



Promoting the educative use of the internet in Portuguese primary schools: a case study

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Abstract

Purpose – The purpose of this paper is to summarise the authors' experience in furthering the educative use of Information Technology and the internet in the primary schools of northeast Portugal. The main goal of the Programme "Internet in Schools" is the development of Information Technology in Portuguese schools. It focuses on the use of the technology, rather than on its immediate pedagogical use. The characteristics of the target regions help in understanding this aim: teachers and students, as well as the population in general, were largely unaware of the potential of IT in general.

Design/methodology/approach – The project, the first and still the largest of its kind in Portugal, ultimately involved 1,137 schools, more than 1,700 teachers, and roughly 13,000 pupils. It was decided to centre the training process in the schools and communities themselves. The methodology implemented is distributed rather than centralised, and involves a series of school visits interspersed with training sessions.

Findings – The transfer of the training process from the university campus to the schools and communities themselves allowed for a very high degree of teacher participation. The first school visit was vital, allowing for the creation of a strong feeling of empathy between the trainer and the teachers and pupils. This was undoubtedly one of the main factors that led to an easier and more enthusiastic participation from the teachers. The efforts to put theory into practice in the classrooms were rewarded by a quicker rate of acceptance of IT in the classroom. The use of the internet, namely of web services and e-mail, was stimulated through the various training and awareness raising sessions (supported by Netmobiles) directed at the community in general. Such sessions enabled many individuals in the region to have their first contact with and experience of IT. This constitutes a sound and valuable contribution in terms of awareness raising, training and development towards IT in the region. The following factors played a very important role in the achievement of the goals: the training team was always present or could be easily contacted; both teachers and pupils contributed with material and resources; there was a continuous exchange of experiences; a vast number of individuals and entities participated in the project.

Originality/value – This was the first and still the largest approach of its kind in Portugal, and this is the only paper purposing and describing the used methodology in detail and the main conclusions reached.

Keywords Internet, Teaching methods, Primary education, Primary schools, Portugal

Paper type Case study



Introduction

The Programme “Internet in Schools”, launched by the Portuguese Ministry of Science and Technology in 1997, aimed at the development of Information Technology (IT) in Portuguese schools[1]. Each school (basic teaching, 2nd cycle – 5th and 6th grade, and secondary – 7th to 12th) was provided with at least one multimedia computer linked to the internet. Figure 1 outlines the education systems in Portugal and the UK. A detailed account of how the education system in Portugal and other countries are organised can be found in www.eurydice.org.

The existence of computers in the schools is, of course, necessary to effectively integrate IT into the learning process, but it is by no means sufficient. Therefore, in addition to the “Internet in Schools” Programme, a number of “Digital Regions” were also created. SCETAD (Serviço Cooperativo de Extensão em Trás-os-Montes e Alto Douro) was the first “Digital Region” created in Portugal, in 1999. Geographically, it covers the area known as Trás-os-Montes e Alto Douro (TMAD), in northeast Portugal. The main goal of the associated SCETAD project, lead by the University of Trás-os-Montes e Alto Douro, was to develop and promote IT in the schools and associated communities of northeast Portugal.

One of SCETAD’s sub-projects, called AEP (Apoio às Escolas do 1º Ciclo), was aimed at supporting Primary Schools. The goals of the AEP sub-project included motivating and increasing the general level of awareness of both the school teacher and pupils to the potential of IT in general, and the computer and the internet in particular, thus lessening and counteracting the lack of information that existed in the region at the time. The project did not concentrate exclusively on the teacher and pupil. Rather, it also aimed at promoting and encouraging an effective use of IT by parents, guardians/tutors and the community in general. The idea was to break down space and time barriers, allowing the schools in the relatively isolated TMAD region to feel closer to each other, and at the same time opening them to the outside world.

The need to train, motivate and involve teachers, pupils and the community in general towards a correct use of IT tools entails a number of technical and cultural problems. This paper discusses these problems and the solutions found to circumvent them.

The project had two main stages. The first involved 72 primary schools, equipped with a multimedia computer and an ISDN link. The network is maintained by the Portuguese Foundation for Scientific Computing (Fundação para a Computação Científica Nacional). For several reasons, detailed below, this study (geographically

Portugal	Pre-scholar teaching	Basic teaching			Secondary teaching	Superior reaching
		1st cycle	2nd cycle	3rd cycle		
Years old	= 3	= 6	= 10	= 12	= 15	= 18

United Kingdom	Pre-primary school	Primary school		Secondary school		Superior reaching
		Stage 1	Stage 2	Stage 3	Stage 4	
Years old	= 0	= 5	= 8	= 12	= 15	= 17

Figure 1.
Portuguese and UK
education systems

localised) was ultimately incorporated into a much broader programme, targeted at the entire region. In the second stage, named Trás-os-Montes Digital/SCETAD – School Support (Apoio Escolas), the SCETAD team worked with approximately 1,700 teachers and 13,000 pupils in 1,137 schools in the Trás-os-Montes e Alto Douro region.

The project was the first large-scale study of its kind ever made in Portugal, and it remains the largest such initiative in the country.

The constraints and their impact on the project

The physical and human geography of the TMAD region had a major impact on the project, and in a sense determined some of the directions that were followed. A brief outline of the relevant characteristics of the region is necessary to fully understand how the project evolved, and the extent to which it was shaped by the constraints and challenges raised by the characteristics of the target region.

The TMAD region is located in northeast Portugal, and consists mostly of steep hills (slopes reaching 15 per cent) and narrow valleys that flatten out into plateaux above 400 m. The Douro River digs deeply into the mountains to form its bed, and the dominant element of the landscape are the vineyards, planted in terraces fashioned from the steep rocky slopes and supported by hundreds of kilometres of dry stone wall. The region includes one of the most ancient winemaking regions in the world, and has been recognized by UNESCO as a World Heritage Site.

Despite its unique beauty, the terraces and steep slopes of Alto Douro make transportation across the region difficult. The distances between towns (and consequently schools) are usually long, and the roads connecting them are twisty and difficult to travel, especially in the winter. It is the vine that drives and sustains the economic activity in the region, which remains deeply rural and sparsely inhabited to the present day. The region covers over 60 per cent of Northern Portugal, yet it contains only 13 per cent of its population. The population density of Northern Portugal is approximately 173 people per square kilometre, whereas that of the TMAD region is close to 38. In fact, the least densely populated areas of the TMAD region average only 10 to 15 people per square kilometre.

