

Is a relevant piece of information a valid one?

Teaching critical evaluation of online information

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Abstract: In this chapter we first point out the importance for any user to keep in mind the level of validity of a piece of information; specifically in the context of the web in which the information is heterogeneous in terms of the editorial process used. We detail the criteria coming from users' behaviour and those that should be taught in order to provide users with an opportunity to become information literate. We suggest a taxonomy of criteria and concepts that can be taught. We present three different ways for a trainer to make trainees learn about information validity: first making students aware of the validity issue, then using a criteria grid and finally teaching based on practice. We finish the chapter with assessments and feedback on these practices.

Introduction

With the Digital information revolution, citizens are faced with the proliferation of information resources and ways to access them.

Considering the Internet and the Web, Carr (2008) criticizes the impact of such media on the ability of people to concentrate and to reflect. He hypothesizes that human cognitive capabilities decrease when using the new technologies. On the other hand, Claburn (2008) claims that cognitive skills are improved using new technologies; basing his claim on a study at University of California that shows that searching the web activates brain areas that are devoted to reasoning and decision making (Small *et al.*, 2009). Indeed, media are not merely means of absorbing information but sources of reflection and thinking models (McLuhan, 1964).

Several studies analyze the way people interact with the web and virtual libraries. A study commissioned by the British Library and JISC (UCL, 2008) analyzes searching behavior in virtual libraries. The authors found that users "spend as much time finding their bearings as actually viewing what they find". Additionally, this study shows that users do not spend time assessing authority; they trust in information by "dipping and cross-checking". When considering the Google gen-

eration (born after 1993), things are even worse. The study shows that young people “have a poor understanding of their information needs”. As a result, they have difficulties in developing effective search strategies and in assessing the relevance of the retrieved information. Whatever the information, evaluating its quality is hard. The heterogeneity of Internet information makes the quality assessment process even harder.

The academic culture may explain the behavior of the Google generation, which does not validate the information they find on the Internet. Formal education generally rests on textbooks. One of the special features of textbooks is the way they are validated at different stages: their authors are generally specialists in the book topic; textbooks have been reviewed either by peers or editor boards; they are under the responsibility of a publication chair; they are chosen by the school, etc. and nevertheless mistakes still occur. The same kind of editorial process occurs in newspapers and more generally in the set of documents that a user will find in a library. Indeed, librarians select the documents that meet criteria that guarantee information quality; this selection occurs from a large number of documents that are published every month. Generally, books are removed from consideration for the library when self-published or edited by editors considered as non reliable or expressing extremist political views. As a result, library users access information that has been filtered twice: before it is published by validation authorities and after it is published, by librarians who select them. This process does not exclude some mistakes and bias occur in books; in addition, because of their seriousness appearance, books can be used as vehicles of ideology.

The character of information production on the Internet is heterogeneous compared to the editorial process described above. Information literacy, a concept first introduced by Zurkowski (1974), thus becomes mandatory for people in their day to day life. Information literacy has been defined as the ability to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ACRL, 2000). Candy *et al.* (1994) identifies information literacy as an essential element for lifelong learning. Indeed, citizens will not be more informed just because of an abundance of information and technology to access it; they need in addition to understand and to be able to use information effectively (Bundy, 2004). In the case of self-education, the reader is responsible for validation of the information. Checking the validity of the information is essential. Teachers and trainers, as well as the authorities, should accompany trainees in this task of information quality assessment. Reference frames describe the skills an information literate user has but do not provide educational scenario to help teachers. This chapter offers a global view of related works in different disciplines and suggests a relation between theoretical concepts and practices.

In this chapter, we aim to point out the importance of information validity, specifically in the context of the web, in which the quality information is variable. We provide a road map of useful criteria that should help users to ascertain the validity level of retrieved information and some pedagogical methods trainers could use to educate pupils and students. The chapter is organised as follows: section 2 pro-

vides a general picture of the digital world and of the information evaluation issue. Section 3 presents elements of how internet users evaluate information validity. Section 4 describes the educational goals and presents information validity in reference frames. Section 5 presents different studies and results and provides a taxonomy of criteria used to evaluate a piece of information. In section 6 we discuss three methods that can be used to teach information validity. Finally, section 7 provides some assessments and feedback.

Digital world, web users and the information evaluation issue

Following the development of the Internet, information usage behaviour evolved dramatically. Evaluating and selecting information became particularly complex tasks for online searchers.

