoring videos put online. Secondly, the company's distribution channels were defined. There are two types of potential clients that the company may reach: those who have never used any interactive whiteboards software before and those who use this kind of program but for some reason are not satisfied with its functioning. The best solution to reach the first type of customers is to enter into a partnership with manufacturers of interactive whiteboards so that UbiStudio would be sold bundled with their products. This distribution channel would be the most beneficial for the company as in a time of crisis it may be difficult to convince clients of the second type to buy different software when they already have one. However, there are also three ways to sell the software to the second type of customers: through distributors of IWBs and distributors of software for IWBs (both online and traditional brick and mortar stores), through IT online stores and finally through the website of UbiStudio.

In the next part of my project I proposed a plan of promotion. There are several possibilities that should be taken into consideration when taking decisions about the advertisement of UbiStudio. First of all, before launching the software on the market, UbiStudio should prepare an informational article about the software and send it to

[19] Kotler Philip, Armstrong Gary, *Principles of Marketing* (Pearson Education, Inc.: New Jersey, 2010), 76.

newspapers and specialty magazines in the area of technologies, education and business. Secondly, Ubiwhere should organize a workshop for teachers to present to them the advantages of the product and to show how easy to use it is. After the introduction of UbiStudio into the market, Ubiwhere should develop two websites: one for educational institutions and another for corporations. Both websites should contain: an exhaustive description of the program, tutoring videos, the access to user's guide, information about the assistance and places of distribution. To create a good image of the product, Ubiwhere should with time publish some case studies presenting the positive impact of UbiStudio on the effectiveness of work in their clients' organizations, together with the opinions of clients. The version for schools should include additionally an information platform for teachers where they would be able to share their opinions as well as resources for interactive lessons. Apart from creating websites, Ubiwhere should start an information campaign on the internet through websites about technologies, like softwareinformer.com, on the forums for teachers (e.g. saladosprofesores.com), on Facebook and other social networks. It would also be desirable to create an UbiStudio Youtube channel, where all the information, together with tutoring videos, would be made available. The last idea is to maintain the presence of the brand at national and international business technology fairs as well as at those devoted to education, e.g. British Educational Training and Technology Show in London.

The question of the last "p"- "price" is more complex. This complexity results from the specificity of the product because in the majority of cases UbiStudio will be sold through distributors or manufactures. The price will then be the result of the negotiation between Ubiwhere and those companies.

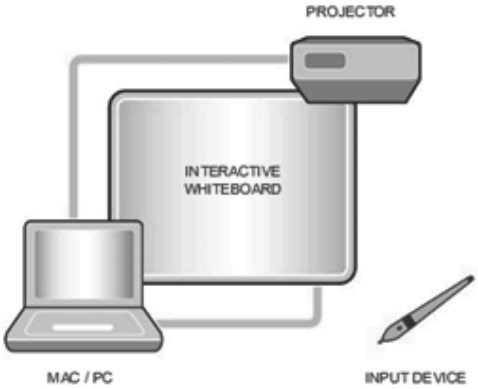
V. Interactive whiteboards

5.1. What are interactive whiteboards?

The concept of interactive whiteboards, as to their software and use of the mouse, was created in 1998 by Xerox Parc from Palo Alto. Their "Liveboard" was the prototype of

today's models. Interactive whiteboards were commercialized in the market in 1991 by today's global leader, the Canadian enterprise called Smart Technology. Although at first they were designed for the use in companies, Smart soon realized that the future success laid in their new application in educational institutions.

An interactive whiteboard usually requires up to four components for its proper functioning: a computer, a whiteboard, a data projector and software. It is important to mention that in some types of whiteboards the projector has stopped being used and is replaced by new technologies. However, the most common solution is a system in which "an interactive whiteboard is connected to a computer with specialized software, in turn connected to a data projector which can display the computer display on the board"[20]. There are also some additional elements that can be considered while setting up the interactive system, like additional software, speakers or voting devices which encourage classroom participation by giving to students a tool to answer teacher's questions individually.



3. Functioning of interactive whiteboards

After some years of developing this interactive technology, three main types of interactive whiteboards dominated the market: electromagnetic, with resistive membrane and infra-red whiteboards.

> As IWBs technology gathered momentum in the early part of twenty-first century, different manufacturers used fundamentally different underlying technologies, and hence came up with different ways of creating an "interactive whiteboard". Right from the beginning there was no real

[20] Chin Paul, *Using C&IT to Support Teaching* (Oxon: RoutledgeFalmer, 2004), 77.

coordinated effort to adopt an industry standard for the way IWBs were created. While all the various technological approaches to building an IWB work fine, each has certain pros and cons that ought to be taken into account.[21]

The first type of interactive whiteboard is constructed with a solid impact-resistant material which interacts only with pen or stylus which sends signals from the whiteboard to the computer. It can be a disadvantage in comparison to other types of this product, because in the case of any malfunctioning of the pen, the whiteboard cannot be used at all. The second type of whiteboard is built of a dual membrane and has a soft, flexible surface. It has two layers of resistive material which are touch-sensitive. The user can use any type of pointing device, pen or simply a finger to write on it. This kind of whiteboards has two great advantages over the other ones. First of all, it is considered that using fingers with whiteboards is the most natural application of the interface. Secondly, it can be used like traditional, ordinary whiteboards. Thanks to the material it is made of, teachers can write on it with a simple dry-erase marker. In this way, each teacher can opt for interactive or traditional lesson and the interactive whiteboard will be fully used. The third type of interactive whiteboards uses the infra-red scanners which detect all the movements across the board. It requires a special electronic pen which has encoded information that allows the scanner to read the position and color of the pen. This is the most affordable solution which requires minimum installation and can work on any type of flat surface - from a traditional whiteboard to a simple wall and that is why it is becoming more and more popular among schools.

Many times in this work I have referred to the positive effects of the use of interactive whiteboards. However, it is obvious that this technology has also some drawbacks. The principal disadvantage is the time needed in the preparation of lessons. Teachers have to spend much more time planning lessons, making them interactive and interesting for students. It can be particularly troublesome for those of them who don't have much experience as technology users. On the other hand however, once done, lessons can be reused in future years. The next problem that may arise is the time needed to master the

[21] Betcher Chris and Lee Mal, *The Interactive Whiteboard Revolution: Teaching with IWBs* (Victoria: ACER Press, 2009), 26.

device and its software. Though teachers usually receive trainings, very often they need further assistance. There are numerous cases of teachers who are reluctant to use interactive whiteboards mainly because they don't feel that their technical skills are sufficient to lead an interactive lesson. Thirdly, the need for technical support is also a drawback. The maintenance of traditional white- or blackboards requires hardly any care and money. Then, from the practical point of view, some types of interactive whiteboards may not be very comfortable to use because of the glare of their surface. Some teachers and students complain also about the shadow that appears on the board while writing on a whiteboard connected to the front projector. Moreover, the problem of the "saturation effect" may appear. Similarly to the use of a computer screen, spending too much time in front of the IWBs may be tiring for users. Finally, probably the biggest disadvantage of interactive whiteboards is their price, which puts them beyond the reach of many smaller schools.

5.2. Influence of interactive whiteboards on the effectiveness of teaching

In the first years of the twenty-first century governments of many countries decided to equip classrooms with interactive whiteboards, although there was no strong evidence that these devices would have any positive impact on teaching. Since that time, numerous studies have been conducted to assess the impact of interactive whiteboards on the effectiveness of teaching. The United Kingdom has made the biggest investment in this technology among all European countries, providing 72% of British classrooms[22] with these devices. The United Kingdom was also the country which started introducing interactive whiteboards into schools much earlier than any other European country. For this reason, the research that was carried out in this country may provide the answer this study is seeking.

[22] Information from 2009 retrieved from *World Interactivity Report* by Futuresource Consulting.

According to research made for the UK government during 2004-2006, trying to assess the impact of IWBs on attainment, attendance and behavior, the introduction of interactive whiteboards into schools was found to have had a multidimensional influence on British schools. First of all, it had a significant impact on improvement of teachers' ICT skills. Secondly, the approach to the new technologies in education has changed:

> (…) PSWE[23] [Primary Schools Whiteboard Expansion] initiative created a different atmosphere and different attitudes to ICT [Information and Communication Technology]. For the first time, rather than early adopters struggling to implement technological innovation in isolation, there was a much greater sense of everybody being in it together, sharing ideas and practices over coffee in the staff room. Teachers had continuous access to the school servers and the internet, and so were able to immediately bring up lesson plans, prepared resources and websites[24].

But what is perhaps most important, the use of interactive whiteboards had a significant influence on children's result. After comparing test results of children at age 11 in Mathematics, English and Science, researchers discovered that in the case of learners who had been taught with IWB for more than 2 years, we can observe a positive influence of this technology on their results. However, it was the time of use of interactive whiteboards in classrooms that had a major influence on positive results, because during the first 18 month of studies the effect was not significant. Authors underline another important subject:

> The point is that, if teaching with IWBs is to work well, IWBs have to be used so that the full potential for them to act as a mediating artifact is realized. This entails the teacher adapting his/her approach so that IWB use fits the purposes of the teaching aims.[25]

It is important to understand that exhaustive training for teachers is the key to success of this technology in schools. Only when teachers thoroughly master the functioning of the device will they be able to fully take advantage of its benefits and increase the

[23] PSWE is an initiative of UK Government which provided in 2003-2004 10 million GBP for the acquisition and use of IWBs.

[24] Lewin Cathy, Somekh Bridget and Steadman Stephen, "Embedding Interactive Whiteboards in Teaching and Learning: The Process of Change in Pedagogic Practice", LLC 2008, *Springer Science*, http://www.springerlink.com/content/w37745k244463338/.

[25] Lewin Cathy, Somekh Bridget and Steadman Stephen, "Embedding Interactive Whiteboards in Teaching and Learning: The Process of Change in Pedagogic Practice", LLC 2008, *Springer Science*, http://www.springerlink.com/content/w37745k244463338/.

effectiveness of teaching. The authors adds that "if IWBs are used without this level of application, as glorified blackboards, or as occasionally animated passive whiteboards, then there will be little effect on pupils' learning"[26].