The climate is characterised by the scant rainfall, long cold winters and very hot summers (“nine months of winter and three months of hell”). Neither the climate nor the landscape of the TMAD region invite human settlement, but their combined potential for winemaking has attracted people for centuries. At the present time, however, the region is no exception to the generalised population decline and ageing that has been felt in the inland regions of Portugal in recent years. According to the Portuguese Institute of Statistics (www.ine.pt), the largest decrease in population in the period between 1991 and 2001 was registered in the TMAD region (about 6 per cent). On the other hand, the percentage of the population aged 65 and over has been steadily increasing, and in the TMAD region it increased by more than 20 per cent in the same period, in sharp contrast with the 33 per cent decrease in the age group 0-14. These facts have further aggravated the isolation of many communities.

We were aware of these constraints from the start and soon realised the impossibility of regularly bringing a large group of school teachers to the university for training sessions. Most of the teachers were already travelling considerable distances from their residence to the schools, on a daily basis. Regular journeys to the

university would only add to that burden. It would have been impossible to work with the many hundreds of teachers in the TMAD region in this way.

The idea of working with a small group of teachers, perhaps those that were teaching or living not far from the university campus at Vila Real, or those that were exceptionally determined and willing to travel on a regular basis to the university, has its disadvantages too. To understand them refer to Figure 2, which represents the number of pupils enrolled in public schools in the 2001/2002 academic year in the region[2].

The majority of the pupils in the TMAD region are enrolled in the first cycle, there being 2,264 primary school teachers in the region, as illustrated in Figure 3. The schools are organised in school groups, supervised by Local Education Authorities. According to Portuguese law, the school groups guide themselves “[...] through the principle of integration in the community that they serve, promoting the integration of the teachers in the community and preventing their constant transfer to schools in other regions” (Lemos and Silveira, 2003, p. 243). Nevertheless, many teachers are not permanently assigned to one school or school group, and from year to year the teacher or teachers assigned to a given school are very likely to change.

This jeopardises the continuity of training, and the risks are twofold. First, from the point of view of the schools and pupils, the assignment of the current teacher to a different school, and his or her replacement with a possibly untrained teacher, could put an abrupt stop to ongoing studies. Second, from the point of view of the teacher undergoing IT training, moving to another school might compromise the possibility of travelling to the university, rendering all his previous work and training useless. Clearly, any attempts to base the IT training at the university campus would be vulnerable to these problems.

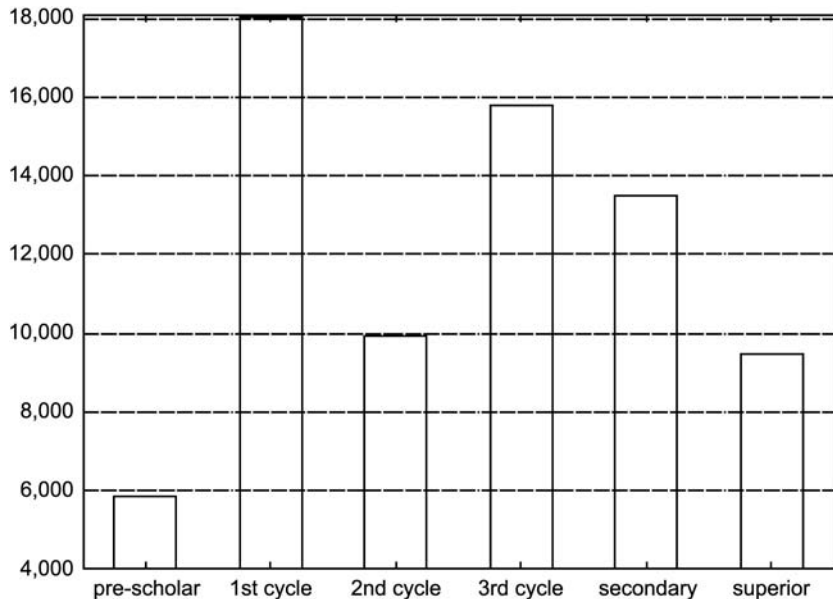


Figure 2.
Number of pupils enrolled
in the TMAD region by
educational stage

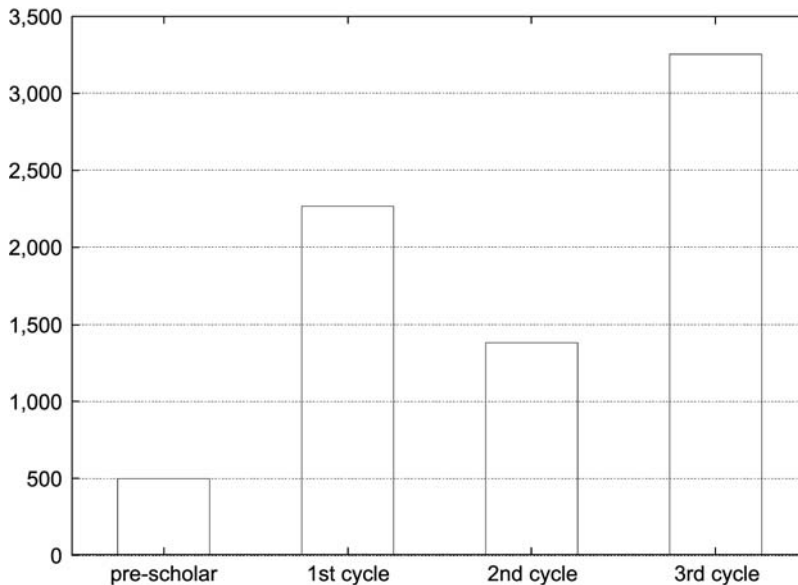


Figure 3.
Distribution of teachers by
educational stages in the
TMAD region

There is yet another obstacle to training strategies centred on the university campus. As explained before, the SCETAD project did not concentrate exclusively on the schools: it also aimed at the development of IT in the associated communities. Being deeply rural, relatively isolated, and with an ageing population, these communities were largely unaware of the full potential of IT in general, and the computer and the internet in particular. The restriction of the training programme to teachers and pupils would not contribute much to counteract this lack of information. To promote and encourage an effective use of IT by parents, guardians/tutors and the community in general, we felt the need to centre the training in the communities themselves rather than at the university campus. The method that we employed, discussed in the section on Methodology, was shaped by the constraints so far mentioned, and follows in a natural way from them.