First of all, people have been confronted with a very large number of information sources which can contain contradictory or controversial information. The various levels of quality is partially due to self-publishing. Indeed, horizontal and decentralized communication constitutes one of the core principles of the Web. Beginning in the nineties, internet users were publishing contents through personal or associative web sites, or through forums and mailing lists. Since the middle of the following decade and the development of Web 2.0, the possibilities for people to publish content have greatly increased, with blogs, wikis, content sharing platforms, and social networks. Anyone can easily become an information producer. The counterpart of this freedom is that, when searching for information on the Web, Net users are confronted with information which has not been validated, that is to say not reviewed or subjected to a scientific or institutional authority before its publication. As a result, internet users should now validate the information they use; validation is carried out downstream from its publication (Serres, 2005).

The information validation task appears to be difficult and complex on the Internet. In the print world, document access can be done by the means of a catalog. By consulting a catalog, users have access to a reference containing information on the resource: author, editor, publication date... These elements make it possible to identify the origin of the information and thus to obtain a more precise idea of its degree of reliability. In addition, printed documents have a form and a physicality which allow the reader to easily recognize their nature and the kind of discourse that they convey (encyclopedia, newspaper, magazine, scientific magazine...). The French historian Chartier (Chartier, 2008) underlines that "a hierarchy of objects can more or less be used to indicate a hierarchy in the validity of the discourses". The digital world confuses these references. Computer screens became an aid to view any type of document or discourse. Internet users are thus confronted with a mix of different information types (Serres, 2005). Thanks to the diversity of web information, users have easy access to a plurality of sources in order to make their proper point of view on the question. However, information

diversity renders more complex the task of identifying important document characteristics and evaluating the information within them, because clearly identifiable indications of these are frequently lacking.

The Internet encompasses different types of information objects. For example, blogs are usually maintained by a single person and contain either diaries or commentaries and news on a topic, whereas Wikipedia is a collaborative encyclopedia. However, the heterogeneity in terms of information objects is hidden on the Internet by a homogeneous way of searching and accessing information. Moreover, even when considering one type of object, the quality is variable (e.g. between scientific blogs and, say, more personal blogs). As another example, the encyclopedic aim of Wikipedia does not prevent it from being used as a propaganda tool. Indeed, information quality assessment is essential and even more important when considering information from the Internet.

Information validity assessment and usage

Many studies consider the way users evaluate information. In the following, we do not claim to be exhaustive but rather aim at emphasizing some specific features in order to point out the need for citizens to be trained in evaluating information.

Fogg *et al.* (2001) from Stanford University highlight that the general public considers primarily formal aspects (design, typography, colours ...) in judging the credibility of a site. On the other hand, resource characteristics (notoriety, statute...) are taken very little into account.

Young people undervalue, even ignore, criteria concerning information validity. Hirsh (1999) presents a study of ten fifth-grade students (~10-11 year old) and shows that they very seldom quote the criterion of source authority to justify their document selection. The same conclusion was found in Boubée (2007) who observed and analyzed the behaviors of 15 primary school and high-school pupils while searching for information. When the trainees explain why they choose a given document, they refer only very seldom to criteria related to information validity or source reliability. When they do mention these criteria, the formulations typically remain vague. Grimes and Boening (2001), Brem *et al.* (2001), and Metzger *et al.* (2003) highlight that students evaluate web sources only superficially. In their study, Le Bigot *et al.* (2007) corroborate these results. The 19-year-old students who participated to this study considered information coming from a personal blog as trustworthy as those emanating from a research center. In the same way, Walraven (2008) reports that students hardly evaluate results, information and sources. Thus, many studies report that evaluation skills are missing at the entire range of schooling levels.

Rieh and Hilligoss (2008) have a slightly different view. They show that students of secondary school are aware of the problems of information reliability and frequently compare several sources in order to check the information they have

found. But the authors also underline the fact that the attention paid to information credibility depends on the type of search they conduct. When the search results involve other persons, young people tend to be more attentive to the source quality. Fink-Shamit and Bar-Ilan (2008) observed 77 individuals while performing information search tasks. The authors show that information quality assessment is composed of several elements such as content credibility, web site credibility, supposed relevance and veracity assessment. Kiili *et al.* (2008) report the results of a study involving Finnish pupils aged 16-17 years. They point out the diversity of the skills and strategies they use to evaluate web sources in an authentic learning task (writing an essay). The authors identify five evaluation profiles from the versatile evaluators and relevance orientated evaluators to the uncritical readers.

