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13. TECHNOLOGICAL EDUCATION

The Issue of Information Retrieval Via the Internet

INTRODUCTION

This chapter focuses on what pupils know about the information they retrieve on the Internet and about what is at stake in the learning process that teaching and especially technology education have to recognise. Information is considered as a major element in personality construction giving the activity of information retrieval on the Internet a specific status in the access to knowledge.

The perception pupils have about the information retrieved on the Internet is examined by means of a questionnaire. This questionnaire gives prominence to the existing confusion about the quality of the information that can be consulted on the Internet and especially on the Wikipedia website. This phenomenon justifies the necessity of investigating information retrieval within technology education.

CONTEXT AND THEORETICAL APPROACH OF THIS STUDY

It is frequently said that children who have grown up with the Internet have no trouble mastering the use of computer systems. And yet, the difficulties quite young pupils (around 11 years old) are often confronted with while doing information retrieval on apparently simple subjects can be very surprising. Before reporting on the research project, it is important to investigate further the subject especially since computer activity is a relatively frequent activity undertaken by young people. Initially, we will review how access to information plays a part in personality construction, particularly if it is via the Internet and with this perspective in mind, we will consider how the situation is in the education system, from the point of view of both information retrieval as education technology and as a subject taught in technology education.

Information on the Internet and Personality Construction

It is obvious that access to information as a source of learning and knowledge constitutes a major part of personality development. The psychological instruments (Vygotski, 1985) to which the Internet gives access can only contribute to the personality construction process. According to Simondon (2005), information lies at the core of the individuation process linking information, communication and formation. Admittedly, the fact that the information is available on a declaration basis,

does not guarantee the learning of the concept nor of the underlying notion, but the thinking process necessary for comprehension and the language communicating the information are indistinguishable. In any case whether the information is right or wrong can modify, complete, or increase the knowledge of a student. From this point of view, the significance of the information is essential as it contributes to cognitive development. Whether it is widespread or not is not to be taken into consideration in this process. This missing concept has prevailed over the Wikipedia project where control by many people does not necessarily guarantee the nature of its intent.

Information on, and from, the Internet: the Example - Wikipedia Website

In 2001, Jimmy Wales and Larry Sanger using wiki technology created the Wikipedia website (*http://www.wikipedia.org/*) which belongs to the Wikimedia foundation. This website was first conceived in English and then, very quickly a French version became available. In the beginning, the designers saw what this technology could provide on the Internet - a free universal, multilingual encyclopaedia that was written collaboratively. This notion is displayed on the home page of the Wikipedia website:

   "the free encyclopaedia that anyone can edit"

The cofounder Jimmy Wales had planned that Wikipedia could reach a quality level at least equivalent to that of the Encyclopaedia Britannica. But the original aim of creating a freely distributed encyclopaedia that anyone can improve makes it the basic strength of Wikipedia but also its great weakness. Articles in Wikipedia are written in a collaborative way, which means that the contributions can come from any person who wants to create or modify web pages under one control - its own self regulation. The intention, which is in itself praiseworthy, can in fact allow any assertion to be published, and as long as nobody else decides to modify it, it can be a total nonsense. The anonymous nature and the lack of control provide the conditions necessary for a quickly evolving website but it does not allow any reliable guarantee on exact direction and meanings. Despite the "pseudo" supervision by the virtual community, mistakes can very well slip by and only a specialist would recognise the errors, even though Wikipedia warns the users by announcing on the website that one of the characteristics of Wikipedia is to be based on mistrust: all wikipedians are encouraged to be careful and critical about the quality of other participants' contributions[1].

   No media can escape the problem of information control and the only known defence of traditional editing is the one the cofounder Larry Sanger took into account when launching the Citizendium project in September 2006 (http://en.citizendium. org/wiki/Main_Page). This project is similar to Wikipedia, the difference being calling on experts to guide the public when writing articles. These experts check the articles, as their aim is to avoid mistakes that are not systematically controlled on the Wikipedia website. It is therefore possible to say that quality editing prevails over speed editing.

   With Wikipedia, we are really able to see the importance that pupils give to the quality of the information retrieved via the Internet because there is no editorial

line valid on many sites, and not only on Wikipedia but furthermore on all personal sites and blogs. Their preliminary knowledge does not always give them the means to separate the wheat from the chaff at this key stage of human development: childhood and adolescence. It is therefore not surprising that the education system needs to have a particular interest in this matter.