Background and goals of the project

The main goal of the Programme “Internet in Schools” is the development of Information Technology in Portuguese schools. It focuses on the use of the technology, rather than on its immediate pedagogical use. The characteristics of the target regions help in understanding this aim: teachers and students, as well as the population in general, were largely unaware of the potential of IT in general.

When the teachers and students were first contacted about IT and computers, a variety of reactions were noted. The students were all enthusiastic about the possibility of having a computer in the classroom, connected to the internet, and learning how to use and explore it. For some this would be the first contact with a computer, and they were clearly looking forward to it. Among the teachers there was less agreement. Although most of them were enthusiastic with the prospect, not all were receptive to the use of computers in the classroom. Some of the teachers were facing other priorities,

such as “lack of daily workplace conditions and constant external demands”, the “lack of didactic and pedagogical material”, the “lack of furniture”, the “holes in the floor”, the “security problems (broken windows, no safety locks, etc.)”. Others questioned the need for computers in classes of very few students (“the ratio investment/students was very poor”). Still others reported a lack of background in IT, and a low level of confidence to use the computer in the classroom. Some of the teachers that were already considering retirement did not consider IT and computers a worthwhile effort.

As a result of these doubts, we felt the need for a strategy capable of motivating the teachers to use the IT resources made available to them. The installation of infrastructures is a relatively simple process, but using them effectively may require training and a change of habits, which are much slower and gradual processes. The need to motivate, train and raise the teachers’ awareness of the potential of IT as a pedagogical tool was felt from the start and became a clear priority, justified by the pivotal role that teachers have in the teaching/learning process. Any external effort has little chance of success without their full support and active cooperation.

The first essential step was training in the use of the technology. Many were quite unfamiliar with computers, and some even with the desktop metaphor and the remaining basic elements of the modern human/computer interface (mouse, buttons, windows, etc.). For many teachers, the computer was a serious obstacle rather than a useful tool, and it became clear that we had to start with the basics. It was necessary to focus on the basic usage of computers and the internet, taking into consideration the very different degrees of familiarity with IT among teachers, students and their families.

Methodology

For the reasons mentioned above, it was decided to centre the training process in the schools and communities themselves. The methodology implemented is distributed rather than centralised, and consists of a series of school visits interspersed with training sessions (Santos and Reis, 2001, p. 863). Although the strategy was also shaped by the human and physical geography of the region, as explained in the previous section, as well as by the obvious need to focus on the teachers, it has a number of other advantages, which are now discussed.

One of the advantages is that it allows working with the teachers and their pupils in a classroom context. The “school visit – training session – school visit” method fosters “learn-by-doing” (Marques, 2000, p. 125) in the classroom, thus allowing for individualised pedagogic support, and promoting learning by putting theory into practice.

The possibility of increasing or decreasing the frequency of the visits and training sessions to meet the needs of each school or to adjust the workload to the available human resources is another advantage of the approach. Because the teacher mobility is relatively high in the region, and the teachers have markedly distinct backgrounds on the use of IT, there was a pressing need to adjust the schedule of the visits to the demands, as these varied from one school to another and from one year to the next.

Because the schools are often located in remote and sparsely inhabited areas, due to the human and physical geography of the region and the population drainage felt in the inland areas of Portugal in past years, the visits allow for some outside contact, thus

breaking the daily routine and isolation. A centralised solution, involving training at the university campus, would not make that possible.

After the first phase of the project, in which greater emphasis was placed on the training of the teachers, the second phase began. With it, the main focus shifted from the teachers to the pupils. Therefore, “the need to educate towards an Information Society in both fronts, i.e. to promote an initial education of young people and the updating and recycling of knowledge in adults (Carneiro, 2001, p. 172)” was present and addressed throughout the entire project.

One of the aims of the project was to promote and encourage the use of IT in the communities as well as in the schools. From this angle also, the importance of the visits and the subsequent interaction with the parents and other members of the communities cannot be overestimated. The need to “reach the communities” was addressed by visits conceived for that specific purpose, and by visits to schools belonging to other education cycles.

School visits

It is the firm belief of the research team that a direct and simultaneous contact with both teachers and pupils in the classroom can encourage and aid their familiarisation with IT more effectively than other less direct approaches. As Dewey wrote, “[...] Nothing counts as much as the school, for, as Horace Mann said, ‘where anything is growing, one former is worth a thousand re-formers’” (Dewey, 1900, p. 7). These school visits also played an important social role since in most primary schools in the TMAD area there is only one teacher. A feeling of empathy between trainer, teacher and pupils was vital. Because of this it was essential that the visits and training sessions in one school be conducted by the same trainer.

In order to do a valuable contribution of the IT pedagogical use we tried to direct our stay in the classroom by promoting a list of exercises, such as directing the web searches (Internet Explorer) to the subjects currently being studied, followed by the elaboration of texts (MS-Word) and drawings (Paint) illustrating the subjects under consideration. This also contributed to the healthy development of children’s “motricity” and creative faculty of the mind. Also, completion of some of the exercises, games and worksheets available at the site “Celeiro do Espiguinha” was encouraged.

The first school visit was of prime importance, since it is through that first personal contact with all the teachers and pupils that awareness of the potential educational use of IT could be developed and fostered. During this school visit and in collaboration with teachers and pupils the activities to be performed throughout the school year were planned, and the school’s web page structured. The activities planned were in line with the structure of the web page to be developed or updated so that the necessary material could be progressively gathered by the teachers and pupils.

The second school visit had two main goals: to allow for consolidation of the topics discussed in the training session, and the actual development of the school’s web page by the teachers and pupils. The development of the web page was made easier as it had been structured during the first school visit, and the necessary materials gathered by teachers and pupils. It should be pointed out that the schools’ web pages contained information of interest not only to the school community but to the community in general. All the web pages contained links leading to a description of the school, teachers and pupils, school activities, the history of the village, town or city, and more.

In fact, the pages also included a page with information about local customs and traditions, legends, tongue-twisters and other activities.

The main objective of the third school visit was to strengthen the concepts discussed in the training and awareness raising sessions.

This way of working with teachers and pupils in a classroom context naturally promotes “learning-by-doing”. By training the teachers first two fundamental goals were achieved: the filling in of any gaps in the teachers’ initial training, often inadequate regarding IT; and the fostering of a lifelong process.