The authors conclude that students generally do not validate the source. Young web users tend to privilege documents related to their search topic and newly published documents and are less aware than adults of qualitative criteria (authority, trustworthiness...). Youth may be more prone to digital misinformation and less able to discern credible from non credible sources (Flanagin and Metzger, 2008).

On the other hand, Macedo-Rouet and Rouet (2008) studied how experts (in a given domain or in uses of document, such as historians or librarians) analyze and organize information. These users identify the explicit and implicit intentions of the authors and conceptualize a document as a pair composed of a source and contents. Not only do they consider the document content but also its author and the author's and source's objectives. They also succeed in forging relationships between sources, considering rhetorical associations (opposition, corroboration...). The documentation expert (e.g. masters students in library or information sciences) can more easily recognize the differences between good and bad quality documents. They use various criteria to evaluate information quality and use more criteria based on the source than do students in other disciplines; the latter can be considered as beginners in information studies (Macedo-Rouet *et al.*, 2008).

Thus judgments of credibility used by experts are based on a process and on criteria more specific and more rigorous than those of the general public (Rouet, 2006). Lessons related to librarianship skills and targeted at information quality assessment are likely to improve the competence of pupils and students.

Educational goals for information quality assessment

In this section we introduce the pedagogical objectives of teaching about information validity. Information quality assessment is considered to be the capacity to judge the quality of various pieces of information (Fitzgerald, 1999).

Babu (2008) wrote an overview of the competency standards for information literacy; he shows that information quality assessment is a common issue. The *International Federation of Library Associations and Institutions* framework indicates that a qualified user must know how to evaluate information critically and

competently. A qualified user “evaluates accuracy and relevance of the retrieved information”. *Information literacy Standard, Indicators and School Libraries* indicates in a more precise way some specific skills related to information quality assessment. An information-literate user “determines accuracy, relevance and comprehensiveness”, “distinguishes among facts, point of view, and opinion”, and “identifies inaccurate and misleading information”. These skills can be supplemented by performance indicators. *Information Literacy Competency Standards for Higher Education* mentions that “the information literate student articulates and applies initial criteria for evaluating both the information and its sources”; he “validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and or practitioners”.

Bundy (2004) edited the Australian and New Zealand Information Literacy Framework. Skills that are linked to information quality assessment are mentioned in a precise way, since according to this framework an information literate person is able to define and apply criteria for information quality assessment; this implies that an information literate person:

- “Examines and compares information from various sources to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias,
- Analyses the structure and logic of supporting arguments or methods,
- Recognises and questions prejudice, deception or manipulation,
- Recognises the cultural, physical, or other context within which the information was created and understands the impact of context on interpreting the information,
- Recognises and understands own biases and cultural context.”

These skills are also mentioned in almost identical terms in the *ALA* (American Library Association) and *ACRL* (Association of College and Research Libraries) published in 2000 (*ACRL, 2000*) frameworks.

The French frameworks devoted to information literacy mention information quality assessment but with very few details. The *FADBEN* (Federation of Librarians of the French National Education System) framework published in 1997 mentions that high school pupils should know how to select references with regard to some identified criteria (novelty, topicality, source, ...) and how to analyse information in order to consider its subjectivity. The B2i (data-processing and Internet certificate for compulsory education) integrates information knowledge as well as data-processing technique skills. Pupil should have a critical and considered attitude with respect to the available digital information. A qualified person:

- Knows how to evaluate the subjectivity or partiality of a discourse,
- Knows to distinguish a rational argument from an authority argument,
- Learns how to identify, classify, organize hierarchically, criticize information...

When analysing these international guidelines, one can conclude that information quality assessment is universally regarded as an essential component of information literacy. We can also note that the guidelines and goals related to this

skill are not equally detailed and do not consist of the same items in the different guidelines. Nevertheless, all guidelines mention critical analysis of the source using identified criteria either in an implicit or explicit way. Other skills relate to the informational contents and the discourse conveyed by the source (e.g. a literate person analyzes the structure and logic of supporting arguments or methods, knows how to evaluate the subjectivity or partiality of a discourse ...).