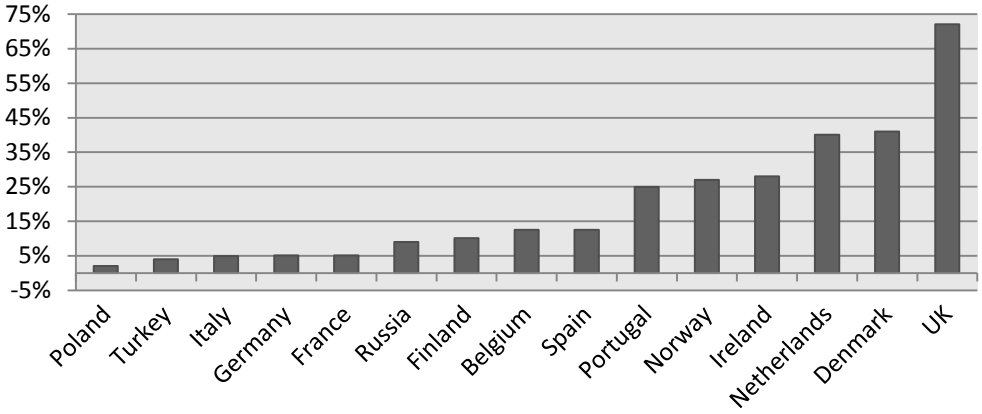
The researchers noticed as well the emergence of new pedagogic practices. According to their conclusions, lessons led with interactive whiteboards are much better structured as their plans have to be accurately prepared at home, together with the association of digital resources (images, movies, sounds). "Being able to rely on the script of a lesson provides more than an *aide-memoire* to how the lesson should develop"[27]. In this way, teachers' attention can be fully directed to learners and their answers to the raised issues. They can easier evaluate the individual commitment of students and the progress that they make.

The second practice mention in this research is the creation of new social practices in the classrooms, while one of learners is working at the board. Authors remark that in traditional classrooms at this time the rest of the class usually loses interest in following the lesson, whereas in interactive classroom teachers keep the class focused by assigning different roles to children, e.g. "scrutineers" responsible for supervising the results of the student on the board, "helpers" when a help is needed or "commentators" of what is being written on the board.

5.3. Situation of the global market

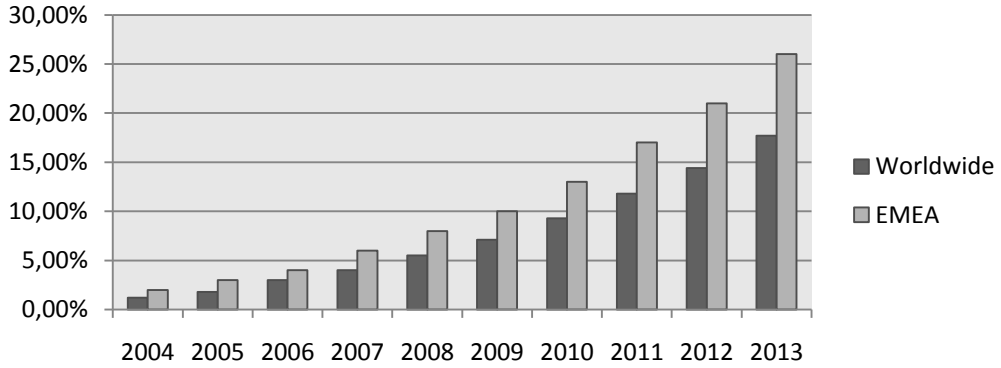
To analyze the situation in the Portuguese, Polish and French markets it would be advantageous for this study to look at the numbers in other European countries to set a scale for comparison. These devices have enjoyed a significant popularity in Portugal but also in other European countries.

[26] Ibid.
[27] Ibid.



4. Classroom board penetration in 2009 according to Futuresource Consulting

As we can see on the graph above, United Kingdom was in 2009 far ahead of any other European country. Portugal however, occupies a good sixth position with a large advantage over the countries like France or Germany. Another graph prepared by Futuresource Consulting, the market research company which regularly publishes reports about interactive whiteboards, presents the dynamism of the global IWBs market and its predictions for the future.



5. World Classroom IWB Penetration according to Futuresource Consulting

The graph illustrates that the penetration of interactive whiteboards in schools is growing rapidly in the world every year. The growth rate in the countries of Europe, the Middle East and Asia is even more dynamic. The biggest opportunity of this market is that there are over 30 million teaching spaces across the world. According to the same company, by 2013 each 1 in 7 classrooms will be equipped with one device.

It is also important to say something about segmentation of the global market. It emerges that 80% of IWBs sold in the world goes to schools and only 20% to other institutions. The global leader of IWBs – Smart Technologies occupies the market share of 53%. The second position belongs to Promethean with its 25,9%[28].

VI. Markets for interactive whiteboards in Portugal, Poland and France.

6.1. Interactive whiteboards in Portugal

6.1.1. Present market situation

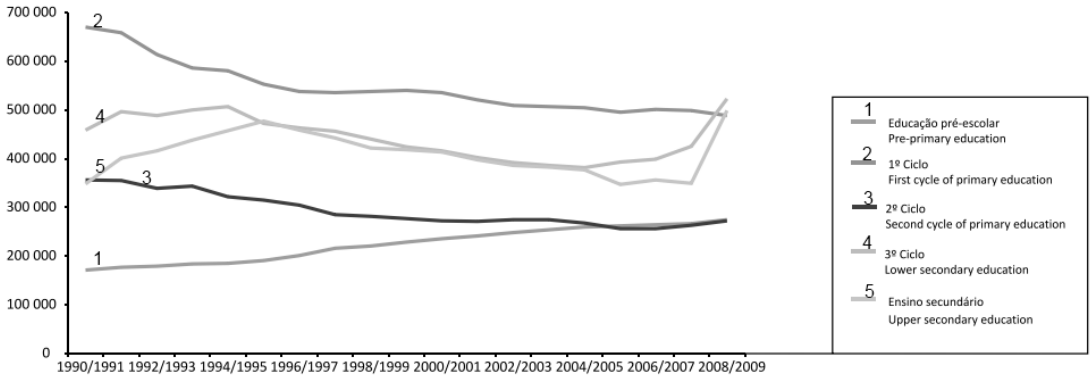
The Portuguese market for interactive whiteboards has been growing dynamically in recent years. The situation in this market is to a great extent the result of the interactions of macroeconomic forces of a political, social, economic and technological nature. Among political factors, the Technological Plan launched in 2007 by the Portuguese government has played a very important role on the market. The initial assumptions were anticipating the introduction of 9 000 interactive whiteboards to schools. In 2009, according to the Ministry of Education, there were already 7 613. What's more, social factors have had a great influence on the sale of these devices as well. The next sections comprise the identification of these factors and their impact on the market.

6.1.2. Social factors

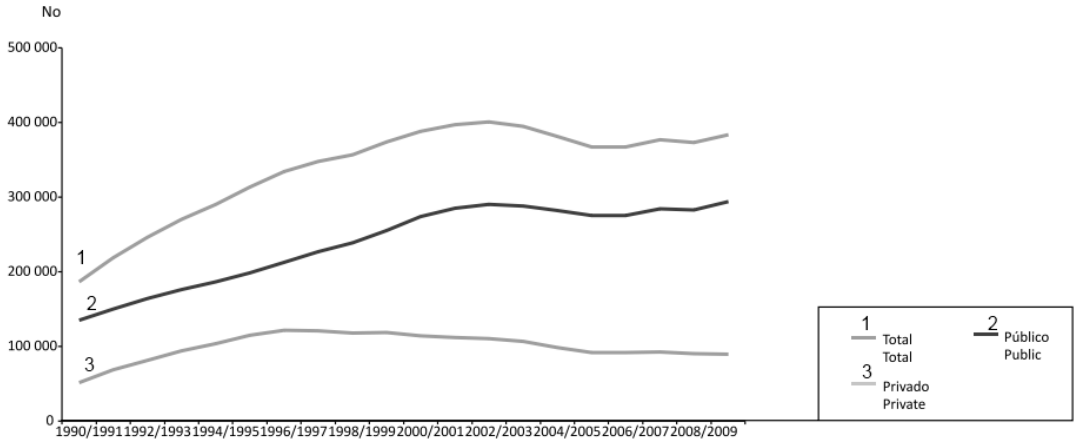
[28] Promethean. " Interim results for the six months ended 30 june 2010. " http://docs.google.com/viewer?a=v&q=cache:pjLwq1l4v2cJ:www.prometheanworld.com/upload/pdf/2010_Interim_Results_Announcement_20100824122038.pdf+Promethean+World+Plc:+Interim+results+for+the+six+months+ended+30+june+2010&hl=en&pid=bl&srcid=ADGEEShdI_ojV94qwFu2jMTJ8ISXqN2N8yJoMxFQDorWJY5a6-h6Su2ZNg-TNEx4bTTWxSNmoG61YVoE2b_GGXBX33wUUosalg7nbPA5whYHl4ndqANjzMwO9Us3Qk4h-CzJvs78_FOh&sig=AHIEtbTVTJX_x-1yYuofH2EIJQ_ZSugjtA.

Social factors have a big influence on the sale of any product. They can be related to: the demographics of the country, trends in the use of products, the popularity of a product at a given moment, opinions of clients or a positive image of the company. Below you will find the analysis of the influence of some of these factors on the market of interactive whiteboards.

Portuguese society is characterized by the decreasing birth rate. This tendency will have a significant influence on the future number of schools which are the main target clients for interactive whiteboard manufacturers. The following table presents tendencies for growth and decline in the number of students enrolled in educational institutions in the last twenty years:



6. Students enrolled in non-tertiary education according to the Office for Education Statistics and Planning.



7. Students enrolled in tertiary education according to the Office for Education Statistics and Planning.

There are few different conclusions that can be drawn from these graphs. Firstly, the number of learners enrolled in primary schools constantly decreases. This will have an

impact on the amount of schools of this level but will entail also a decrease in the presently growing number of secondary schools. This tendency is already visible in government policies. In 2010, 701 schools were closed and another 200 will be in 2011[29]. Secondly, the number of children enrolled in pre-primary institutions is increasing. This information can seem contradictory to the data concerning the decreasing birth rate, but it is very probable that this growth is caused mainly by the change of lifestyle of the society. Nowadays parents send their children to nursery schools much more often than they did before. However, the growth of this number will not impact the market significantly, as pre-school institutions are not an important part of the market targeted by interactive whiteboards producers. It is undeniably an attractive group of potential clients that might be taken into consideration in the future. Manufacturers could take into account the very youngest and create software adapted to the needs of pre-school children, e.g. containing educational interactive games etc. Thirdly, the number of students enrolled in higher education institution constantly increases. These institutions will constitute a very important market for interactive whiteboards.