Training and awareness raising sessions

The training and awareness raising sessions were divided into two groups: One was aimed at catering for the teachers’ needs and the other at meeting the pupils’ requirements. The type of language, material, strategies, and so on, employed for each group was, therefore, adapted to meet those specific needs. Every person had access to a computer, that is, the number of available computers was equal to the number of people attending the sessions.

The teachers’ training and awareness raising sessions were conducted in the visited Town Halls and were supported by Netmobiles (Netmóveis). A Netmobile consists mainly of two trainers, one technician and a van, adequately identified and equipped with twelve laptops, a printer, a digital camera, a Router, a Hub, a multimedia projector, a screen projector and a video-conference system among other equipment (for further details see Reis *et al.*, 2002). These sessions were conducted in partnership and with the support of the participating Town Councils, which made available the necessary facilities and in some cases contacted the School Groups and Regional Educational Departments directly. These in turn contacted teachers to find out how many would be interested in attending the training sessions. The aim was to reach as many people and entities as possible.

The “learning-by-doing” approach was present throughout the whole process, and all sessions were of a practical nature. According to Georg Kerchensteiner, “[...] theory comes naturally out of practice, or rather, both are involved in a process of continuous reciprocity and exchange” (Savioz, 1956, p. 268).

Three training and awareness raising sessions were conducted throughout the academic year, always after school visits. The first training session aimed at how to browse the internet correctly, using the Microsoft Internet Explorer. Apart from a brief explanation of how to use the browser correctly, other topics were also explored. These included how to browse the Net correctly, several web browsing techniques, creation of folders, how to copy and move files and an introduction to the use of word processor (Microsoft Word). In these and other sessions an exchange of the teachers’ experiences in the educational use of the internet was encouraged. The aim was to foster good practice in the educational use of the internet. This would enable teachers to conceptualise and devise a new pedagogic methodology to be applied to a range of learning modes. Training in the use of electronic mail (e-mail) was initially addressed in the first session and further developed in the third session. The second session focused on guiding the teachers in the development of their school’s web pages, using Microsoft FrontPage Express. The aim was for teachers to learn how to use this software to maintain the web pages. The third session aimed at enabling a correct use of e-mail by using the Microsoft Outlook Express. Topics dealt with in this session

included a correct use of e-mail, how to send and access received messages and send attachments, among others.

Teachers were encouraged to share their experiences about the use of e-mail in the classroom. This sharing is one of the main goals of these sessions. It increases the motivation of the teachers, who begin to see how IT can actually be used in the school; it helps them to become more familiar with the software and the computers and it fosters communication between different schools and regions.

Throughout the 2002/2003 academic year and jointly with the Rehabilitation Engineering Centre in Information and Communication Technologies (Centro de Engenharia de Reabilitação em Tecnologias de Informação e Comunicação) training and awareness raising sessions were directed towards Special Educational Needs. Some of the available techniques and software were demonstrated, emphasising the tools built in the operating system (e.g., Microsoft Magnifier).

The sessions directed towards pupils were always conducted in a classroom context with the support of Netmobiles. The fact that these sessions were held in the classroom was highly valuable for the pupils since they learnt the basics of IT and the internet in the same physical place where they started their formal educational. Through these sessions the world of school opens up to the outside world, to a society of information and knowledge. Throughout this process the sessions were of a practical nature, thus favouring a “learn-by-doing” and “learn-by-playing” approach (education/entertainment or “edutainment”). The training and awareness raising sessions aimed at teaching how to browse the Net correctly (using Microsoft Internet Explorer), and how to use e-mail (Microsoft Outlook Express), word processing (Microsoft Word), and Paint software. Secure and safe internet surfing/browsing was always addressed and stressed. As always, the exchange of experiences and knowledge between schools through e-mail was encouraged.

Other types of sessions

Throughout the second stage of the Trás-os-Montes Digital/SCETAD – AE further training and awareness raising sessions were conducted. These were aimed at teachers and pupils of the second (year 5 and 6) or third (year 7, 8 and 9) education cycles and secondary schools (year 10, 11 and 12). The sessions were always supported by Netmobiles, thus enabling teachers and pupils to stay in their own schools.

Although the topics addressed in sessions with teachers and pupils were the same, namely web browsing, use of e-mail and an educational use of IRC, in the former greater emphasis was placed on the exchange of experiences to enable teachers to collectively rethink the methodology to be applied in their classrooms. The sharing of good practice towards an educational use of the internet was thus highly valued.

Bearing in mind a lifelong learning process, the project’s intervention area was widened to allow for the inclusion of the community at large. Training and awareness raising directed at the community in general was also held in the TMAD area. The main goal of such sessions was to make the ordinary individual aware of the potential of the computer and the internet as a source of information and knowledge and as a means of communication. In so doing the project contributed to the development of an information society in the TMAD area. Therefore, one of the noblest objectives of any higher education institution was accomplished – that of making knowledge accessible to the community at large.

Using Netmobiles, the research team participated in several events organised by the Town Councils, such as Book Fairs, Home-Grown Produce Fairs and Arts and Craft events among others. This enabled further promotion of the internet and its use amongst the community in general. Most of these events took place in the summer. It should be stressed that the presence of the Netmobiles and their teams at such cultural events was intended to raise awareness and to familiarise the communities with the computer and the internet. The response was very noticeable, with active participation of people from all ages and backgrounds at both the events and the sessions (Plate 1).

At this stage the project emphasis was placed on the training and awareness raising of the community in general towards the possibility of obtaining a Certificate in Basic Skills in Information Technologies (<http://www.diploma. umic.pcm.gov.pt>). This certificate is part of the national policy towards the introduction of widespread access to IT. The certificate represents an official recognition of the individual's acquisition of skills in word processing, internet browsing and the use of e-mail. Training sessions leading to the award of these certificates were held in the Citizen Bureau – Gabinete de Apoio ao Cidadão (GAC) – in the Town Councils part of the Trás-os-Montes Digital/SCETAD project.

Resources

Throughout the project some resources were developed to support teachers and pupils in their educational use of the internet. These resources aimed at filling any gaps highlighted in this area during the school visits and training sessions.