What are the Issues Relating to the Internet and the Education System?

The distance between access to and learning of knowledge gives a crucial aspect to the matter of education. Access to knowledge can only constitute a first step in the learning process, but the initial access ensures a first meeting with the knowledge itself but not necessarily with its acquisition. Therefore, access to different media through which information is transmitted cannot be imposed. If documents uploaded onto the Internet are to be submitted to the critique of all, then this requires an education in critical evaluation and becomes a fundamental educational matter. It comes down to giving each and everyone the means to judge the quality of documents transmitted through the Internet.

Numerous injunctions from the French National Ministry of Education lead towards the integration of ICT in the overall teaching of every subject. In general, this policy emerges through impact initiatives or initiatives related to technology education. On a European level, most initiatives fall within this framework[2]. Each in their own way brings an answer to the problem of ICT integration to education (La Borderie & Perriault , 2002). The Educnet[3] website, launched in 1998, gathers for example reference texts on the matter, examples of teaching practices, and lists of resources. In some way, it represents the showcase of governmental educative measures and is available through the Ministry website: www.éducation.fr. The B2i (Computer and Internet Certificate) and the Educnet projects are part of initiatives organised or favoured by the French National Ministry of Education.

The educaunet program. Educaunet is part of a European initiative supported in France by the Clémi[4]. Within the Ministry, the Clémi is a centre in charge of conceiving and developing educational programs concerning the media. The aim of this program is to develop education as a means of defence against the risks of accessing 'wrong' information on the Internet. Solutions integrated into computer systems are available and can be transferred to the computers, the selection of which can be watched (filtering software, authorised access, browser security system, etc.). This 'human-machine' coupling (Deforge, 1985) is not the one that has been selected by the Educaunet program. The opposite approach has been chosen. It focuses on favouring education by warning pupil users of the possible risks, while teaching them how to protect themselves whenever possible. It hopes to avoid the trauma of shocking pictures but also to allow them to seize the originality of this kind of communication where you have trouble identifying the persons you are dealing with, to become self-sufficient, critical and responsible, and able to appreciate the resources of the Internet while skilfully escaping its pitfalls[5].

The éducaunet program is mainly centred on prevention and can only function if young people are being supported. The list of risks as well as the list of answers is a long one (Chenevez, 2001). The reasoning used in the éducaunet program seems interesting as it shows the connection established between education and consulting websites, from the skills that the pupils are missing to be able to use the Internet critically as well as a cautious adult, who is, to some extent, able to protect him/herself against harmful, improper or illicit contents, fraudulent, deceiving, and false practices or manipulative behaviours which can hide amongst the unquestioned resources of the network, and are not always easy to locate.

The B2i: computer and internet certificate. While other training institutions (some of the Greta[6], IUT, Universities or private organisations) or other countries (for example Italy, Austria, Ireland, Norway, Sweden) have already adopted the PCI (Computer Driving Licence) originating from associations[7]; the National Education in France has chosen to set up a Computer and Internet Certificate, the B2i. It was created in 2000 in order to validate the skills acquired by pupils in primary school (level 1) and in secondary school (level 2) and the abilities mastered in the computer field of ICT. This certificate is not a qualification but an attestation. A Computer and Internet Certificate for teaching, the C2i2e was planned for teachers.

Level 1 validates the following:

The pupil can use the information and communication technologies available in school in a self-sufficient and well reasoned way; to read and produce documents; to retrieve information that is useful; and to communicate through electronic mail. To be able to do so, the pupil has to have command of the first basis of computer culture in its technological and citizen dimensions.

Level 2 validates the following:

The pupil has command over all the skills covered in level 1 of the certificate. Besides, he/she is able to control usual computer tools in order to produce, communicate, get informed and organize his/her own documents. He/she, in particular, is able to organize complex documents consisting of tables, formulas and links with other documents. In order to proceed, he/she has to know the elements of computer culture directly useful to him/her (specific vocabulary, essential technical characteristics, and methods for data processing through computer systems). He/she can perceive the limits relative to the use of nominative information as well as the limits determined by the respect of intellectual property.