Theoretical approaches on how to teach information evaluation supplement the study of guidelines. Fitzgerald (1999) highlights the complex character of this task. According to her, components of evaluation include:

- Meta-cognition: it is defined as “knowledge or cognition that takes as its object or regulates any aspect of any cognitive endeavor” (Flavell, 1981 referenced in Fitzgerald 1999).
- Source and information quality assessment are often associated with critical thinking. It is a core element in the media literacy programs of Anglo-Saxon countries (Piette, 1996).
- Prior knowledge in a searched topic is an important component. However, it can also be a brake on learning new knowledge on the topic or to validate information that one will consider as true (Fitzgerald, 1999).

Information evaluation criteria

As noted before, users can enumerate the criteria that justify their document selection. Researchers have also studied how searchers act and what should be the criteria an information literate user should use. Some lists of criteria have been derived from this and are available in the literature (see for example Barry and Schamber (1998), Boubée (2007)).

In the following, we propose a schema that presents the various evaluation criteria we consider as important for evaluating information. This schema takes into account previous works and guidelines previously mentioned in this chapter. Our goal is not to observe and report actual practice but rather to provide point of reference to teachers whose aim is to train users to be critical about information. Indeed, our experience as teacher trainers has shown us that teachers and librarians often face difficulties in conceiving teaching activities and distinguishing and treating on a hierarchical basis the evaluation criteria in order to teach them.

Indeed defining information quality is a complex and multi-faceted issue. Numerous information quality frameworks that propose different criteria exist (Knight and Burn, 2005). For example, the Université de Montréal suggests a grid that can be used to evaluate a web page (Guertin et al. 2009). The authors consider three main classes of clues that can be used in order to evaluate the quality of a web page. In the first part, the authors suggest considering the author of the page (is he identified? What are the competences of the authors with regard to the page content? What is the publication date?, etc.) Secondly, they suggest considering

the page content in terms of quality (clarity, objectivity, contradictory, citations, information noise such as ads) and finally the last part considers the importance of the page with regard to the objectives of the reader.

One difficulty when enumerating criteria is that there is no single terminology to designate these criteria. Information scientists and communication researchers often use different terms to denote close concepts such as authority, credibility, reliability, trustworthiness, etc. (Savolainen, 2007).

To try to solve these ambiguities and to facilitate the development of teaching sequences, we propose two diagrams that summarize and treat on a hierarchical basis the principal criteria of information quality assessment in the context of web information retrieval.

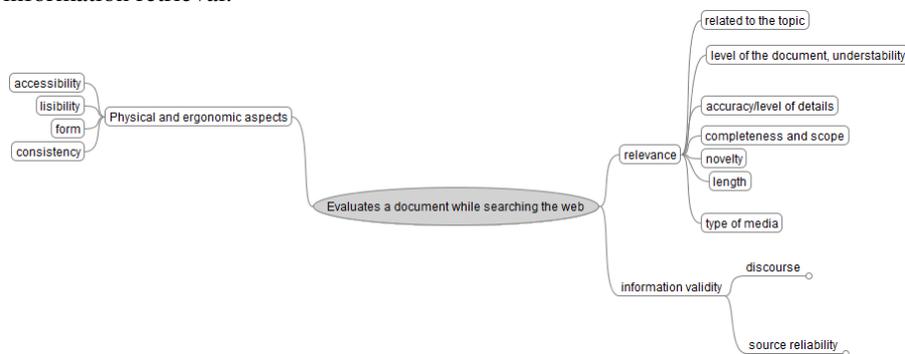


Figure 1: Main criteria to evaluate document.

Figure 1 provides a general picture of what document evaluation covers. We distinguish three main types of criteria. Physical and ergonomic aspects refer to criteria associated with the form of the document, its accessibility (including restricted access, price, software used to read it), its consistency (table of contents, delivers what it is supposed to, etc.); whereas relevance and validity are related to the information content. Indeed, like Rouet (2006) and Kiili *et al.* (2008), when considering information content, we distinguish information validity and information relevance. Document relevance refers to the fact that a document answers a user's information need in a given context (Mizzaro, 1998). A document can be relevant, that is to say can appear to satisfy the user's information need, while containing errors, out-of-date data, or bias. A relevant document will address the research topic (*related to the topic criteria*); the user will be able to understand it and learn something from it (*level of the document, understandability*). According to the level of search, the user can also privilege the documents which treat various facets of the subject – this can also help him to specify his information need – or those which are precise enough (*accuracy/level of details and completeness and scope*). The document should contain up to date information (*novelty, topicality*). Of course, the length and type of media will be what the user is looking for e.g. video, music, etc. (*length, type of media*).