Plate 1.
An example of an awareness raising/familiarisation session aimed at the community in general

“Espiguinha”

From the first session held under the SCETAD–AEP project in 2000, the need to make web browsing easier for teachers in the TMAD area was felt. Therefore, an easily accessible site, named “Espiguinha” (www.espigueiro.pt/espiguinha) was developed. The site consists basically of a set of links to useful sites and/or services of interest to teachers and pupils, tutors and the whole educational community as potential users. This site was used by teachers and pupils in the participating schools as a starting point to the web and was accessed more than 560,000 times since its creation in September 2000. This figure is highly significant when compared with the total number of teachers and pupils in the TMAD area – 29,200). The site contains a series of links organised according to topics/areas of interest, including: “Teacher’s Support”, “Resource Centre”, “Christmas at Espiguinha”, “Carnival at Espiguinha”, “Father’s Day”, “Easter at Espiguinha”, and “Mother’s Day”. In creating the site/link “Teachers’ Support”, for example, the aim was to compile and gather a series of links covering the three major study areas of the first cycle (primary school): Portuguese Language, Mathematics and Social Studies.

Analysis of the server log data (Figures 4-6) confirms that the site has been accessed mainly by schools. This explains the reduced number of site visits registered in July, August and September, which includes the period of summer holidays, as well as the decrease on Saturdays and Sundays (Figure 5). As can be seen in Figure 6 the site was accessed more frequently during school hours.

The Barn of “Espiguinha”

The website “The Barn of Espiguinha” (Celeiro do Espiguinha) (Santos *et al.*, 2003, p. 137) which can be found at www.espigueiro.pt/celeirodoespiguinha represents an attempt to develop knowledge and IT skills, and has been crucial for support to teachers, pupils and parents throughout the educational process.

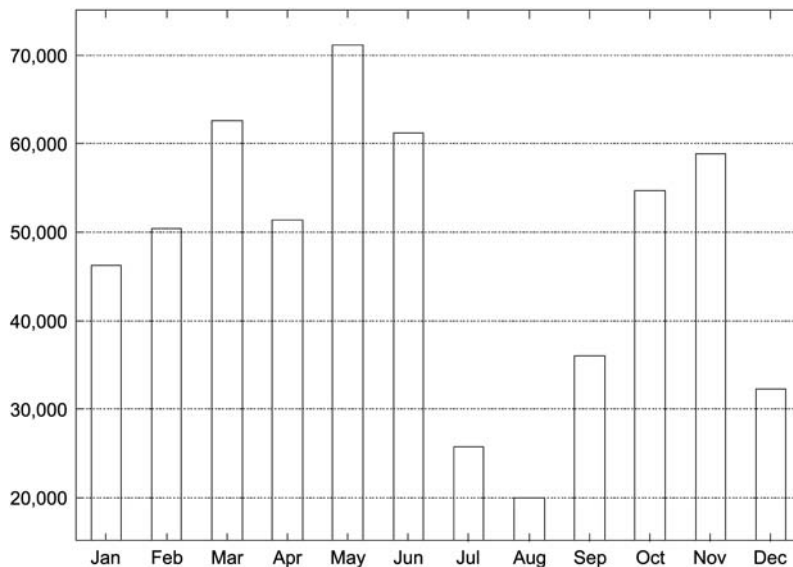


Figure 4.
Distribution of the number
of accesses throughout the
year

AP
60,2

122

Figure 5.
Distribution of the number
of accesses throughout the
week

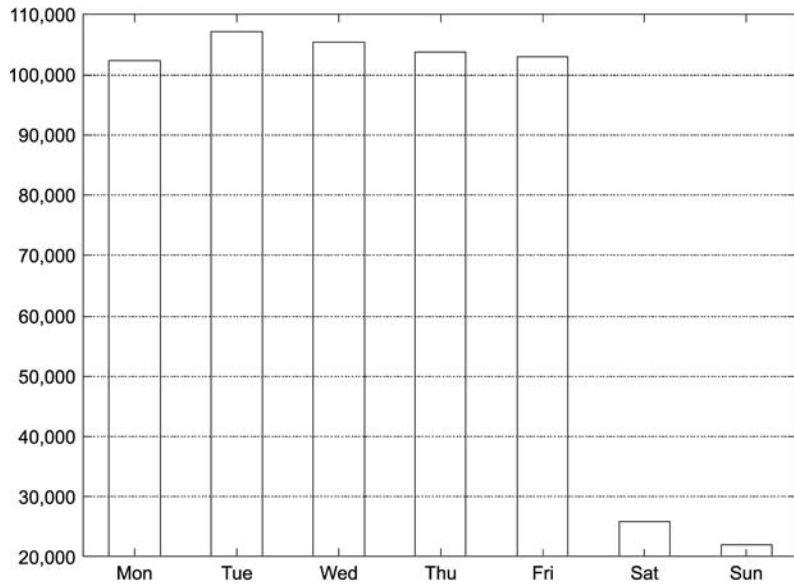
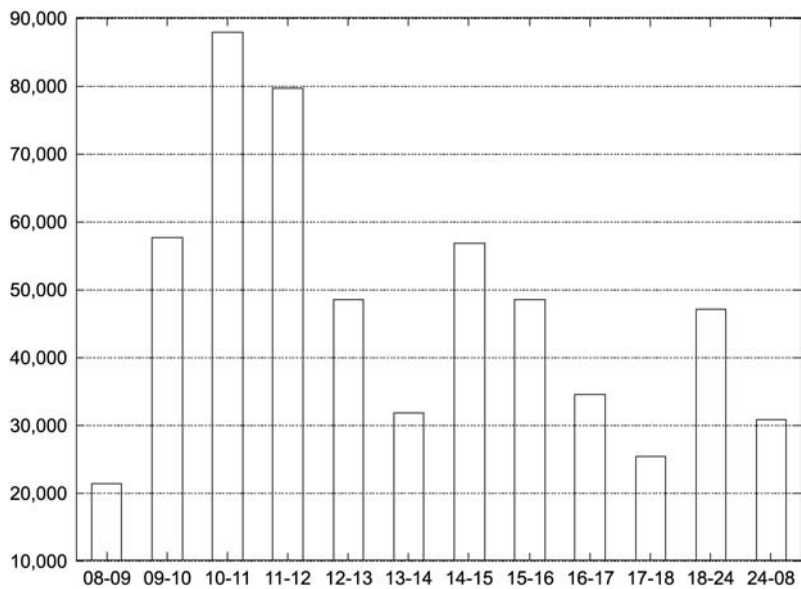


Figure 6.
Distribution of the number
of accesses throughout
the day



Barns were very important in the TMAD region in bygone years. They were used mainly to store cereals, which were a major part of the wealth of the region. The “Barn of Espiguinha” stores information rather than cereals, and offers a number of activities useful to teachers and pupils alike. The goal was to contribute content which would enable pupils to learn by playing. The entertainment is designed to be educational, so that the pupil might develop skills either with the help of the teacher in the classroom or with parents or tutors at home or elsewhere.