Another factor which has an impact on the market of interactive whiteboards is a growing number of tutoring centers, which constitute an important sector among the purchasers of this product. As schools are being closed, teachers who lose their job, decide often to continue their careers in these institutions. Their popularity grows also because of the change in the approach of the society towards education. The work market has become so competitive that students are ready to pay additional money to improve their school results, which will give them a bigger chance to succeed in their professional lives. As the increasing number of these institutions provokes a more competitiveness of this market, tutoring centers, to gain a competitive advantage, will equip their premises with interactive whiteboards.

The "digitality" of modern children, mentioned in the first part of this study, has a huge impact on the market. Schools are searching for solutions which would attract children's attention to their studies. What's more, people nowadays and children in

[29] Expresso.pt. "Saiba quais são as 701 escolas que vão encerrar." http://aeiou.expresso.pt/saiba-quais-sao-as-701-escolas-que-vao-encerrar=f599729.

particular are very open to the new technologies. We are witnessing a great progress in technological innovation and new solutions are usually received with a positive response. This technophile approach is taken advantage of by producers of interactive devices.

6.1.3. Opinions of clients

The opinions of potential customers, as well as of those who are already clients of IWBs enterprises, are very material to Ubiwhere. Their impressions about a particular product may create a positive or negative image of the brand, may encourage them to buy new products or to recommend them to other people. The best way to examine the opinions of potential clients is to conduct a questionnaire which can provide the company with some important feedback about their product, as well as help in setting objectives for future development.

To examine the opinion of UbiStudio's targeted clients, I was assigned the task of conducting a questionnaire in selected educational environments. The questionnaire was related to the use of interactive whiteboards and of their software, in particular by teachers. My objectives were to find out how many teachers use interactive whiteboards at work, to determine their opinion about the software, to make them evaluate the effectiveness of interactive whiteboards in teaching and to investigate the need for interoperability between products of different producers.

6.1.4. Methodology

The questionnaire was conducted online using one of the most popular poll services. The link to the questionnaire was sent to teachers teaching in schools in the regions of Aveiro and Porto. As the number of answers was quite modest, I decided to extend the scope of respondents. In consequence, the address of the website was distributed to teachers participating in National Competitions of Science which took place in May 2011 at the University of Aveiro. About eighty teachers (independently of the localization of their schools) were asked to answer the questionnaire. However, it must be noticed that

teachers participating in this kind of events are probably particularly committed in teaching and their own professional development, so it is likely that they are more open to new technologies and new educational products in general. Their answers might therefore have made the results of this questionnaire more positive about the use of interactive whiteboards. I should stress that the presentation of the questionnaire had an academic character and was conducted on my own behalf, not the company's.

Teachers were requested to give their answers to 20 questions. These questions are given here, translated into English (the original questions in Portuguese are presented in an appendix).

1. What is the name of your organization?
2. Where is your organization located?
3. What is the profile of your organization?
    - Public
    - Private
    - Tutoring Center
    - Center of Free Time Activities (Centro de Actividades de Tempos Livres)
    - Other
4. What is the level of education of your institution?
    - Pre-school education
    - Primary education
    - Secondary education
    - Higher Education
    - Other
5. Approximately how many learners are there in your organization?
6. What languages do you use in your workplace?
7. What subject do you teach?
8. Have you already used any software for interactive boards in your workplace?
9. If your answer was "no", can you specify why?
    - There are no IWBs in my workplace.

- There are IWBs in my workplace, but I find them inadequate to teach my discipline.
- There are IWBs in my school, but I don't like to use them.
- There are IWBs in my school, but because of the lack of training, I don't know how to use them.
- There are IWBs in my schools, but because of the insufficient training, I don't know how to use them.
- Other

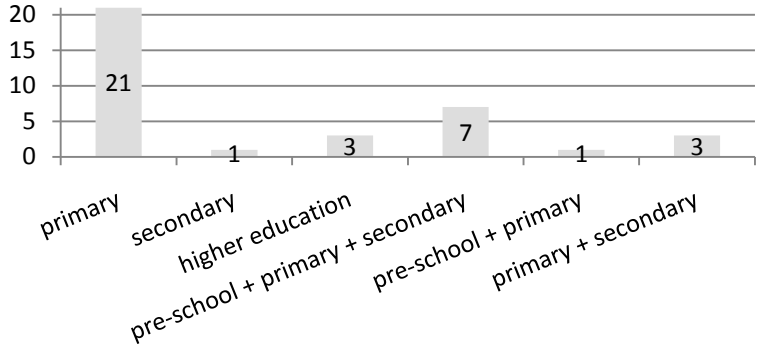
10. If your answer was "yes", could specify the degree of use of the software?
    - I use the IWB only as a screen and the digital pen as a mouse.
    - I only use materials prepared and made available by other teachers.
    - I prepare my own materials prepared in the same software.
    - Other
11. If you chose the second or the third option, please specify which features you like the most/ consider the most effective while using the software.
12. How often do you use interactive whiteboards?
    - Everyday
    - 2-3 days a week
    - Once a week
    - Sometimes
    - Rarely
    - Very rarely
    - Never
13. Did you find any of the features superfluous/ineffective? Why?
14. Could you specify the brand of the software that you use?
15. Using the scale from 1 to 5, could you specify which features of software for interactive whiteboards are important for you to have? (1-Not Important 2-Slightly Important 3-Average 4-Important 5-Very Important)

Tools for: mathematics (compass, ruler, protractor etc.), geography, literacy, collaboration feature, geometrical shape recognition, handwriting recognition, toolbar settings defined by user profile, recording feature, image gallery, teacher resource website, simple, intuitive toolbar, tools like spotlight and picture reveal, possibility of use of different backgrounds per page, toolbar settings defined by user profile, teaching games, unlimited surface of pages, possibility of inserting graphs and tables.

16. Do you have any suggestion for other tools that you would find useful in this kind of software?
17. Do you think that the use of interactive whiteboards increases the effectiveness of teaching? Justify your answer.
18. Do you think that interactive whiteboards make teaching simpler or on the contrary, that they dissipate students' attention from the most essential part of studying?
19. Have you ever encountered any problem with using your own materials prepared for lessons caused by the fact that the software used to prepare them was not associated to the IWB with which you wanted to use them?
20. Do you think that there is a need for software which could work with any type of IWBs in your workplace?

6.1.5. Main findings

There were 38 people who agreed to complete the questionnaire. Among them 30 people were teachers from public schools, 7 people were teaching in private ones and 1 in another type of institution. When it comes to the level of education of institutions, the answers were the following (more than one answer could have been chosen):



8. The level of education of schools where the respondents taught.

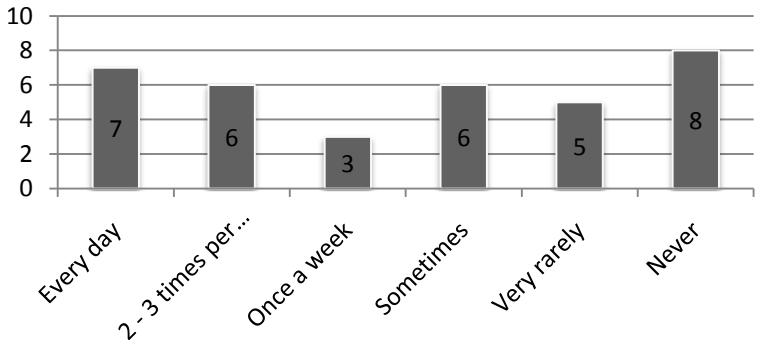
All of the respondents indicated Portuguese as the language that they use in their workplace. However, 8 of them also pointed to English as a language of use. This information may be important for the future language policy of the enterprise, e.g. in the case of the introduction of educational games into the software, it may be advantageous to include also some applications in English.

As to the disciplines taught by respondents, they were various: 10 people declared that they taught Portuguese, 7 – mathematics, 5 - Physics and Chemistry, 4 - Biology, 3- English, 3 - History and the rest were single respondents for other subjects, e.g. Music, Multimedia, Informatics, Administration, Civics etc.

27 respondents answered that they used interactive software for interactive whiteboards. Among 11 people who gave a negative answer, only one person pointed out that there were no IWBs in his/her school. It is important to underline the fact that seven people pointed out the lack of or insufficient training as the reason of not using these devices. It shows how important it is to provide teachers with the right instruction so that they could fully take advantage of interactive educational technologies. Among those ones who use IWBs in their workplace, 54% of respondents answered that during the lessons, they display their own resources created before in the same software. But 33% of them admitted that they used IWBs as a monitor and the interactive pen as a mouse. In this case, the potential of an interactive whiteboard is not fully taken advantage of. Taking into consideration the amount of money invested in these devices, these answers show

the weakness of the system of introducing educational technologies into schools. Instead of using the interactive board, these teachers could just project the materials using a simple projector and a large amount of money would be saved. This situation shows again how much importance should be given to the training and motivation of teachers.

13% of respondents said that they only use the resources made available by other teachers. It is a very good solution for those who don't have time to prepare interactive lessons, but who want to use the potential of the boards anyway. As to the question about the frequency of the use of IWB, 20% admitted using it every day, 17% - 2-3 times per week, 9% - once a week, 17% - sometimes, 14% very rarely and 23% never, so the answers are quite spread out.



9. The frequency of the use of IWBs

The conclusions that can be drawn from this data are that only 45% of respondents answered that they use interactive whiteboards regularly or often. The majority of teachers said that they take advantage of this technology only sometimes, very rarely or even never. Among eight people who declared that they had never used these devices, only two had not had access to it. Others claimed that it was caused by lack of or insufficient training.

When talking about the features that they appreciate, teachers enumerated the interactivity of tools, e.g. the magnifying glass, the infinitive area of slides, math tools, the curtain effect as well as the possibility of making annotations on the documents and of opening the internet browser and video player inside the program.

When asked about inefficient or superfluous tools the majority of teachers did not specify any. But there were a few different answers. One person noticed that the files for interactive lessons usually occupy a lot of space on the disc. She said that she preferred to save all her resources in a simple Microsoft Word file and that in this way she was able to keep lessons from two years on one pen drive. Another respondent said that the time needed for preparations of resources is much too long compared with its utility. One teacher indicated as well that the chat function is not necessary in his communication with learners.

When it comes to the interactive tools that teachers find important, they enumerated: language tools, the collaborative mode, the recognition of shapes, the recognition of handwriting, a personalized, simple and intuitive tool bar, the gallery of images, existence of the website for teachers, the curtain effect, the infinitive area of slides and the possibility of inserting tables and graphs. In general, their answers were very positive for all of the tools proposed on the list. Among enumerated tools, there are also those that are not included in UbiStudio software. The answers of the respondents shown above can indicate to Ubiwhere the direction of future development of their software: which tools they should introduce initially and which ones can be introduced at a later stage.