The teacher in charge of his/her class in primary school is responsible for the B2i level 1, while in secondary school (although recommendations suggest that any teacher can undertake the work) in reality, the technology teacher often takes care of it, as certain computer technology units of the technology education program are the same as the skills acquired in the B2i. However, using the Internet is also part of accumulation, classification, and dissemination of information activities.

Internet: a subject taught in library studies. In secondary school, the work of librarian teaching staff in the library and document centre (CDI) is mainly of an educational nature and has to be conducted in close collaboration with the teachers. Their actions contribute towards increasing the use of books and in a more general fashion, towards information sources. To this end, they favour the introduction of pupils to reading graphic and audiovisual documents and the use of the computer, in collaboration with the teachers within the framework of the programs. But, nowhere is it stated a detailed description, with a teaching programme, as to what the librarian staff really has to teach.

Information retrieval in various subjects. Even in school, information retrieval allows activities to be set up rather easily without a clear learning process. It certainly presents numerous challenges. However, many sites, amongst which 'educnet' can be found, offer to take into account requirements to evaluate the information which tends to show that this assessment is not obvious but requires a special learning process. In order to know if information can be trusted, this method relies on a set of questions. While following this method, the first question to ask is: 'Who?' This question focuses directly on the source of the information. To be able to identify this source represents a major element concerning the assessment on the reliability of the information. When the author is identified (whether a person or a legal entity), it becomes possible to think about his/her competences. The TLD (Top Level Domains) give us information on the editor: .org, .net indicates an association or a non profitable organisation. The .com TLD concerns websites dedicated to the Internet network itself.

The second question this method suggests is: What? It concerns information accuracy. In order to answer this question, we need to check if the information found is just a collection of facts or whether it is attested and well argued, and whether it is bringing the information closer to the kind of audience the site is aimed at (for example, specialist; initiated; any kind of audience). In fact information found on a website visited by specialists and elaborated by specialists that has links to other websites where we will find this information, is likely to be more accurate than information that is published by an individual, even if the latter information is as valuable as any other.

The third question: 'Where?' relates to the origin of the information. With reference to legislation for instance, it seems appropriate to choose first, information provided by a website located in a geographical area connected to the required information. Generally, the website address is useful, as it brings valuable information as to the origin of the website. However, it is useful to know that the country code (for example TLD like .fr or .uk) is not necessarily the code of the country where the person has published the website, but the TLD linked to the server.

The fourth question relates to time: 'When?' It is necessary to know how frequently the information is updated. Of course different kinds of information require different frequencies of updates. It is therefore necessary to check the date when the article was written and, if it is the case that the article could be outdated, it would be appropriate to look for a more recent one.

For the fifth question: 'How?' It is necessary to investigate how the information is put at the disposal of the user, how the document is structured and if the information is written or backed up by figures. If we are dealing with written information, then we must look under what kind of form this information is offered: whether it is on an assertion basis, to assess something or to be controversial in order to start a debate.

Finally, the purpose of this method is to get us to question the reasons why the website offers this information. This is the question: 'Why?' What is the aim of this website? Does the author provide indicators about the purpose of the information he/she is publishing on the network (such as passion, personnel training, altruism, proselytism)? Is the information free? Is there advertising on the website? If so, is it connected to the information you are looking for? Is the advertising clearly separated from the content of the documents?

This method suggests a certain number of questions we have to ask ourselves, in order to assess properly the credibility of the information found, whatever the subject studied.

Information retrieval and technological education. The fact that information retrieval on the Internet is useful in all subjects taught makes it difficult to identify a vertical continuum within technological teaching. The fact that there are constant fluctuations concerning the place of information technologies in the teaching programmes in secondary school bears witness to this problem. Even though there are many opportunities to undertake information retrieval, it is somehow difficult to know how it is taught exactly and if the right idea of the knowledge about information retrieval is passed down by the teachers.

Technological analysis of information retrieval activity. Kolmayer (1998) considered that the information retrieval situation is a problematic task in which the cyclic aspect of information retrieval (Dinet, Rouet, & Passerault, 1998) in the database has been observed by different writers; in particular in the cognitive model of Guthrie (1988) consisting of 5 phases (formation of objectives, selection, information extraction, integration, and recycling) and the evaluation-selection-treatment process from Rouet & Tricot (1998). One of the most significant elements of this cyclic aspect consists of the modification of the objectives currently used (Marchioni, 1992 ; Osmont, 1992 ; Villame, 1994).The cognitive processes of planning, control, and regulation (Rouet & Tricot, 1998) that are brought into operation during the activity of information retrieval in formalised databases, remain true with the use of the Internet. But, pupil activity differs from expert users' activity in a variety of aspects (Brandt-Pomares, 2003).