During the school visits and training sessions, time constraints to cover the whole curriculum were one of the most frequent reasons advanced by teachers for not using the computer and the internet. The site meets the requirements of the school curriculum set by the Ministry of Education, and renders the task of the teacher easier. The site offers several activities and interactive exercises that cover the various study areas in each of the four years of primary school teaching. It has become extremely useful to the teachers, who have since contributed to its updating (Resource Centre). The content contributed by the teachers includes a set of worksheets and exercises for the pupils.

This site is structured according to a series of topics of interest to the whole school community, organised in “pages”. There are pages directed at teachers, and pages aimed at pupils, which renders the navigation easier for both. The contents, the approach (pedagogic component) and the language meets the needs of the readership, either teacher or pupil. The pages intended for teachers and those targeted at the pupils may share content, but that content is likely to be described by distinct expressions, such as “exercises” or “games”. Whereas the word “exercises” draws the teachers’ attention, the word “games” appeals to pupils.

The Barn also allows for the creation of links of interest for the primary schools – like those in “Espiguinha”. To encourage the exchange of experiences, ideas, opinions, etc., among the virtual community, an opinion forum and the site “e-@migo” (is-@-friend) was also developed. Bearing in mind the targeted audience, i.e. children aged between six and nine years old, four characters were created. These characters, which appear throughout the site, represent the children’s imaginary world. Empathy between children and the characters is consequently established. The fact that the characters have different interests, personalities and nationalities attempts at making children aware that being different can actually constitute a positive and enriching experience.

Given the teachers’ contribution and feedback as well as the number of accesses, the site “The Barn of Espiguinha” can certainly be regarded as highly accepted by the school community. From November 2003 the site had been accessed more than 108,000 times (Figure 7), and the rate of access has been increasing steadily. The exceptions are the months of July, August and September during which the number of accesses falls sharply due to the summer holidays.

“B-A-B@ da Internet”

The handbook *The Internet ABC (B-A-B@ da Internet)* was written (Reis and Santos, 2002) to consolidate the topics dealt with in the training and awareness raising sessions. It presents the topics in a simple and clear way so that it may serve as a support tool for teachers, parents and tutors in their first attempts at using the internet. *The Internet ABC* is divided into three chapters: The World Wide Web, Electronic Mail and FrontPage Express. The programs discussed in the handbook can be downloaded free of charge, and were available at all schools involved in the project.

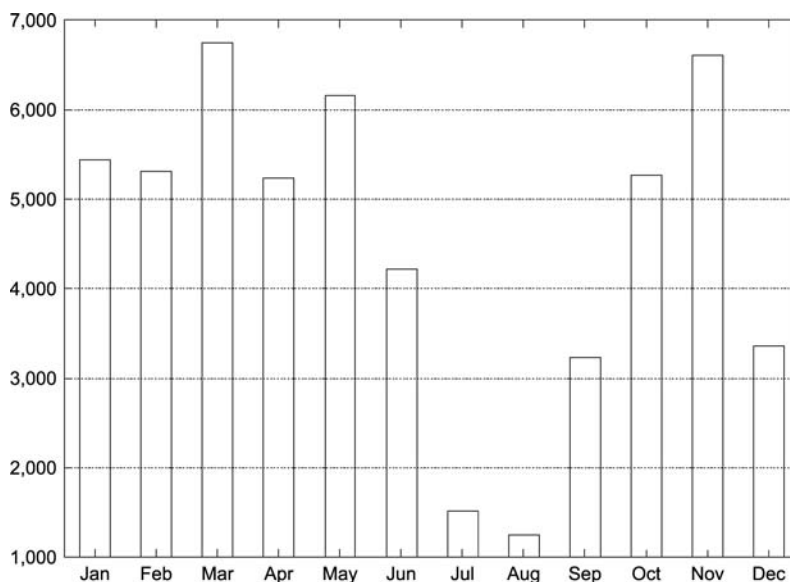


Figure 7.
Number of times the site
"Barn of Espiguiinha" was
accessed

The first chapter defines the internet, its services and some of the advantages of using it as an educational resource. Web browsing with Internet Explorer 5.0 is also explained with the help of pictures depicting various functions of the program. The chapter also includes examples, a set of exercises and a list of useful addresses. The second chapter deals with e-mail. It explains it clearly and concisely and teaches how to use it through Outlook Express 5. The topics are illustrated with pictures depicting the functions of the program. The chapter also contains examples and exercises, including the use of e-mail with Megamail services. The third chapter focuses on the use of FrontPage Express and the construction of web pages. It makes use of pictorial representations, illustrating the various commands, menus and steps that are necessary to create a web page. The chapter also includes a section on WS FTP.

The handbook was given to every teacher who attended the training and awareness raising sessions, and it can also be downloaded from the site "Espiguiinha".

Results

Given the goals of the Programme "Internet in Schools" and the aims of the project, namely to promote the use of computers and the internet in schools and society in general, uniformly across the TMAD region, the results of the research can be measured in terms of metrics such as the number of visits to the support sites and its distribution in time, rate of teacher participation, participation in the IT awareness raising sessions, number of certificates issued, and so on. This section discusses these metrics and the reality that they highlight.