The majority of respondents didn't have any suggestion for new tools that they would find useful in this type of software. The suggestions that were made concerned: the possibility of programming the software to adapt it better to the individual needs of users and the introduction of specialized tools from the area of experimental sciences. Some answers did not concern specific tools, but features of the software, e.g. greater compatibility of imported files or more possibilities for screen resolution. This feedback should be taken into account by the IWB companies to improve their software in the future.

I asked the respondents whether they think that the use of IWBs increases the effectiveness of teaching. Generally, teachers gave a positive answer enumerating different reasons. Many of them said that this technology increased the motivation of students and more easily caught their attention, thanks to the "power of image and

sound". One respondent said that thanks to the possibility of saving lessons, teachers can create "almost a school manual" completely adapted to their students' needs. Some teachers underlined the fact that nowadays learners are very receptive to technologies and that this technology allows them to work in a more cooperative and interactive way with students. Moreover, they think that thanks to IWBs students manage to acquire and consolidate knowledge in an easier way. One respondent remarked that this device facilitated in a significant way the work of teachers because instead of using different devices like: traditional blackboards, video projector, retro projectors etc., they can use one device that possess all these functions. Some respondents appreciated the playful aspect of learning, as well as the easiness of adapting lessons to the special needs of learners. However, not all of the replies were favorable. Four people responded that they don't think that IWBs could increase the learning results of their students. One of them rightly notices that it is not the technology that influences the effectiveness of teaching, but the daily effort of good teachers. Another person remarked that the use of IWBs might diminish the quality of teaching. One respondent said that due to the lack of time and training as well as insufficient number of devices, he can't see any positive impact of IWBs on teaching.

Interviewed teachers admitted that in the majority of cases the IWBs made teaching simpler. But some of them remarked that these devices could sometimes dissipate the attention of children and even of teachers, and distract them from the most important information. Moreover, they underlined that IWBs shouldn't be used all the time, but only when their use is justified by the material taught.

72% of respondents acknowledged that there was a need for software that would work on any type of IWBs. 28% answered that they did not think that it was necessary or that they already had software that ensured the requisite level of interoperability.

6.1.6. Government policies

Government policy had in the past, and still has, a huge impact on the market of IWBs. During recent years the Portuguese government has put a special emphasis on

educational technologies. Several programs were undertaken to increase technological equipment in Portuguese schools. The "Minerva" program carried out from 1985 to 1994 had the objective to introduce the TIC (Communication and Information Technologies) to primary and secondary schools. "Nónio Século XXI", which started in 1996, has been continuing the implementation of the objectives of its predecessor. Project "Uarte" introduced universal connection to the Internet in schools. Then, through the initiative "e.escola" and "e.escolhinha", which promoted the use of computers with broadband Internet, almost one million computers were delivered to professors, workers enrolled in the "New Opportunities" program, primary and secondary school learners, as well as to students from various associations.

One program had a particularly significant impact on the market of interactive whiteboards. Launched in 2007, the Technological Plan brought many positive changes to Portuguese schools. According to the document issued by the Advisory Council of the Technological Plan:

> To recover ground, Portugal needs to evolve towards a new competitive model, taking advantage of the opportunity to position itself resolutely in the front line of the technological revolution for the first time in its history. The Technological Plan is an idea to trigger change, a priority agenda and a political commitment which aims to promote Portugal's development and competitiveness through a pledge focused on knowledge, technology and innovation.[30]

Among its three axes of activity, the axis of "Knowledge" was supposed to bring the answer to the problem of insufficiency of TIC in schools. As a consequence of the announcement of the public tender for interactive boards, a consortium of the following companies Nautilus, Decitrel, Iberogral and Promethean was chosen. All the schools of the 2nd and 3rd cycle were equipped with ACTIVboards (Promethean). The program lasted four years, during which 5 613 interactive whiteboards were delivered to schools. This constituted 33% of all the classrooms in the country and it increased significantly the total number of these devices in the country. This program has leveraged Portugal into the sixth position in educational equipment in Europe.

[30] Advisory Council of the Technological Plan, Technological Plan. *An idea to trigger change, a priority agenda and a politicial commitment*, 2006.

The Portuguese government has not abandoned its path of modernizing education. In 2010, a new project called "Agenda Digital"[31] was launched. Among its priority lines, "Excellence in Education" aims to develop several areas of learning, by creating virtual learning platforms, virtual workbooks or online enrolment and certification system. One of its objectives creates an opportunity for IWBs producers. The "Virtual Math Tutor" is supposed to improve math skills in primary schools by providing schools with virtual tools to be used with interactive whiteboards and computers. This program will last till 2015.

6.1.7. Economic factors

The world at the moment is struggling with an economic crisis. Portugal is one of the countries where this crisis is felt particularly hard. It can have an impact on the interactive whiteboards markets at two levels. The implementation of the austerity program will have some serious consequences on public expenditure. Portuguese public expenditure on education in 2007 was above the European Union average which was 4,96%.

% GDP			
EU - 27	4,96	LV	5,00
DK	7,83	PL	4,91
CY	6,93	IE	4,90
SE	6,69	EE	4,85
MT	6,31	LT	4,67
BE	6,02	DE	4,50
FI	5,91	ES	4,35
FR	5,59	IT	4,29
AT	5,40	RO	4,25
UK	5,39	CZ	4,20
NL	5,32	BG	4,13
PORTUGAL	5,30	SK	3,62
HU	3,15	LU	3,15
SI	5,19	GR	X

10. Public expenditure on education according to EUROSTAT, National Accounts.

[31] Ministério da Economia, da Inovação e do Desenvolvimento, *Agenda Digital 2015. Novas Tecnologias. Melhor Economia.* 2010.

It is not yet known what kind of measures the Portuguese government will implement and which part of public expenditure will be the most affected. It can however, and probably will, have a serious impact on the financing of educational equipment.

Moreover, the crisis has certainly had a negative impact on private institutions: schools, tutoring centers and enterprises, which are very important potential clients of interactive devices. Struggling with financial problems, they may not have funds for goods which are not indispensable for their functioning.

On the other hand, the crisis may also have a positive influence on the sale of boards. Taking into consideration that software for interactive whiteboards can be used as a communication and teleconferencing tool, this solution would allow enterprises to save a serious amount of money on business trips.

6.1.8. Technological factors

Producers of IWBs constantly try to improve their technologies to gain a competitive advantage over the competitors. They try to reduce the glare of boards, to make them more user-friendly or to implement new tools in the software. Technological inventions can influence the market significantly quickening the development of products or completely altering the basis of their functioning. Interactive whiteboards might have to compete with newer or cheaper solutions, e.g. interactive consoles or simple touch screens.

As public tenders play an important role in their sales plan, manufacturers must be ready to make constant improvements to their product. Technical requirements vary from tender to tender, from country to country. The majority of these prerequisites concern the software, e.g. that it should work on any operative system, it must be compatible with all marks of interactive whiteboards, etc.

6.1.9. Forecasts for the future

Thanks to all the investments that the Portuguese government has undertaken, Portuguese schools have already at their disposal generally very well equipped classrooms. Thanks to the Technological Plan, 111 491 new personal computers were delivered to schools which constitutes 1 computer for every 5 students. Moreover, schools were provided with 28 711 video projectors and 5 613 interactive whiteboards[32] which constituted machines for 33% of all classrooms. Quoting the numbers given by Ministry of Education, there are already 7 613 IWBs, therefore it is clear that the total number in use is still growing. It creates a solid basis for Portuguese teachers and learners. The resellers predict that the market for interactive whiteboards will be still developing. Thanks to projects carried out by the government, schools have already become familiar with interactive whiteboards, learnt how to use their tools and what advantages they can bring. It can be expected that encouraged by this experience they will slowly increase the number of devices in schools. In these cases schools may opt for smaller and cheaper products, e.g. mobile interactive whiteboards which can create an interactive surface on any boards or even wall, being a very good complement to their fixed equivalents.

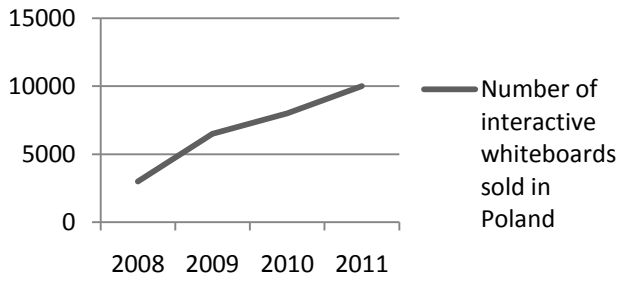
6.2. Interactive whiteboards in Poland

6.2.1. Present market situation

Interactive whiteboards are still not a widely known technology in Poland. However, in recent years the demand for this product has grown significantly. In 2008 Polish schools purchased 3 000 IWBs which constituted about 5% of the total number of classrooms. In the same year, according to Futuresource Consulting, a company specialized in educational technology market research, SMART Technologies had a market share of

[32] According to data provided by Gabinete de Estatística e Planeamento da Educação from August 2010.

52,8%[33] strongly dominating the market. In the next year the number of sold IWBs doubled, 6 500 boards being delivered to schools. This amount was achieved thanks to increasing knowledge about European Union's subsidies for schools. In this way, schools could take advantage of interactive solutions worth PLN 10 000 (around EUR 2 500), which is the equivalent of one interactive whiteboard with one projector. New companies started to compete on the market, threatening Smart Technologies' predominance. In 2010, following the assumptions of distributors saying that 8 000 IWBs were sold, the situation in the market was as follows: Smart achieved about 46% of the market, QOMO 25% and the rest of the market was divided between IQBoard, Promethean, Interwrite, IBoard, Clasus, Polyvision and a Polish producer 2 x 3, which became more visible in the market with its 12% of the market share. It must be underlined, however, that these numbers are only assumptions and may not be entirely true. Usually, retailers only reluctantly reveal the number of sold items or even tend to overstate it. Retailers themselves declare that, as IWBs are quite new products in the Polish market, there is not a lot of information about the situation in this market.