Information retrieval techniques and therefore the technological knowledge relating to information retrieval on the Internet is a matter of using data processing equipment, such as a computer, browser software, and the Internet network. A particular analysis was made of this process and it has enabled the elaboration of expert knowledge (Brandt-Pomares, 2003) linked to the instrumental origin of the

tool (Rabardel, 1995) and therefore to the acquisition of research mode techniques in implementation schemes, tool choices, selection in the result lists, data base on which the research is based, of hypermedia browsing, of website notion and network referencing. Thirteen year old pupils frequently use the Internet, despite having evaluated the tool only through experimentation and having limited perception as to the potentialities of that tool. They underestimate what the tool can do (Norman, 1988, 1993; Leplat, 2000). It justifies the fact their practices must be enriched and widened in relation to keywords (Blondel, Schowb & Kempf 2001), multiple requests (Hôlscher & Strube, 1999), and regulation processes (Brandt-Pomares, 2003) as students turn to these less than other users during research retrieval via the Internet.

Analysis of pupils' activity. Retschitzki & Gurtner (1996) underline the powerful motivation seen in most children when they spend time on computer activities. This is easily verified in the classroom when observing how speedily pupils leave their desks to settle in front of the computer screen. When 13 years old pupils are placed in an information retrieval situation, the link between what they find and what they are looking for, is based on an evaluation of the nature and the relevance of the information they have access to. The information is not only linked to the implementation of the tool, if a number of elements are intrinsic to the artefact, others are not depending on it, for instance, the wording of a website address is dependant on the Internet organisation (official websites, personal websites, trademark websites, etc.). This wording can give indications of the sources of the retrieved information. But the different sources do not seem a determining factor in pupil practice. It would seem that only the existence of the information gives it a probative strength. The natural tendency to believe what is asserted (Goffard & Goffard, 1998) belongs to the credulity of childhood. Children first believe the propositions that are made are true, before they can step back and consider them, something which is favoured by education, as children do not spontaneously question the nature and sources of information. The fact that pupils consider the information seen on the Internet to be true, leads us to think that it is difficult for them to discriminate between right and wrong information. This is a worrying fact as anybody can create their own internet website and publish it after writing any information - true or false. Some websites can give free access to any kind of information even if it is illegal. Besides which, anybody can modify the content of some websites or articles, as we have seen with Wikipedia which is not the most unreliable website there is. Information retrieval is very much linked to the actual subject of the retrieval, to the informative nature of what is retrieved. Regarding this, we are able to underline that the efficiency of the retrieval made by pupils, depends greatly on their initial knowledge (Rouet & Tricot, 1998).

It is therefore important to investigate the hypothesis that 11 years old cannot see the difference between various information sources and that they hold information published on the Wikipedia website to be true, when using the Internet to retrieve information.

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EMPIRICAL RESEARCH

A survey of 47 pupils in two classes of 11 years old has been conducted: the aim being to verify the hypothesis that:
– pupils go on the Internet to undertake information retrieval;
– pupils do not make any distinction between different sources of information;
– pupils believe that information published on the Wikipedia website is true.

Creation of the Questionnaire

The questionnaire contained 13 questions. The aims of these questions are detailed below:
– Question 1: Do you know when you are connected to the Internet?
This question allows us to know if the pupil knows at which exact moment, he/she is on the Internet or if he/she is on a local system (CD-rom, hard disk, local network) and to know if he/she is able to identify the information source he/she is consulting.
– Question 2: You have to do some research to trace the history of boats in order to give a presentation in your technology class. How are you going to proceed? Give number 1 for the means you will use first, number 2 for the second way, number 3 for the third way etc.
This question will allow us to know which research methods the pupils are going to prioritise.
– Question 3: Give a score from 0 to 10 if you think the information you have found will be right in any case.
This question will allow us to know if the pupil gives more value to one source of information rather than another.
– Question 4: Do you think that what is written on the Internet is verified, and if so by whom?
Here we want to examine whether the pupil thinks that the information available on the Internet is verified and if so by whom.
– Question 5: Do you distinguish between something you read in a book and something read on the Internet? If you do, what difference/s do you identify?
This question will allow us to examine if pupils give more credit to books and if they see a difference between what is written in a book (which is then not easily modified) and what is written on the Internet.
– Question 6: At the end of your presentation, will you be able to create a website or a blog on boat history?
This question will allow us to examine whether the pupil is conscious of the fact that he can himself publish a website on a subject he has little knowledge about. If the pupil answers "yes", he/she should then know that what is said on the Internet is not necessarily written by experts and that some of the information is wrong. However, there is a risk that the pupil will interpret this question in another way "will you be able to" as it is a rather wide concept.