"SCETAD-AEP" (1999-2000)

The results of the first phase of the project were highly satisfactory and teachers' participation was high. As shown in Figure 8, out of 276 teachers (from 72 schools and

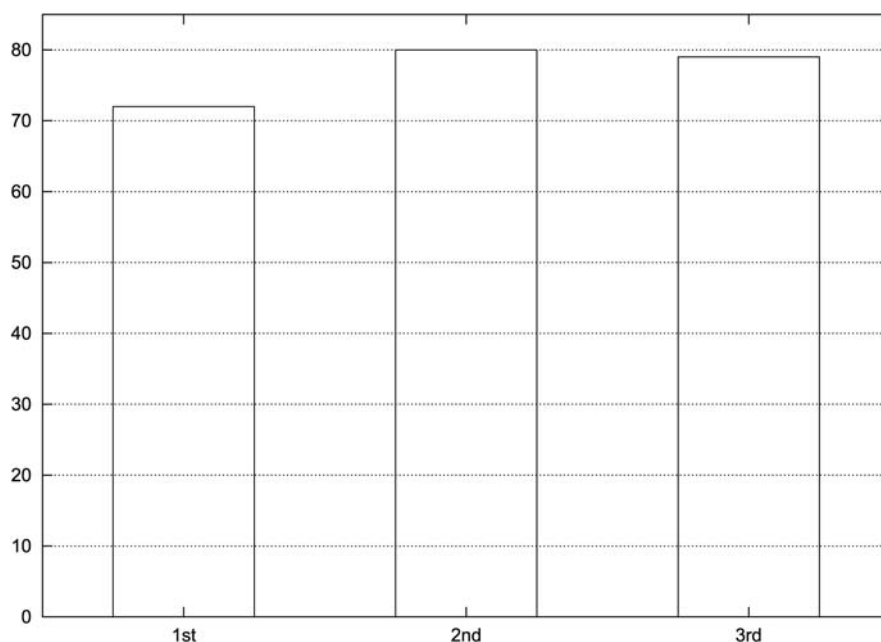


Figure 8.
Percentage of teachers'
participation in the three
training sessions

approximately 3,000 pupils) the rate of participation in the first, second and third sessions was 72 per cent, 80 per cent and 79 per cent respectively.

It should be stressed that in schools with less than four teachers (50 schools altogether), participation in the first session reached 95 per cent of overall teacher population. In the second and third sessions the figures were respectively 83 per cent and 71 per cent. Further details can be found in Figure 9. The decrease in the rate of teachers' participation may to some extent be justified by a high rate of teacher transfer from one school to another, frequently from one district to another. Such a decrease in the participation rate may also be connected with the impossibility of contacting teachers in all schools personally due again to this phenomenon of teacher transfer and consequent mobility. The smaller percentage of participation in schools with more than four teachers may be due to the impossibility of contacting and talking to each teacher individually during the first school visit. In schools with more than four teachers where this personal contact was possible adherence to the project reached almost 100 per cent. Lack of interest in the use of some technologies, the fact that some teachers were approaching retirement or may have been attending other training sessions/courses may also have had a direct impact on the rate of teacher adherence to the project.

Figure 9 is also representative of the high teacher participation rate from Schools of Teaching Through the Use of Media (Enseño Básico Mediatizado – EBM)[3]. In primary schools with less than four teachers, EBMs and Special Educational Needs teachers, the motivation and interest in the project was exceptional and evident right from the beginning. Such interest was partly due to the isolation, and the hope that IT (especially the internet web services, e-mail and IRC) would mitigate it. It should be pointed out that teachers in EBMs are used to working with some form of media (the

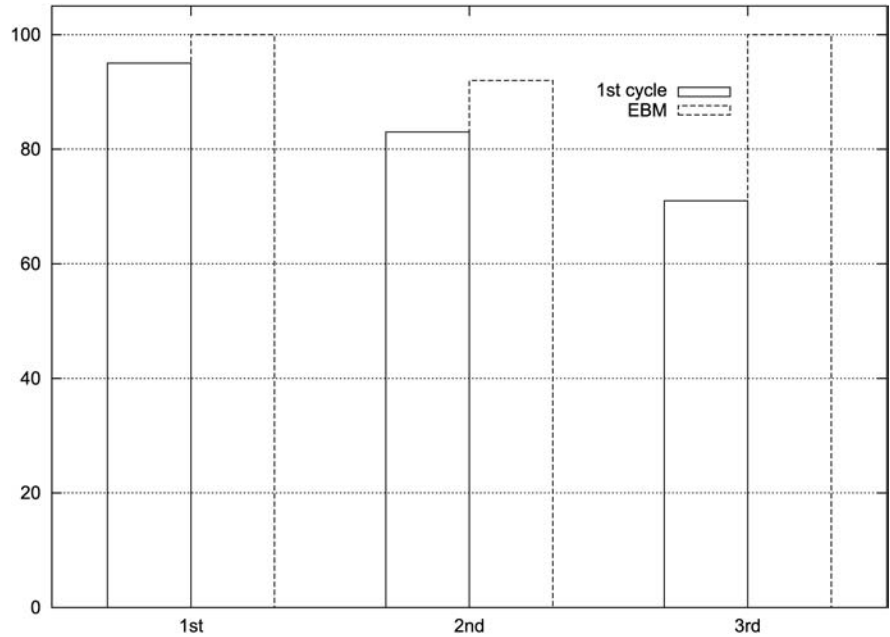


Figure 9.
Rate of teacher participation in the various training and awareness raising session in schools with less than four teachers

Television in particular) in their classrooms. Special Educational Needs teachers have experience in using the computer as a support and resource tool.

“Trás-os-Montes Digital/SCETAD–AE” (2001-2003)

The results obtained in the second phase of the Trás-os-Montes Digital/SCETAD – AE surpassed expectations in every aspect. A vast number of sessions were conducted: 449 training and awareness raising sessions in primary schools; 22 sessions aimed at teachers of Special Educational Needs in primary schools; 570 sessions aimed at primary school pupils; 71 practical sessions in schools of stages 2 and 3 and secondary schools. In addition, 1,955 technical-pedagogic visits to primary schools were also held.

Aiming at promoting, training and raising awareness towards the use of the internet by the community in general, six training and awareness raising sessions were conducted in the Department of Agriculture of Trás-os-Montes (Direcção Regional de Agricultura de Trás-os-Montes – DRATM), 24 in Administrative Departments (Gabinete de Extensão Autárquica – GEA), 132 in the various Citizen Bureaux (Gabinetes de Apoio ao Cidadão – GAC) and 17 in Town Halls (Juntas de Freguesia – JF) aimed at their respective personnel. The Netmobiles were present in 99 events (throughout the region) and 381 sessions aimed at the community in general, in which approximately 18,900 individuals participated.

In total 3,627 sessions were conducted covering the length and breadth of the TMAD region. These sessions, which were always supported by Netmobiles, were of a diverse nature: training and awareness raising sessions, promotion and advancement of the internet, among others. Attendance at the various types of sessions throughout the entire region totalled 34,799. These results are summarised in Table I.