11. Number of interactive whiteboards sold in Poland

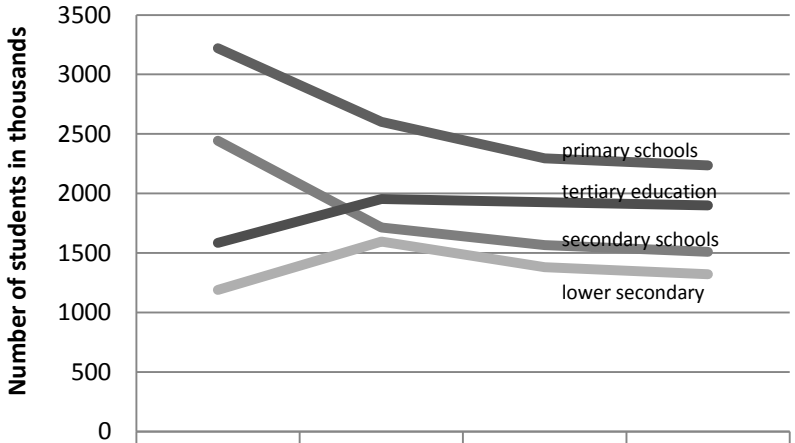
In Poland, similarly to other countries, the purchasers from educational institutions constitute 80% - 90% of the market. These are mainly schools and universities, as well as companies organizing courses and training, conference centers and hotels.

It is important to notice the change in the commercial strategy of IWBs producers, as well as in the approach to this technology in educational institutions. As I already mentioned

[33] "Tablice interaktywne zdobywają rynek." http://technika.dlastudenta.pl/artykul/Tablice_interaktywne_zdobywaja_rynek,42178.html.

in earlier parts of this study, training is an indispensable element in the process of implementation of IWBs in schools. To increase the percentage of teachers using seamlessly this new technology, producers of IWBs directed their attention to the teacher training centers and educational departments of universities. In this way, future teachers learn about all possible applications of this product already at an early stage of their own education. This strategy is very likely to become a great success for the companies. Not only will a bigger group of teachers be willing to use IWBs in their future work, but also it is very probable that when they gain an influence on the purchase of IWBs for their schools, they will opt for the brand with which they are already familiar.

As I mentioned before, demographics have an important role in the sale of any product. In case of IWBs and their sales, which depend strongly on the number of potential users, it is crucial to be aware of the number of educational institutions which are your potential customers.



	2000/01	2005/06	2008/09	2009/10
Primary Schools	3220,6	2602	2294,4	2235
Lower Secondary Schools	1189,9	1596,8	1381,4	1322,2
Secondary Schools	2443,1	1714,9	1567,9	1510
Tertiary Education	1584,8	1953,8	1927,8	1900

12. Number of students enrolled in the educational institutions in Poland according to Central Statistical Office

The graph above shows that similar to the situation in Portugal, the number of students enrolled to schools in Poland is decreasing. The greatest fall can be noticed in primary and secondary schools. This decrease has an important influence on numbers of primary

schools which decreased by almost 3 000 during the last ten years (from 16 766 to 13 986) and on the number of secondary schools (from 8 327 to 7 216)[34]. This fact will certainly diminish the demand for IWBs in the future, but for now, as the market is far from being saturated, the producers may be reassured about sales in upcoming years. The number of students enrolled in tertiary education has significantly grown for the last ten years. This growth is reflected in the number of higher education institutions which have increased from 310 in 2000 to 461 in 2009. As with the situation in Portugal, the producers of IWBs present in the Polish market should direct their attention to this segment of the market.

According to retailers of IWBs in Poland, the most recommended type of board is the one with short or ultra short projectors. In this way, the shade created when writing on IWB is reduced to a minimum. However, these products are the most expensive on the market (around 1 000 euro). Polish clients are still principally opting for the cheapest tools (which cost less than 500 euro), quality being only a secondary consideration. Cheap, low-quality items are more and more numerous in the market. Their producers do not ensure any support (like software, which has a crucial importance with these devices) nor offer any back-up maintenance services. Without the proper knowledge about this technology, schools may lose funds on cheap solutions and get discouraged by these devices.

Retailers observe however a progressive change in this approach. School managers have a greater knowledge about what is on offer on the market and they have started to realize that they should not only take into account the retail price but also costs of maintenance and easiness of operation. Moreover, they should pay attention to the resistance of the IWBs, which in schools with children and teenagers can be subject to many “accidents”. Salespersons notice also that schools usually purchase only one interactive system and very rarely they decide to buy a few devices at once. This can be a result of the lack of money at the disposal of schools but also of distrust of a technology unknown to them.

[34] Central Statistical Office, *Concise Statistical Yearbook of Poland* (Warsaw: Zakład Wydawnictw Statystycznych, 2010).

6.2.2. Government policies

Following the example of other European countries, the Polish governments did not neglect technological changes in Polish schools. Thanks to reforms prepared by the Ministry of Education, supported financially by European Social Fund, almost every school in the country was equipped with ten computers. It contributed to the reduction of social contrasts between rural and urban schools as well as between schools from poorer and richer regions of the country. But, according to Krystian Grzenkowicz[35], the executive editor of *PC World Magazine*, it is really disconcerting that since this reform took place already a few years ago, there has been no other major nationwide supply of equipment. The decisive power in this matter has been delegated to local governments, which since then have been responsible for finding and granting funds to educational institutions. This change, which was supposed to facilitate the process of applying for funding, has in reality greatly hindered the procedure. In an optimistic scenario, the realization of projects lasts around one year and in a pessimistic one, due to the lack of funds, projects may be not executed at all.

The system of technological reforms in education does not function properly. Only in some schools the managers are determined enough to bring about technological "revolutions" in their institutions. Other schools are still far from understanding the positive changes that might be achieved by new devices. Unfortunately, only some schools know that they can apply individually for money granted by the European Union *inter alia* through the program "Human Capital" financed by the European Social Fund, which among its many objectives has the improvement of educational levels to fully take advantage of human capital in the future.

Luckily, there are many cases where local governments by their own initiatives allocate special funds for this kind of equipment. In the region of Kujawsko-Pomorskie, thanks to a project carried out by local government, all the classrooms for learners of the

[35] Grzenkowicz Krystian, "Sprostać wyzwaniom", *PC World,* 3(2009), http://files.idg.pl/pdf/materialy/pcw/PCW_Wydanie_Specjalne.pdf.

first three years of primary education were equipped with IWBs. 627 schools were provided with 2 346 IWBs and at the end of this year a special website will be open to allow teachers to share their teaching contents[36]. Thanks to the great number of devices sold, the price of each item was reduced by a few thousand Polish zloty.

The lack of any nationwide project has had one serious consequence. According to data provided by the Ministry of Education, there is a big disproportion in equipment between regions. Whereas in 2009, in the region of Warsaw around 18% of sold items were located, Swietokrzyskie which is one of poorest regions in Poland had only 4% of these devices. This situation, which contributes to inequality of opportunity in the education of Polish children, shows that there is a great need to undertake more general measures in this area.

6.2.3. Forecasts for the future

There is a lot to be improved in the Polish system of supplying and using educational equipment, but unfortunately no changes are expected at present. There are many legal rules that are obsolete and impractical e.g. the obligation to buy only stationary computers for schools or the prohibition on the renting of school space for other than teaching purposes, which could bring in considerable revenue to schools. What should be changed as well is the general approach towards technology in education. In Poland there are still many teachers who have never heard about interactive whiteboards. The computers in Polish schools are still generally used only as a tool to learn Informatics and Technology. Many schools seem not to know that the possible application of technological devices can by much greater. As a consequence of this technophobic approach, Polish schools are far behind other European countries when it comes to the presence of technology in classrooms.

Fortunately some Polish schools and local governments have started to notice the potential of new technologies. Thanks to their initiatives the market for IWBs has started

[36] Krzemińska Beata. "Wybraliśmy dostawcę tablic interaktywnych." http://www.kujawsko-pomorskie.pl/index.php?option=com_content&task=view&id=16633&Itemid=126.

to grow in the last few years. Teachers slowly get familiar with IWBs and local governments are more and more successful in taking active advantage of available European funds.

According to forecasts of IWBs retailers, the market of IWBs in Poland is very promising. In 2011 10 000 IWBs should be sold, whereas in 2012 and 2013 growth of 50% - 60% in sales is expected. Salespersons predict as well an increase in the number of public tenders for IWBs. What gives rise to such an optimistic vision? First of all, as I have already mentioned, the market is far from being saturated. There are about 30 000 schools in Poland. Supposing that each of them has at least 10 classrooms we can assume that there is a place for 300 000 IWBs. Secondly, European funds will continue to be available for Polish schools for the next few years. Thirdly, retailers observe an increase of interest in this technology in the business sector.

6.3. Interactive whiteboards in France

6.3.1. Present market situation

Although at the beginning of 2010 France occupied the eighth place in Europe in terms of the equipment of schools, French teachers and students are only in 24th place in terms of their everyday use. This problem was raised by French deputy Jean-Michel Fourgous in the report "Réussir l'école numérique" (To Succeed in the digital school) sent to the Minister of Education. The author admits that France has lagged behind other European countries in terms of educational technologies. New projects have been undertaken to remedy this situation.

In 2009, there were 27 000 IWBs in French schools (18 600 in secondary schools and 8 400 in primary). It represented 3,5% (2,1 IWBs per school) of classrooms in primary schools and 8% (2,7 IWB per school) in secondary establishments[37]. According to *Le*

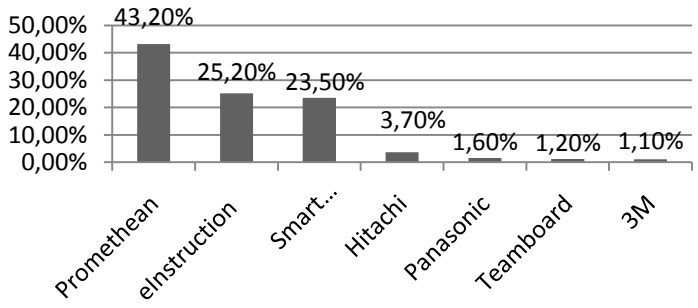
[37] Equipe de la Mission Fourgous. *Réussir l'école numérique*. http://www.tagaro.fr/ecole_numerique/rapport.html, 68.

Monde the potential market is "gigantesque". The equipment for one classroom costs from 2000 to 5000 euro, so the whole market represents at least 1 billion euro. Manufacturers and distributors predict an "explosion" of demand[38]. That is why there are more and more enterprises in the market who have decided to adapt their production plan to the current popularity of IWBs. Hitachi and Panasonic are only two examples of companies who are trying to get a "piece" of that lucrative market. Watching the example of other countries, where governments continuously carry out projects aiming to increase IWBs penetration in the classrooms, producers of these devices can be optimistic about their future.