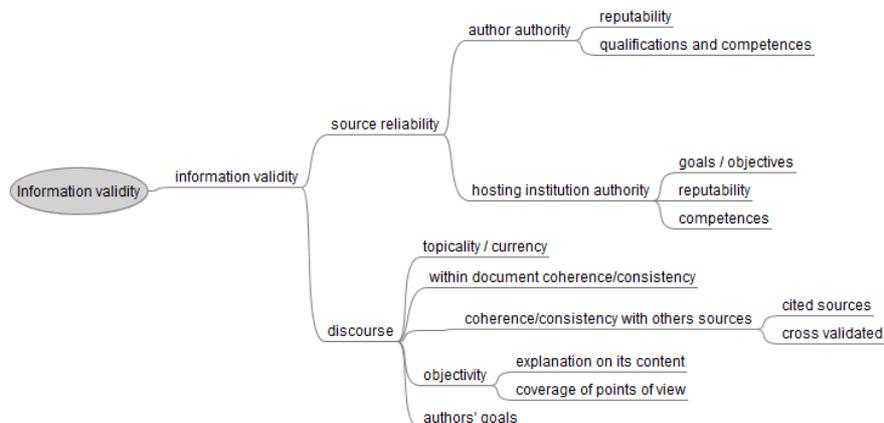


Figure 2: criteria related to information validity

Figure 2 describes the information validity aspects (quality of the information content) in more detail. One generally considers as valid information which has been produced recently by an honest and qualified person in the field working from a disinterested stand point. Evaluating information validity consists of checking if the information meets these qualities (Sahut and Tricot, 2010).

Pupils must learn how to analyze the reliability of the source in order to be able to assess its credibility¹ on rational bases. That supposes that they can identify the source reliability. Source reliability depends not only on the author's authority but on the institution's authority as well. The authority of the author depends on his reputability, his titles and functions, the quality and the number of his publications, his competences in the domain. In the same way, pupils and students have to be able to determine if information the author has published has been reviewed and validated prior to its publication and consider the intentions of the validating authority (for example the editor, the press agency, etc.) as well as the reputability, and the degree of expertise.

However, it is important not to systematically trust a validated document, merely because it has been validated in a particular context. Indeed, the competences and objectives of the institution or of the persons who have validated the information can sometimes be called in question. In such a case, it is mandatory to analyse the informational contents of the document in order to identify the kind of the discourse² (scientific, militant, encyclopedic, etc.)³ and to evaluate the following aspects:

¹ Like Macédo Rouet and Rouet (2008) we consider that credibility is the subjective perception of the information receiver on its reliability.

² We considered that the discourse is a practical application of a language. Any discourse is subject to standards and organizational rules that exist in a given social group. In addition, any discourse testi-

- Its topicality: the facts and data that are mentioned in the document should be valid at the time they are read.
- Its consistency: the argumentation should be logical and no contradiction should occur within the document.
- Its consistency with other sources: this criterion can be evaluated through cited sources. This is a question of determining if these sources are appropriate to the subject covered for example if they are reliable according to the criteria mentioned above (author authority, information validation by an authority...). Moreover, information must be cross-validated using various sources, and these sources should be connected using rhetorical relations (Rouet, 2006).
- Its degree of objectivity. Objectivity refers to philosophical discussions and is quite difficult to define. We consider that high level of objectivity is reached when the document makes clear the way it has been constructed and it refers to the main points of view and studies on a given topic.
- Its goals. A document can be written for different goals : militant, scientific, didactical...(Duplessis, Ballarini-Santonocito, 2006).

Of course any criterion is subjective and can be applied differently according to the domain and the type of discourse of the document. For example, if the document topicality is a very important criterion for domains such as technologies, data become outdated slower in human sciences.

Text consistency can be evaluated differently according to whether the text is narrative, explanatory, descriptive, etc. Scientific discourses are at the same time coherent with others discourse but they are likely to bring something new which is in rupture with the usual discourse.

In addition, we may note that these various criteria should be combined in order to assign an informational value to the document.