- Question 7: Have you heard of Wikipedia? If you have, can you write an article on Wikipedia? Can you modify an article on Wikipedia?

The aim of this question is to give us information on what the pupils know about Wikipedia.

- Question 8: Do you know who can create a website?
- Question 9: Do you think a company can create a website?
- Question 10: Do you think an association can create a website?
- Question 11: Do you think anybody can create a website?

Questions 8 to 11 will allow us to know if the pupils are aware who is publishing the information on the Internet.

- Questions 12: While looking at the document, tell me how many hulls a catamaran has and tell me (if you can) in what year the catamaran was invented.

How many hulls ? Year of invention?

- Question 13: Give a score from 0 to10 (0 meaning I am not sure at all about the information I found to 10 I am absolutely sure about the information I found). If you want to explain why you gave this score you can do it below.

The document to be consulted in question 12 is a screen copy of the Wikipedia website concerning the definition of the catamaran.

These two questions will allow us to see up to which point the pupils believe what is said on the Internet and if they stop their information retrieval as soon as they have found the answer to their questions.

Analysis of Answers to the Questionnaire

In answer to the first question, 42 pupils have indicated that they knew when they were connected to the Internet. On the other hand, out of those 42 pupils, only half were able to give an answer that indicated that they know when they are actually on the Internet. In fact, only 21 pupils really know when they are connected to the Internet (cf. Table 1).

Table 1. Answers to question 1

Question 1: Do you know when you are connected on the Net?	
Yes	No
21	26

Answers to question 2 are gathered in Table 2.

According to the pupils' classification, the results have been graded in the chart and each result has been multiplied by a value according to this classification (6 points for the 1st method, 5 points for the 2nd method, 4 points for the 3rd method, 3 points for the 4th method, 2 points for the 5th method, 1 point for the 6th method).

Table 2. Answers to question 2

Question 2: You have to do some research to trace the history of boats in order to give a presentation in your technology class. How are you going to proceed? Give number 1 for the method you will use first, number 2 for the second way, number 3 for the third way etc.						
Position	*1st*	*2nd*	*3rd*	*4th*	*5th*	*6th*
Web site	15	21	9	1	1	
Wikipedia	14	13	12	4	3	1
Books	9	7	13	10	5	3
Parents	4	5	8	17	10	3
Friend	5	1	5	10	13	13
Blog				5	15	27

The results are:

    Internet websites: 236

    Wikipedia: 216

    Books: 184

    Parents: 155

    Friends: 124

    Blogs: 72.

   The results show that pupils mainly use the Internet for their research work. Table 2 and the previous results underline the fact that pupils favour information retrieval via the Internet (Internet websites then Wikipedia) rather than research in books (books or encyclopaedia). Next we find information given by parents and friends used and lastly the pupils' research on blogs.

   Results to question 3 are gathered in table 3.

Table 3. Answers to question 3

Question 3: Give a score from 0 to 10 if you think the information you have found will be right in any case											
Scores	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Books					2	2	1	3	10	9	20
Internet	1	1	2	1	1	1	1	8	8	11	12
Wikipedia	1		1	1	1	6	5	3	5	12	12
Parents	1		1	2	1	10	4	11	9	2	6
Friend				3	5	10	7	6	4	9	3
Blog	16	6	10	4	1	3	2	2	1	1	1

The average scores given by this chart are:

    Books: 8.6

    Internet websites: 7.7

    Wikipedia: 7.6

Parents: 6.7
Friend: 6.5
Blog: 2.3.