Although the French government has started its technological reforms in education much later compared to e.g. United Kingdom, this delay has given them one significant advantage - the access to even newer technologies. When at the beginning of the first decade of twenty-first century, the UK decided to improve the technological development of schools, they had access only to "fixed" IWBs. French schools had an opportunity to use mobile IWBs – the eBeam technology that uses ultrasound and infrared receivers. Thanks to these small devices (200mm x 41 mm x 10,5 mm) that can be easily moved from one place to another, teachers can create an interactive whiteboard on any flat surface in 2 minutes. French companies like Média Perfect or Speechi have soon realized the potential of these new devices. Schools can also opt for technology of interactive video projectors a recently introduced on the French market, which are a much cheaper solution compared to the purchase of fixed boards. Thierry Klein, the founder of Speechi enterprise, said in the interview given to the website ludovia.com that the market for IWBs was slowly moving in the direction of interactive video projectors. He added that the demand for fixed IWBs had dropped abruptly in the last month and that only mobile IWBs can withstand this strong competition. In his opinion, the future belongs to video projectors with their 50% market share and mobile IWBs with around one third of the market. The rest of the market taken by traditional interactive whiteboards will continuously decrease.

[38] Leloup Damien. "Les tableaux blancs interactif, un marche à enjeux." *Le Monde*, http://www.lemonde.fr/technologies/article/2010/04/27/les-tableaux-blancs-interactifs-un-marche-a-enjeux_1342874_651865.html.

According to the information delivered by AEF (Agence Education Formation) at the beginning of 2011, the market was divided between the following producers:



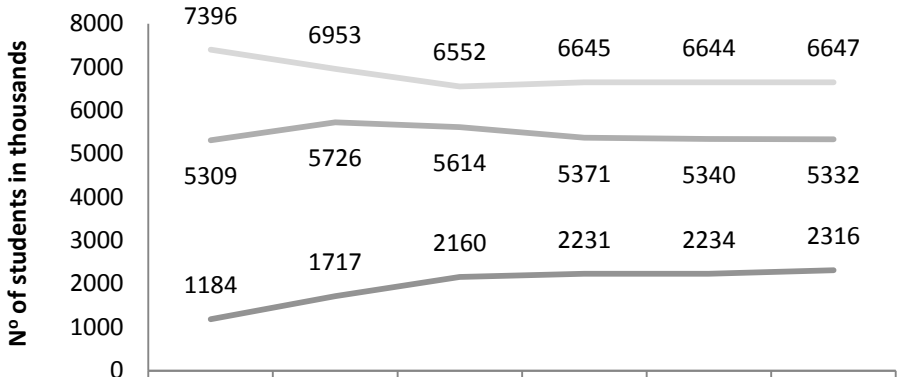
13. Market shares in France

It is worth noticing that trends in the French market differ from global ones. British company Promethean is the leader of this market, followed by an American company eInstruction whereas Smart Technologies (the global leader) occupies only third position with its 23,5% of market share[39].

The graph below presents the number of schools of the primary, secondary and tertiary levels in France[40]. It is certain that the French market represents great opportunities for IWBs manufacturers as the number of learners in this country is much bigger than in the countries analyzed before. It can also be noticed that the number of learners has not significantly changed in the past ten years. Therefore, producers of IWBs can expect that the number of schools will stay more or less the same. This supposition seems to be even more probable taking into consideration the positive birth rate of the country.

[39] "Tableaux blancs interactifs : le point sur le marché français et européen par Emmanuel Pasquier (Promethean)." http://www.educnet.education.fr/depeches-de-laef/146017/.

[40] Institut National de la Statistique et des Etudes Economiques. "Effectif d'élèves et d'étudiants." http://www.insee.fr/fr/themes/tableau.asp?reg_id=0&ref_id=NATFPS07119.

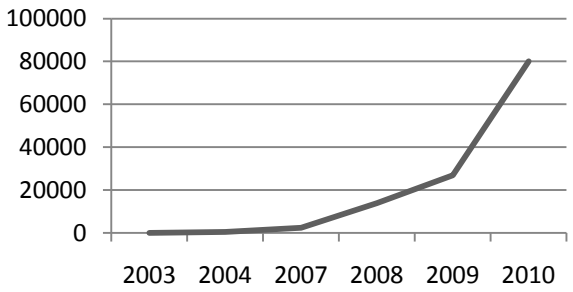


	1980	1990	2000	2007	2008	2009
Primary schools	7396	6953	6552	6645	6644	6647
Secondary school	5309	5726	5614	5371	5340	5332
Higher education	1184	1717	2160	2231	2234	2316

14. Number of students enrolled to educational institutions in France (in thousands)

6.3.2. Government policies

According to Fourgous's report, before 2003 there were only ten interactive whiteboards on French territory. The most relevant interventions for this study are reforms of educational technology called "PrimTICE" and "SD-TICE" started in 2003. 1,3 millions euro were invested to provide schools with the right equipment. The number of IWBS grew to 461 in primary schools. Since that time, this number has continuously grown, but there are serious disparities between regions: there are schools in which 100% of classrooms are equipped with IWBs, and those that don't have them at all. In 2007, there were already 2500 IWBs and in 2008, around 14000 IWBs were sold. This dynamic growth is represented on the graph below:



15. The number of interactive whiteboards in France

One of the objectives of the "To Succeed in the digital schools" program was to provide one IWB for each school in the country. In this way in 2009 there were already 27 000 IWBs in French schools and in the next year 80 000. The ambitious plan of this project consists on multiplying by a factor of 7 the number of IWBs in three years.

In 2009 a new project was launched. This time, the planners directed their attention to rural schools and they invested 50 million euro in computers and IWBs for schools located in villages with less than 2 000 habitants. The interest in this initiative surprised even its organizers; the ministry had to spend an additional 17 million euro to respond to all requests. However, it is not surprising that schools in smaller villages were interested in this project, which could represent for them a "window on the world". It facilitates distance teaching and can help, for example, to learn foreign languages by video-conferences with native speakers. Smaller schools would probably never have that opportunity without the TIC.

The Fourgous Report aims to improve and develop the introduction of digital devices in schools. Jean-Michel Fourgous declares in the objectives of his report:

> One observation: the digital revolution has already begun. Now the question is no longer whether it is relevant or not. The question is rather to catch up and to play an undeniable role in the global competition.[41]

[41] Equipe de la Mission Fourgous. *Réussir l'école numérique*. http://www.tagaro.fr/ecole_numerique/rapport.html, 6.

Fourgous adds that the future of the country depends on the education of children and that this education should be supported by digital technology. In his opinion, France being a technophile country has already a basis to "succeed with digital schools". According to the results of the investigation carried out by Ifop/L'atelier BNP- Paribas published in February 2010, 66% of Frenchman consider that new technologies are rather useful in education whereas 22% find them very useful. It may be quite surprising to learn that in the age group older than 65 years old, 26% of people replied that this technology can be great help in education compared to only 19% of people younger than 35 years of age giving the same answer[42]. 43% of Frenchmen think that game consoles may be also a useful tool in education. 70% of them agree that digital devices "represent a real asset especially when teaching languages[43].

Despite this technophile approach, France competes with difficulty with emerging countries and the introduction of new educational technologies into schools will certainly "boost achievement of students and better prepare children for the professions of the future"[44].

The Fourgous Report contains 70 different lines of action among which those concerning training for teachers are prominent. Fourgous notices that about 80% of the money invested in educational technology was spent on equipment, and only 20% on training. He suggests that a 50%-50% distribution would be much more advantageous. The country would pay 80% of the price of equipment, while the rest of the money would be financed by local collectivities. The report remarks as well on the importance of videoconferencing in the process of teaching. France, delayed in the use of this technology, will only be able to catch up with United Kingdom in 3 to 4 years. To do so, the Ministry of Education announced in 2007 the plan of "1000 videoconferences" to improve the teaching of foreign languages (especially English). Many people however continue to ignore how useful and advantageous the use of IWBs in this area may be. The

[42] Peiron Denis. "Ecole et nouvelles technologies, un duo gagnant." http://www.la-croix.com/Ecole-et-nouvelles-technologies-un-duo-gagnant/article/2413157/4076.
[43] Equipe de la Mission Fourgous. *Réussir l'école numérique*. http://www.tagaro.fr/ecole_numerique/rapport.html, 23.
[44] Ibid.

ability to organize a conference with any person from any country (after his or her prior consent) can give to teachers and learners endless possibilities. The conversation with a native speaker can greatly increase the effectiveness of learning languages by improving listening skills, learning the original accent and gaining fluency in speaking. Thanks to additional funds provided by the government, the program was extended to 1 500 schools. According to the author of the report, these devices will help to reduce inequality between schools in the big cities and those in remote regions. The regional disparities between schools are very significant. While in 2010 it was estimated that only 3% of students had used this tool in school, in some regions 20% of learners had already taken advantage of this technology.

6.3.3. Forecasts for the future

The forecasts for the French market for IWBs are very promising. Following the objectives of the governmental projects in 2011 there should be installed already 130 000 IWBs. The plans for 2012 are equally ambitious: 55 000 new IWBS will be added to the total number. This number will give to IWB companies many new business opportunities, because the sale of these devices entails additional profits – the costs of other devices like students responding systems, speakers and especially the costs of training for teachers. It cannot be ignored that the number 185 000 signifies not only the expected number of IWBs in France, but also the number of teachers that will need to learn how to use these devices. And supposing that one interactive whiteboard is used by more than one teacher in a school, this number must be much higher.

We can also expect, following the opinion of founder of Speechi company, "the death of fixed interactive whiteboards"[45]. Fixed interactive whiteboards will be probably gradually substituted by mobile solutions which are more handy and easy to transport. Speechi estimates that at presence, 1/3 of interactive whiteboards are mobile and 2/3

[45] Speechi. "Le tableau interactif fixe est mort, vive le vidéoprojecteur interactif." http://www.speechi.net/fr/index.php/2011/04/20/le-tableau-interactif-fixe-est-mort-vive-le-videoprojecteur-interactif-12/.

fixed. This proportion will change in favor of mobile devices, which in his opinion will dominate the market together with interactive projectors.

VII. Comparison of the markets

The earlier parts of this study were devoted to the analysis of Portuguese, Polish and French markets for interactive whiteboards. These markets are characterized by many similarities, as they are all related to the same product which is at presence in full development in many countries, especially in Europe. There are however some significant differences between these three countries when it comes to this technology. To provide the answer that this study is seeking, it is necessary to define clearly the characteristics that these markets have in common as well as those that differ from each other.