The examination of guidelines, didactic tools and teaching sequences in the field of information literacy makes it possible to identify competences that depend on information validity evaluation in order to:

- Evaluate the source reliability considering the competences of the author, his intentions, information topicality,
- Differentiate the sources according to their level and their reliability degree
- Use various sources in order to compare and cross validate information.

Acquiring these competences supposes the understanding of certain concepts arising from the library and information sciences (author, editor, method of informa-

fies a transmitter's aim; the transmitter aims at producing an effect on the receiver (e.g. to cause a stir, persuade the reader or inform him) Mainguenu (2007).

³ Some of these types of discourse can be declined into more specific types. For example, when they talk to general public, journalists use discourses that are codified according to quite particular types (reporting, editorial, news....).

tion creation, quotations, source...) which allow one to better apprehend the conditions of information production and validation.

Teaching validity

In this section, we present different ways to teach information validity to trainees. We considered pedagogical scenarios from French data bases (Edubases documentation, <http://www.educnet.education.fr/bd/urtic/documentation/>, Aivasat <http://docs.ac-toulouse.fr/aivasat/recherche.php>), collaborative web sites librarian teachers maintain (Docs pour docs <http://docsdocs.free.fr/>) as well as our proper experience.

We considered three different ways for a trainer to make trainees learning about information validity. They correspond to three different goals: awakening trainees, developing skills, and integrating skills in practice.

Awakening students to the information validity issue

The objective of this teaching is to show internet users that some pieces of information seem valid while they are not. Teachers could search for real information that is already on the web. However, some web sites are built exactly to this purpose. For example, Teacher tap (<http://eduscapes.com/tap/topic32.htm>) lists misleading websites that can be “parodies, satire, hoaxes, or designed to show students the importance of questioning information found on the web”. Tic Tac doc does the same for resources in French (<http://aristide.12.free.fr/spip.php?article84>).

In order to illustrate this type of teaching approach, we report a teaching sequence carried out by Pierrat (2006) with 15 and 16 years-old pupils. Pupils are asked to answer questions about an animal called a “dahu” using some pre-selected sites. The types of questions they have to answer are: which are the main characteristics of a dahu? Where does it live? Information pooling shows that the various visited sites are contradictory. This raises the crucial question: does a dahu really exist? Pupils are then asked to consider various elements (author of the web site, nature of the site, mention of the sources...) which help them to evaluate the reliability of the sources using a grid. The main principle of this type of teaching activity is to develop a culture of doubt and a form of scepticism.

However, professionals of information and education do not completely agree with this teaching approach. Indeed it implies that some pages that contain errors and whimsical information are edited on the web, sometimes on reliable sites (if only the other pages are considered). This teaching approach contributes to the bad quality of information available on the Web through misleading sites. And

some teachers prefer to base their programs upon established and trustworthy information such as ipl2 (<http://www.ipl.org/>), which is the result of a merger of the Internet Public Library (IPL) and the Librarians' Internet Index (LII) or the Internet Scout Project (<http://scout.cs.wisc.edu>).

In addition, teaching practices that uses false information created for teaching purposes appear to lead to a binary representation of the quality of information (either true or false), which is undoubtedly one possibility for starting a training but which is reducing to train pupils with a task as complex as the information validity evaluation.

Developing skills

The objective of this second pedagogic approach is to lead pupils to compare various sources using skill grids. The objectives of this teaching is first to provide skill grids and second, ways of using them. The role of the teacher is to preselect a certain number of documents on a hotly-debated topic in order to confront pupils with discourses of various natures (institutional, scientific, media, militant...). To analyze and to compare the preselected documents, it is possible either to give to the students a grid of pre-established criteria, or to help them building one.

Following a pooling of the analysis results of the various sites, the teacher can take again the various criteria and specify some of the concepts related to information validation. The purpose of this type of teaching activity is to lead pupils to characterize the various information sources, to identify the objectives of these sources and their degree of reliability. This type of activity refers in an implicit way to the Rouet' expert model of source uses (Rouet, 2006) mentioned above.

However, Serres (2005) makes the point that some of the grids used for these teaching activities mix criteria related to the content and criteria related to the form. In order not to be too technical, he recommends teaching students some of the main concepts such as relevance, information quality, information organization, etc.

Based on practice skills

In this case, the objective of the pedagogical scenario is to place students in the role of information producer; authors who aim at providing valid information to internet users.