These results prove that pupils are really sure of the information they found, when it was found in a book rather than on the Internet. They are also rather confident in the answers given by their parents or their friends while they have little confidence in the results of researches from blogs.

The results to question 4 (cf. Table 4) allow us to see that 18 pupils think that what is said on the Internet is verified. In the second part of the question, when asked "who verifies the information published on the Internet?" 6 answers show that pupils do not know who verifies the content of the web pages. 4 answers concern the 'owner' of the website. In other answers we find: teachers, parents, parental guidance, computer specialists or the police. We notice a certain confusion in the pupils' minds.

Table 4. Answers to question 4

Question 4: Do you think that what is written on the Internet has been verified?	
Yes	No
18	29
If it has, by whom?	
I don't know	6
The website owner	4
Parental guidance	2
Parents	2
Teachers	2
Webmasters	1
The police	1

It is possible to group the answers from Table 5. We can see that a little fewer than half the pupils note a difference between what can be read in a book and what can be read on the Internet. Among those 22 pupils differentiating between what is written on the Internet and what is written in books, 12 seem to think in the same way as one who wrote the following answer:

"What is said in a book is necessarily right, and you can't be sure of the result of what is on the Internet."

It must be said that 3 pupils answered "information found in books and on the Internet are not the same" and two of them answered "that there are less explanations in a book than on the Internet".

To the question n°6, at the end of your presentation, will you be able to create a website or a blog on boat history? 25 pupils think that they will not be able to create a website. But as we had anticipated, this question can have resulted in this kind of answer for reasons we are not really able to distinguish. Actually some

pupils seem to have answered that they could not publish on the Internet because of lack of appropriate skills. The pupils have thought that they did not know enough on the history of boats to create a website on this subject which is not what we were trying to find out. It is therefore difficult to interpret their answers to this question. We note once more the intricacy between technical questions of publishing on the Internet and the nature of the information to be published itself.

Table 5. Answers to question 5

Question 5: Can you distinguish between something read in a book and something on the Internet?	
Yes	23
No	24
If you answered yes, what difference/s do you think there are?	
In the book, it will be more right	12
Not the same information	4
There are less explanations in books	2
Books can't lie	2
Books are more serious	1
The writer has been through enough effort to write the book	1

Responding to the 7th question (Table 6), 25 pupils knew of the Wikipedia website. On the other hand, 15 children amongst them (meaning a majority) stated they could not modify or create an article on this website. The analysis of the answers to questions 8, 9, 10 and 11 (Do you know who can create a website? Do you think a company can create a website? Do you think an association can create a website? Do you think anybody can create a website?) allows us to find out that 33 pupils are able to express that they know who can create a website. On the other hand, 46 pupils say that a company or an association can create a website, but only 29 pupils are positive that anybody can create a website. Finally, a large number of pupils (18) are left who seem to believe that individuals cannot create a website.

In answer to the 12th question, Table 7 shows that 28 pupils answer that catamarans have two or three hulls (from what they could read on the screen print of the Wikipedia web page), 9 said that catamarans have three hulls and 10 said catamarans had 2 hulls. Concerning the year when the catamaran was invented, all the pupils answered that it was invented in 1700, whereas the text indicated that the English pirate and adventurer William Dampier was the first one to describe a catamaran around 1690.

Concerning question 13, the answers of the 47 pupils show that they consider the information they found to be right. They are almost sure regarding the number of hulls and completely sure regarding the invention date. As it happens, the total number of answers comes to an average of 8.4 (from 0 "I am not sure at all about this information" to 10 "I am completely sure about this information") while 25 pupils give a score of 10. Regarding the invention date, 27 pupils give a score of 10 and the total average of the answers is 8.3.

Table 6. Answers to question 7

Question 7: Do you know Wikipedia?	
Yes	25
No	22
Can you create or modify an article on Wikipedia?	
Yes	10
No	15

Table 7. Answers to question 12

Question 12: How many hulls are there on a catamaran?	
2 hulls	10
3 hulls	9
2 or 3 hulls	28

Synthesis of Results

The pupils' answers to the questionnaire have allowed us to know first of all (Question 1) that not all pupils are able to understand the difference between documents consulted directly on line on the Internet or documents consulted in other media, such as cd-rom, local network, and local copy.