The most important feature characterizing these markets is the fact that they are all at the stage of full expansion. The system of interactive devices in education is gaining more and more popularity in these three countries. In Portugal, in 2009 around 33% of the education market was penetrated. In Poland, adopting assumptions of sales staff, about 26 500 IWBs will be sold until the end of 2011 which constitutes only about 9 % of the potential market. In France, the 130 000 interactive devices expected till the end of 2011 will be still only a small part of the market. These numbers are very promising for producers and marketers of interactive whiteboards. It seems like the greatest opportunities can be offered by the Polish and French markets which still have the biggest part of "interactive revolution" process ahead of them. They are also considerably bigger markets – whereas in Portugal there is a place for about 18 000 whiteboards, in Poland, where the number of schools oscillates around 30 000, the potential number of customers is much greater. France might also represent better opportunities when it comes to the number of schools in its territory. Not only is their total number the greatest, but also it does not show any downwards trend like in Portugal or in Poland.

Secondly, the Portuguese and French governments have undertaken great projects to provide their schools with interactive devices. Their plans turned out to be very successful

and have significantly improved the equipment of classrooms. However, in Poland the process of introducing IWBs is not nationwide and often presents many difficulties for schools. Polish schools are still technologically held back in comparison to their foreign equivalents and a technophobic approach can still be seen in schools and in society in general. Compared to Portugal, that has effected important changes in their technological policy-making, to become a country that has progressed the most during the last 5 years in the area of innovation (among the 27 countries in the European Union) and registering a growth rate almost ten times bigger than European average[46], Poland still has a lot of catching up to do.

The "Interactive revolution" started much earlier in Portugal than in Poland and France. This is the reason why the type of interactive equipment adopted will probably differ between these countries. Portugal has mainly opted for fixed interactive whiteboards, as their mobile equivalents were not yet popular at this time. In France and Poland the proportions between fixed and mobile devices will be certainly different. However, this difference is at present mainly noticeable in France; it might be expected that Poland will follow its example. Moreover, in all three countries, the sale of IWBs is definitely directed to educational institutions, however in France and Poland retailers predict a progressive change in this trend. In Portugal, where enterprises are fighting the financial crisis, it may take a while longer.

To finish, another problem should be broached. As was mentioned earlier, the insufficient training of teachers is a big problem for countries implementing educational technologies. According to the results of my questionnaire, in Portugal there are still many teachers who did not receive enough instruction when it comes to the use of IWBs. In Poland, many teachers have not even heard about this technology. France seems to have found solutions for both problems. A new distribution of funds devoted to the implementation of the technology (50% of money for the equipment and 50% for trainings) may significantly improve educational benefits from using this technology. Moreover, introducing IWBs in the training centers for teachers as well as in educational

[46] "Inovação: Portugal foi o país que mais progrediu a ritmo quase 10 vezes superior à média da UE." http://www.portugal.gov.pt/pt/GC18/Noticias/Pages/20110201_Not_Inovacao_UE.aspx.

departments of universities will make the next generation of teachers familiar with these new products.

VIII. Conclusions

During five months of my internship I had the opportunity to deepen my knowledge and gain new practical skills. Firstly, it was a very valuable experience to apply the knowledge gained at the university to practical work situations. Secondly, I had occasion to improve my language skills, acquire work habits and understand better organizational relationships. Thirdly, the internship helped me to broaden my knowledge about new technologies, especially those applied in education.

To conclude the analysis of the sales of IWBs, it must be said that they are clearly promising markets which will for sure be developing over the next few years. However, to fully take advantage of these devices, governments and managers of schools should not forget the attention that should be given to proper training. Neglecting the necessity of supporting teachers on this new technological path may entail the failure of this ambitious undertaking. It must be also noted that the capacity of an interactive whiteboard depends mainly on its software. For this reason, the purchase of this device should be preceded by a thorough analysis of products on the market, also taking into account their interoperability in cases where the product is bought for a bigger institution. Portugal and France are on course to modernizing the education of young people. The Polish market is also developing dynamically, but there is a pressing need for change in the approach towards technology.

What will be the future of this technology? We can already observe the improvements that producers are trying to implement in their whiteboards as well as new technologies slowly displacing old ones. Will fixed interactive whiteboard really give way to mobile devices? Or maybe a completely new technology will be developed? In any way, the future seems bright for this kind of educational technology.

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X. Appendices

10.1.Translation

1	English	Polski	Français
2	UbiStudio	UbiStudio	UbiStudio
3	Copyright Ubiwhere Lda 2007-2010. All Rights Reserved	Copyright Ubiwhere Lda 2007-2010. Wszelkie prawa zastrzeżone. Ten produkt jest licencjonowany na podstawie warunków umowy licencyjnej oprogramowania UbiWhere.	Copyright Ubiwhere Lda 2007-2010. Tous droits réservés.
4	This product is licensed under the Ubiwhere Software License terms.		Ce produit est disponible sous les termes de la licence.
5	To send comments or report bugs use the following email address:	Wszelkie uwagi jak również i błędy prosimy zgłaszać na adres e-mail:	Pour envoyer vos commentaires et signaler les bugs utiliser l'adresse électronique suivante:
6	Trial Version	Wersja próbna	Version d'essai
7	Register	Zarejestruj	Enregistrer
8	Email:	E-mail:	E-mail:
9	Telephone:	Telefon:	Téléphone:
10	Name:	Nazwa:	Nom de l'utilisateur:
11	Company:	Organizacja:	Organisation:
12	Country:	Kraj:	Pays:
13	Your message goes here...	Twoja wiadomość trafia tutaj...	Ton message va ici...
14	Send Message	Wyślij wiadomość	Envoyer le message
15	Continue Trial	Kontynuuj używanie wersji próbnej	Continuez l'utilisation de la version d'essai.
16	Exit	Wyjście	Quitter
17	This license can't be used on this computer.	Ta licencja nie może być używana na tym komputerze.	Cette license ne peut pas être utlisée sur cet ordinateur.
18	Your trial license has expired.	Twoja licencja próbna wygasła.	Votre license d'essai a expiré.
19	Please contact us.	Prosimy o kontakt.	Contactez-nous s''il vous plaît
20	Invalid License. To get the license, please fill in the form below. Thank you!	Licencja nieważna. Jeśli chcesz nabyć licencję, wypełnij poniższy formularz. Dziękujemy!	License non valide. Si vous désirez acquérir une license, remplissez le formulaire ci-dessous.
21	Already used {0} day(s) of the {1} day(s) you have available.	Upłynęło/y już {0} dni z {1} dostępnych	
22	Successfully Registered.	Rejestracja przebiegła pomyślnie.	Enregistré avec succès
23	Please wait for a confirmation email.	Prosimy poczekać na e-mail z potwierdzeniem.	Attendez l'email de confimation s'il vous plaît.
24	Error:	Błąd:	Erreur:
25	Note:	Uwaga:	Notez que:
28	Welcome	Witaj	Bienvenu
29	Message	Wiadomość	Message
30	OK	OK	OK
31	Save	Zapisz	Enregistrer
32	Cancel	Anuluj	Annuler
33	Add Files	Dodaj Pliki	Ajouter des fichiers
34	Saved Files	Pliki zapisane	Fichiers enregistrés
35	File Saved:	Plik zapisany:	Fichier enregistré
36	File	Plik	Fichier
37	New	Nowy	Nouveau
38	Open	Otwórz	Ouvrir
39	Save	Zapisz	Enregistrer
40	Save as...	Zapisz jako...	Enregistrer sous...
41	Print	Drukuj	Imprimer
42	Import	Importuj	Importer
43	Export	Eksportuj	Exporter
44	Exit	Wyjście	Quitter
45	Edit	Edycja	Edition
46	Undo	Cofnij	Annuler
47	Redo	Ponów	Rétablir
48	Cut	Wytnij	Couper
49	Copy	Kopiuj	Copier
50	Paste	Wklej	Coller
51	Select All	Wybierz wszystko	Tout sélectionner
52	View	Widok	Affichage
53	Fullscreen	Pełny ekran	Plein écran
54	Free Screen View	Widok na pełny ekran	Affichage en plein écran
55	Slide View	Widok Slajd	Affichage en diaporama
56	Desktop View	Widok Pulpit	Afficher le Bureau
57	Gallery	Galeria	Galerie
58	Insert	Wstaw	Insertion
59	Media	Media	Médias
60	Link	Łącze	Lien
61	Tools	Narzędzia	Outils
62	Magnifier	Lupa	Loupe
63	Keyboard	Klawiatura	Clavier à l'écran
64	Calculator	Kalkulator	Calculatrice
65	Clock	Zegar	Horloge
66	Browser	Przeglądarka	Navigateur Web
67	Recognize	Rozpoznaj	Reconnaître
68	Settings	Ustawienia	Paramètres
69	Spotlight	Reflektor	Spot
70	Page Cover	Kurtyna	Rideau
71	Help	Pomoc	Aide
72	Check for Updates...	Sprawdź, czy są aktualizacje...	Vérifier s'il y a des mises à jour
73	About UbiStudio	Informacje o UbiStudio	A propos de UbiStudio
74	General	Ogólne	Général
75	Record & Snapshot	Nagrywanie & Wycinek ekranu	Enregistrement & capture d'écran partielle
76	Language:	Język:	Langue:
77	Save Recording Path:	Zapisz ścieżkę zapisu:	Sauvegarder le chemin d'enregistrement
78	Save Snapshot Path:	Zapisz ścieżkę wycinka ekranu:	