Typology	Total number of training sessions	Total of people present
TS to teachers Primary School	471	4,499
TS to students Primary School	570	8,203
TS to teachers 2nd/3rd/Sec.	8	92
TS to students 2nd/3rd/Sec.	63	1,135
School visits	1,955	0
TS to DRATM employees	6	64
TS to "Agents" and "Intermediaries"	24	270
TS to community in JF	17	499
TS to community in GAC	132	1,182
TS to community	381	18,855
Total	3,627	34,799

Table I.
Summary of the training sessions (TS) results of the Trás-os-Montes Digital/SCETAD – AE project (2001-2003)

In the training and awareness raising sessions conducted in the GAC a Certificate in Basic Skills in Information Technologies was awarded to individuals from the general community. Altogether 1,005 individuals were examined and 830 certificates awarded. It should be stressed that 172 individuals were not awarded the certificate primarily due to their failure to provide the relevant documentation required for insertion in the data base of the government's Information Society Agency.

Conclusions

As far as we can tell, the methodology used proved to be highly adequate in the achievement of our goals. The transfer of the training process from the university campus to the schools and communities themselves allowed for a very high degree of teacher participation. The first school visit was vital, allowing for the creation of a strong feeling of empathy between the trainer and the teachers and pupils. This was undoubtedly one of the main factors leading to an easier and more enthusiastic participation from the teachers. The efforts to put theory into practice in the classrooms were rewarded by a quicker rate of acceptance of IT in the classroom.

The social role of the visits was important, and grew in proportion to the isolation of the communities being visited. The prompt availability of the trainer and the ability to support the teachers by telephone, mobile phone, fax, e-mail or any other means was also an important aspect.

The methodology discussed may represent a new concept in training and a new training model highly suited to regions sharing the characteristics of the TMAD region. The model is composed of two distinct parts: the training itself taking place in the teacher's school with his/her own class and the training taking place in an after-school environment with other teachers. During the school visits the teacher learns together with his/her pupils. An exchange of experiences between the various agents involved, namely teacher, pupils and trainer, and the establishment of a somewhat symmetrical relationship where learning is truly a bilateral process is thus enabled. The teacher is no longer the only and main repository and transmitter of knowledge, and becomes also the receptor of knowledge. It should be stressed that the first school visit aims essentially at making pupils and teachers aware of the potential

of using the computer and, in particular, the internet. The training given to all teachers is targeted towards the mastering of this technology, but also aims at encouraging the sharing of experiences between teachers from different schools, contributing to the establishment of knowledge and good practices in the educational use of the internet.

The Resource Centre (“The Barn of Espiguinha”) meets the pedagogic and scientific requirements set by the Ministry of Education, and has been elaborated with the aid of teachers from this school level, according to the guidelines published by the Ministry of Education (www.dgidc.min-edu.pt/curriculo/Programas/programas_1ciclo.asp). The number of contributions that the teachers have made with exercises and worksheets, as well as the number of accesses to the site demonstrates that this Resource Centre has proved to be an invaluable tool in the teaching/learning process. It enables learning in a pleasant and fun environment, where colour, image, sound and movement predominate. This site has proved crucial in its support of primary school teachers and pupils in the TMAD region. Teachers themselves, as well as pupils, parents and/or tutors have already contributed with resources and additional content that has been added to the site.

The use of the internet, namely of web services and e-mail, was addressed through various training and awareness raising sessions (supported by Netmobiles) directed at the community in general. Such sessions enabled many individuals in the region to have their first contact with and experience of IT. This constitutes a sound and valuable contribution in terms of awareness raising, training and development towards IT in the region.

Several factors played a very important role in the achievement of these goals:

- the training team was always present or could be easily contacted;
- both teachers and pupils contributed with material and resources;
- there was a continuous exchange of experiences; and
- a vast number of individuals and entities participated in the project.

As a result, the process appears to have become self-supporting, and there is already some evidence that IT would continue to be used in the schools and communities even if our support discontinued at this point. Nevertheless, as is well known, education is a complex, lengthy and gradual process, and persistence and more fieldwork may well be required before the educative use of IT gathers sufficient momentum throughout the entire TMAD region.

Notes

1. Work partially supported by POSI, European Union and FSE.
2. See also www.ine.pt, the site of the Portuguese Institute of Statistics (Instituto Nacional de Estatística).
3. Schools of Teaching Through the Use of Media (“Ensino Básico Mediatizado” – EBM) started in the decade of 1960 to help bring compulsory education to remote rural areas or highly populated suburban areas where schools were overcrowded. Television, then a relatively new technology, was introduced in teaching, and the initial broadcasts were gradually replaced by pre-recorded video tapes. The EBM is probably best described as a distance learning system with the presence of a learning facilitator - the teacher/tutor.

References

- Carneiro, R. (2001), *Fundamentos da Educação e da Aprendizagem – 21 Ensaios para o século 21*, 2nd ed., Sodilivros, Lisboa.
- Dewey, J. (1900), *The Child and the Curriculum/the School and Society*, combined ed. 1900/1956, The University of Chicago Press, Chicago, IL.
- Lemos, J. and Silveira, T. (2003), *Autonomia e Gestão das Escolas – Legislação Anotada*, 4th ed., Porto Editora, Porto.
- Marques, R. (2000), *Dicionário Breve de Pedagogia*, Editorial Presença, Lisboa.
- Reis, M. and Santos, G. (2002), *O B-A-B@ da Internet*, Universidade de Trás-os-Montes e Alto Douro, Vila Real.
- Reis, M., Santos, G., Teixeira, C., Vieira, N. and Peixoto, S. (2002), “Internet as a learning tool in the ‘Trás-os-Montes e Alto Douro’ region”, *Proceedings of the International Conference on Information and Communication Technologies in Education, Badajoz*, Vol. 3, pp. 1494-8.
- Santos, G. and Reis, M. (2001), “Formação de professores de Trás-os-Montes e Alto Douro na utilização da Internet – 1ª fase SCETAD – AEP”, *Actas da II Conferência Internacional de Tecnologias de Informação e Comunicação da Educação, Desafios 2001, Challenges’ 2001*, Braga, Vol. 2001, pp. 861-71.
- Santos, G., Reis, M., Rodrigues, F., Cordeiro, M., Ribeiro, S. and Pinto, P. (2003), “Centros de recursos educativos: o exemplo do ‘Trás-os-Montes Digital’”, *Actas Challenges 2003, 5o SIII*, Braga, pp. 13-148.
- Savioz, R. (1956), *Georg Kerchensteiner*, Chapter 10, Livros do Brasil, Lisboa, pp. 267-83.

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