Observing questions 2 and 3, it is obvious that pupils favour research on the Internet more than research in books or encyclopaedias. Even so, and that makes the results rather reassuring, they give more credit to a result found in an encyclopaedia than to a result found on the Internet. This proves that they can see a difference, even though it is difficult to define the nature of this difference. Perhaps a false link is made between credibility and the effort required to retrieve the information. It is rather strange to note that numerous pupils (29/47) think that what is written on the Internet is not verified, while pupils trust in the majority of the information given on the Internet (cf. Table 3, score 7.7/10). This means that a certain number of pupils know that the information is not verified but despite knowing this, still believe in it. We have previously noticed that it was very difficult to make use of answers to question 6. However, this question, or rather the way it was answered, attests once more to the intricacy between the nature of published information and the technology used to publish it.

Considering Wikipedia, on average, pupils will trust this website, despite a number of pupils knowing that information can be modified or created on Wikipedia (10/47 cf. results to question 7), (cf. average score of 7.6/10 obtained from Table 3, average score of 8.3 and 8.4 obtained on Question 13.)

CONCLUSION

Although we had a limited number of questionnaires, the results analysis allows us to write that the hypothesis stating that pupils use the Internet to do information

retrieval is verified, as 32 pupils out of 47 use the Internet (Wikipedia or other websites) in first or second position when asked which means they would use first to prepare a presentation (cf. answer to question 2).

Our second hypothesis concerned the fact that pupils would not be able to distinguish between information sources. Relying on the results of questions 3 to 5, we can say that this hypothesis is not really verified, which is rather a reassuring fact even though it does not relate to all the pupils. As a matter of fact, we notice that pupils give more importance to information that is not provided by the Internet. They also know (a large majority) that information on the Internet is not always verified. Moreover, pupils tell us that they do not find the same information in books or in encyclopaedias but grant more importance to the content of books. On the other hand, concerning the third hypothesis saying "pupils think information published on the Wikipedia website is true", we can say this hypothesis is verified. As a fact, when looking closely at the results related to question 3 or to question 13, we are able to say that pupils trust the results coming from this website despite the way in which editing occurs.

In fact, pupils have a correct intuition that all information is more or less the same, but are not sufficiently equipped to find out from the information they have access to, via the Internet, the one that they can identify as more trustworthy than any other. When looking at the results of the questionnaires, it seems important to warn pupils about the risks they are taking while retrieving information on the Internet and in particular on the Wikipedia Website. The quantity and variety of information available on this website does not allow them to realise that the people who have written the articles published on this website, are not necessarily expert and competent in the subject but it does not make them question the quality of the information published on this website.

Debate about Technology Education

Involving pupils in real activity is necessary to improve teaching. If technology education has a role to play relating to the use of the Internet, including information retrieval, it has to be structured around a real activity, in which pupils can learn about information retrieval and teachers can teach the key learning objectives. The fact that information retrieval on the Internet is useful in all subjects makes it difficult to identify a vertical continuum within technology education. Even though activities involving information retrieval are frequently practised, it is always difficult to know exactly how to teach it, if it involves a real kind of teaching, and the exact knowledge that should be taught by teachers. Nevertheless, at a specific time in schooling, technology education should contribute to the teaching of information retrieval in order to improve the efficiency of pupil research.

NOTES

[1]   http://fr.wikipedia.org/wiki/Wikip%C3%A9dia:R%C3%A8gles
[2]   European Schoolnet: European program gathering this type of initiative can be consulted at http://www.eun.org

3   http:/www.educnet.education.fr
4   Training to understand and use media in the classroom is part of these priority missions http://
     www.clemi.org/formation.html. It gives advice and follow up in class projects. It trains the education
     staff. It is a conciliation and mediation institution. It produces educational tools http://www.clemi.
     org/formation.html
5   EDUCAUNET, critical education about the Internet and the risks linked to its use, consult http://
     www.educaunet.org/versions/francais.html.
6   GRETA is a group of secondary schools within the National Education system in 6000 locations
     across France.
7   The PCI is an international independent standard acknowledged by the European Union. Created by
     the CEPIS (The Council of European Professional Informatics Societies [http://www.cepis.org]) it is
     held up by the EDCL foundation (European Computer Driving Licence Foundation [http://www.
     ecdl.com/main/index.php]). PCI website: http://www.pci.tm.fr/sitepcie/html/instit_education.htm

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