This type of project is likely to improve information literacy because it is centered on the information production. Pupils can understand, in a concrete way, the various constraints that media production faces (temporal, technical, financial, linguistic, documentary, etc.) and the conditions under which choices are made. One

interesting case is the development and correction of articles on collaborative encyclopedia resting on wiki technology (Wikipedia, Wikimini...)⁴. Students are first asked to analyze how the tool works and what the editorial rules are. They are then asked to locate articles that could be improved and to make the modifications they consider as necessary. The objective is to lead students to respect the constraints related to this mode of publication (sourcing, neutrality of the point of view...) and thus to understand requirements for producing high quality pieces of information.

To conclude, we will mention different recommendations on teaching information validity:

- acquiring evaluation skills implies a sufficient amount of time devoted to their teaching as well as regular practice. "Evaluating is much too difficult a process to be taught in one unit" (Fitzgerald, 1999),

- practicing debates that require formal argumentation is also likely to develop these skills (Fitzgerald, 1999),

- it can be also relevant to lead pupils to browse the history and discussion pages of a Wikipedia article (Flanagin and Metzger, 2008; Francke and Sundin, 2009). That can result to a clearer identification of the various criteria of information quality assessment in collaborative encyclopedia. These criteria are then largely applicable to all types of sites,

Le Men (2010) in their work in sociology of sciences (Callon and Latour 1990) proposes a specific activity for students at the university; this activity being complementary to the teaching activities we described above. The students are put in situation where they are asked to follow and analyze scientific controversies: they have to locate the various actors of the controversy, the relationships that link them, the arguments considered in the debate. This type of activity makes it possible to go further than a binary approach of information evaluation (true / false). The advantage of this activity is that it locates information in the social domain and makes people become aware of the temporal and conflicting character of information and knowledge.

Assessment and feedback

Several authors report that it is difficult to improve students' information evaluation practices. Boisvert (2002) shows that skills used to evaluate resource credibility increase very slowly during schooling.

⁴ In English, several projects are listed on Wikipedia:School and university projects http://en.wikipedia.org/wiki/Wikipedia:School_and_university_projects

In French, a project description can be found on the following web page: Wikipedia :projets pédagogiques http://fr.wikipedia.org/wiki/Wikip%C3%A9dia:Projets_p%C3%A9dagogiques.

Studies take into account the practice and show the difficulty in teaching students information evaluation skills which are truly effective. In higher education, Manuel (2005) observes that the first-year students can be able, after a training, to quote evaluation criteria such as authority and credibility, scope, coverage, relevance, bias, accuracy, currency, navigability, commercialism. However she also points out that they face real difficulties in applying these criteria to the documents they find. Mothe (2010) shows that even if students acknowledge they learnt some skills they think they will not change their practices.

The central problem seems to be the durable integration of information evaluation skills and their transfer from a learning situation to other situations. Walraven (2008) tested two educational programs on students. The first program is called “the high road programme” and aims at developing meta-cognitive skills. In this program, teachers draw the attention of students to the various steps in a validation process and to the way these steps can be used flexibly in different situations. The second one is called “the rich representation theory” and it aims at helping students to acquire deep knowledge of concepts associated with the key concept of evaluation. For that, students are required by teachers to discuss the evaluation criteria of some sites and use mind mapping in order to represent them. Walraven (2008) shows that these two programs help the transfer of the information evaluation skills.

Conclusion

In this chapter, we analyzed various frameworks in order to elaborate a synthetic approach of the skills linked to information evaluation: we distinguished skills associated with source analysis and skills associated with discourse analysis.

We also clarify criteria that can be used to evaluate information from a teaching perspective: a first level considers three main classes: physical and ergonomic aspects, relevance, and information validity. Considering the information validity, the criteria as directly associated with the skills we mentioned above.

Finally, we depicted three teaching models associated with these skills:

- Awakening students to the information validity issue by providing trainees with pages that contain either errors or controversial information (eventually built by teachers themselves).
- Developing skills by using skill grids and some chosen pages.
- Based on practice by placing trainees in the role of information producer.

Considering the difficulty the students face to apply the concepts they learn, whatever the model the teacher chooses, it is essential to devote enough time to practical application. In addition, as teachers training school teachers, we think that teachers continuing education is a key component of information literacy.

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