79	Record Audio	Rejestrator dźwięku	Enregistrement du son
80	Video	Video	Vidéo
81	Output Format	Format wyjściowy	Format de sortie
82	Audio	Audio	Audio
83	Device	Urządzenie	Appareil
84	Sampling		
85	Bitrate:	Szybkość transmisji:	Débit binaire
86	Saved on	Zapisane na	Enregistré sur
87	Add to Current Page	Dodaj do bieżącej strony	Ajouter à la page courante
88	Add to New Page	Dodaj do nowej strony	Ajouter à la nouvelle page
89	Go to Folder	Idź do folderu	Aller au dossier
90	Close	Zamknij	Fermer
91	Hide Pages Panel	Ukryj panel stron	
92	Add New Free Page	Dodaj nową stronę	Ajouter une nouvelle page
93	Add New Slide Page	Dodaj nowy slajd	Ajouter une nouvelle diapositive
94	Delete Current Slide	Usuń bieżący slajd	Supprimer la diapositive en cours
95	Record	Nagrywaj	Enregistrer
96	Snapshot	Wycinek ekranu	Capture d'écran
97	Fullscreen/Region Selection	Zrzut ekranu/wycinek ekranu	Capture du plein écran/Capture d'une zone définie
98	Selection	Wybierz	Sélection
99	Hand Tool	Narzędzie rączka	Outil Main
100	Pen	Pisak	Stylo
101	Smart Pen	Inteligentny długopis	Stylo intelligent
102	Highlighter	Zakreślacz	Marqueur
103	Eraser	Gumka	Gomme
104	Colors	Kolory	Couleurs
105	Fill	Wypełnij	Remplissage
106	Stroke Size	Grubość	
107	Shapes	Kształty	Formes
108	Lines and Arrows	Linie i strzałki	Lignes et flèches
109	Text	Tekst	Texte
110	Recording and Snapshot	Nagrywanie i wycinek ekranu	Enregistrement et capture d'écran partielle
111	Stop Recording	Przerwij nagrywanie	Arrêter l'enregistrement
112	Keyboard	Klawiatura	Clavier à l'écran
113	Duplicate	Powiel	Dupliquer
114	More	Więcej	Plus
115	Shutdown	Zamknij	Fermer
116	Minimize	Minimalizuj	Minimiser
117	Add Media	Dodaj Media	Ajoutes des médias
118	Add Page	Dodaj Stronę	Ajouter une page
119	Embed	Osadź	Incorporer
120	Bold	Pogrubienie	Gras
121	Italic	Kursywa	Italique
122	Underline	Podkreślenie	Souligné
123	Bullets	Punktory	Puces
124	Numbering	Numerowanie	Numéros
125	Align Left	Wyrównaj do lewej	Aligner à gauche
126	Align Right	Wyrównaj do prawej	Aligner à droite
127	Align Center	Wyrównaj do środka	Aligner au centre
128	Align Justify	Wyjustuj	Alignement: Justifier
129	Opening	Otwieranie	Ouverture
130	A background operation is in progress. Please wait...	Inna operacja jest w toku. Proszę czekać...	Une autre opération est en cours. Patientez s'il vous plaît.
131	Please wait...	Proszę czekać...	Patientez s'il vous plaît
132	Starting the installer of the updated version. Please wait...	Uruchamianie instalatora aktualizowanej wersji. Proszę czekać...	Demarrage de l'installateur de la version misa à jour. Patientez s'il vous plaît.
133	Download was cancelled.	Pobieranie zostało przerwane.	Le téléchargement a été annulé
134	Error	Błąd	Erreur
135	Unsupported File!	Nieobsługiwany plik!	Fichier non prise en charge!
136	Not Implemented Yet!		Pas encore implémenté!
137	The address URI must be absolute e.g. 'http://www.google.com'	Adres strony musi być bezwzględny, np. "http://www.google.com"	L'adresse URL doit être absolue, par exemple "http://www.google.com"
138	The address URI contains errors.	Adres strony zawiera błąd	L'adresse URL contient des erreurs.
139	Export Format Error!	Błąd eksportowania formatu!	
140	Not Supported Tool!	Nieobsługiwane narzędzie!	Outil pas pris en charge!
141	File contains errors!	Plik zawiera błędy!	Le fichier contient des erreurs.
142	Wrong Content!	Niewłaściwa zawartość!	Contenu incorrect
143	Error on Record Starting!	Błąd podczas rozpoczynania nagrywania!	Erreur dans l'enregistrement
144	Stroke Recognition failed!	Nie powiodło się rozpoznawanie tekstu!	La reconnaissance de l'écriture manuscrite a echoué.
145	Microsoft PowerPoint missing!	Microsoft PowerPoint nieobecny!	
146	Closing Error:	Błąd podczas zamknięcia	Erreur de fermeture
147	HTML is not supported!	Format HTML nie jest obsługiwany	Le HTML n'est pas pris en charge.
148	Not Supported!	Nieobsługiwany!	Pas pris en charge
149	Not Supported Type!	Nieobsługiwany typ!	
150	Cannot start Clock Application!	Nie można uruchomić aplikacji Zegar!	Impossible de démarrer l'application Horloge.
151	Error Saving File	Błąd podczas zapisywania pliku	Erreur d'enregistrement du fichier
152	File doesn't exist.	Plik nie istnieje	Le fichier n'existe pas.
153	Invalid File	Nieprawidłowy plik	Fichier non valide
154	Can't embed	Błąd przy osadzaniu	Ne peut pas incorporer
155	An error occurred during the snapshot saving.\nPlease check the saving path of snapshots in Tools>Settings.\nDetails	Wystąpił problem podczas zapisywania wycinka ekranu.\n Proszę sprawdzić ścieżkę zapisu wycinka okranu w Narzędzia>Ustawienia.\nSzczegóły	Une erreur s'est produite lors de la capture d'écran.\n Veuillez vérifier le chemin d'enregistrement de la capture d'écran dans Outils>Paramètres.\nDétails
156	Error: importAux: {0} must be 0 or 1.	Błąd: imortAux: {0} musi wynosić 0 lub 1.	Erreur: importAux: {0} doit être égal à 0 ou 1.
157	Download failed.	Pobieranie nie powiodło się.	Téléchargement a échoué.
158	Download failed. Check your Internet connection.	Pobieranie nie powiodło się. Sprawdź połączenie z Internetem.	Le téléchargement a échoué. Vérifiez connexion Internet.
159	Enter a Website URL	Wpisz adres strony	Entrer l'adresse de la page.
160	Add Link as	Dodaj łącze jako	Ajouter un lien comme
161	Image Icon	Ikona	Icône de l'image
162	Please insert a valid URL.	Wpisz poprawny adres strony	S'il vous plaît, introduisez correctement l'adresse URL de la pag
163	Remove Hyperlink	Usuń łącze	Supprimer le lien hypertexte
164	Local Files	Pliki lokalne	Fichiers locaux
165	Hyperlink	Łącze	Lien
166	UbiStudio Update	Aktualizacja UbiStudio	Mise à jour d'UbiStudio
167	There is a newer version of UbiStudio available for download.	Nowa wersja UbiStudio jest dostępna do pobrania.	Une nouvelle version de UbiStudio est disponible au téléchargement.
168	Update now?	Aktualizować teraz?	Mettre à jour maintenant?
169	Current Version:	Aktualna wersja	Version actuelle:

10.2. Questionnaire

Inquérito

Caro(a) professor(a), Chamo-me Julia Stańczak e sou aluna do segundo ano de mestrado em Línguas e Relações Empresariais na Universidade de Aveiro. O meu projecto final refere-se a software para quadros interactivos. Por esta razão, ficaria muito grata se me pudesse ajudar, preenchendo este inquérito. Muito obrigada!

* Obrigatório

1.) Qual é o nome da sua instituição de ensino?

2.) Onde está localizada a sua instituição? *

3.) Qual é o perfil da sua instituição? *

- Público
- Privado
- Centro de Explicações/ de Estudos
- Centro de Actividades de Tempos Livres (ATL)
- Outro

4.) Qual/Quais os nível/níveis de ensino da sua instituição? *

- Pré-escolar
- Escola Básica
- Escola secundária
- Ensino superior
- Outro

5.) Quantos alunos frequentam a sua instituição?

- 1-50
- 51-200
- 201-500
- 501-1000
- 1001-1500
- 1501-2000
- 2000-5000
- >5000

6.) Quais os idiomas utilizados durante a sua actividade? *

7.) Que disciplina(s) leciona?

8.) Já alguma vez utilizou um software para quadros interactivos no seu trabalho? *

Sim/Não

9.) Se respondeu “NÃO”, pode explicar porquê? (Se respondeu não, poderá acabar o inquérito depois de responder a esta questão. Obrigada!)

- Não há quadros interactivos no meu local de trabalho.
- Há quadros interactivos no meu local de trabalho, mas eu acho-os inadequados para ensinar a minha disciplina.
- Há quadros interactivos na minha escola, mas não gosto de usá-los.
- Há quadros interactivos na minha escola, mas não sei utilizá-los pois nunca tive formação nessa área.
- Há quadros interactivos na minha escola, mas não sei utilizá-los pois a formação que tive nessa área foi claramente insuficiente.
- Outro

10.) Se respondeu "SIM", pode especificar o grau de utilização do referido software?

- Apenas uso o quadro interactivo como monitor e a respectiva caneta como rato.
- Apenas exponho recursos elaborados e disponibilizados por outros professores.
- Construo e exponho os meus próprios recursos elaborados nesse mesmo software.
- Outro

11.) Se assinalou a segunda ou terceira opção na questão anterior especifique, por favor as funcionalidades que gosta mais/acha mais profícuas quando utiliza o software?

12.) Com que frequência utiliza um quadro interactivo?

- Todos os dias
- 2-3 dias por semana
- Uma vez por semana
- Às vezes
- Muito raramente
- Nunca

13.) Considera alguma das funcionalidades supérflua/ineficaz? Porquê?

14.) Pode especificar qual o software usado?

15.) Pode especificar quais são as funcionalidades mais importantes neste tipo do software para si?

(com a escala de 1 até 4, onde:

- 1- Sem importância
- 2- Pouco importante
- 3- Importante
- 4-Muito Importante)

Ferramentas de matemática (compasso, régua, transferidor, etc.)	

Ferramentas de geografia	
Ferramentas de línguas	
Modo colaborativo (vários utilizadores podem compartilhar o mesmo conteúdo remotamente)	
Reconhecimento de formas geométricas	
Reconhecimento de escrita manual	
Barra de ferramentas personalizável pelo utilizador	
Funcionalidade de gravação	
Galeria de imagens	
Website com os recursos para professores	
Barra de ferramentas simples e intuitiva	
Efeito holofote	
Efeito cortina	
Possibilidade de utilização de diferentes fundos de página	
Jogos com fins educativos	
Página de área infinita	
Possibilidade de inserir tabelas	
Possibilidade de inserir gráficos	

16.) Tem alguma sugestão de outra(s) ferramenta(s) que considere importante(s) e que gostaria de ver implementada(s) neste tipo de software?

17.) Considera que o recurso a quadros interactivos aumenta a eficácia do ensino? Explique a sua resposta.

18.) Acha que os quadros interactivos simplificam o ensino de alguns conteúdos ou, pelo contrário, na maioria das vezes, dispersam os alunos do essencial da aprendizagem visada?

19.) Já alguma vez deparou com a impossibilidade de utilizar os seus recursos pelo facto do software utilizado para os elaborar, não ser o associado ao quadro interactivo a utilizar?

20.) Avalie a necessidade de existir, no seu local de trabalho, um software que pudesse funcionar em qualquer tipo de quadro interactivo.

OBRIGADA!