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A principle-based approach to teaching grammar on the web

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Abstract

The advantages of computer-assisted grammar teaching and more recently, web-based grammar teaching, include the possibility, for the instructor, of devoting class time to teaching communication skills, and the capacity of individualizing the course work. Several websites have been created for these very reasons. However, most of these sites include only a small portion of the grammar and very few are based on educational principles. This paper will summarize what should be the guiding principles in the design of this type of website, most of which involve instructional design and the need for structure and adaptability to different learning styles. It should also be noted that there are design principles specific to grammar teaching, such as the distinction between exploratory and pre-established modes, and the scaffolding of concepts. The application of these principles will be illustrated through the presentation of a web site.

1 Introduction

When asked by a seven year old what grammar was and why it had to be taught, especially on the Internet where there are so many fun games, I realized that grammar on the Web would never be very popular. However, second language learners, older ones especially, need and even ask for grammar. The importance and the role of grammar in language learning have been discussed in many other articles and will not be reviewed here (see Hall (1998) and Hyland (2003) for a brief overview). Whether you view the integration of grammar in the language-teaching curriculum as a necessary evil or as an intellectual quest, grammar is now an integral part of first and second language learning in a large proportion of colleges and universities around the world. The importance of grammar and the proportion of teaching time allotted to it vary greatly from one instructor to the other, and are usually secondary to the acquisition of communication skills. While grammar is in fact

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only one of the communicative competences (Canale & Swain, 1980; Bachman, 1990), it cannot be neglected. In my view, it is important to teach grammar to learners who ask for it because the teaching of formal structures allows learners to quickly understand a rule that would take them a long time to deduce in an environment where the time of exposure to second language speech is very limited, and because it satisfies their curiosity and need for reassurance. Having the opportunity to learn both communicative skills and grammar represents an ideal that often has to be compromised because of limited class time.

However, unlike most other components of communicative competence such as pragmatic, textual or socio-linguistic competences, grammatical competence can be taught separately (McBride & Seago, 1997). This explains in part how older teaching methods came to be based on grammar. Indeed, it may be best if the grammatical competences are learned individually on a computer since the computer can adapt to the learners' wide ranging needs (Beaudoin, 1998). Ayersman (1996) showed that the computer can better accommodate the different learning styles and the variable levels of interest by adapting feedback and environment. CALL also fits very well with the idea that grammar should be set apart from the rest of the learning material (Dulay *et al.*, 1982). By asking learners to individually study grammar in their own time and at their own pace, the instructor can focus on communicative skills instead of spending a lot of limited class time explaining grammar rules. The learners can study only the rules they need, which is difficult in a linear medium such as the textbook. Furthermore, Nutta (1998) even claims that computer-based grammar instruction is more effective than class instruction in some circumstances. However, considering the number of factors involved in the delivery of such material, it is difficult to even compare the two media.

Grammar is by nature hypertext (McBride & Seago, 1997): it describes a system of rules that are dependent on one another. A structured hypertext grammar provides an organization of the rules (Lamy, 1997) as well as the opportunity for scaffolding concepts. Furthermore, the links between concepts can be rendered to facilitate learning.

Many grammar websites are available (Felix, 1999), and French grammar is no exception: ClicNet (Netter, 1995) indexed fourteen such websites at the time of the writing of this article. The scope and the overall quality of the sites vary greatly, however (Lamy, 1997). This may partly be due to the fact that most grammar websites are built with a limited audience and goal in mind, and partly due to the fact that very few grammar websites fit into a broad set of educational principles.

This article will explore the principles that should guide the building of a grammar website. This set of principles has been developed from published research articles and from the experience of building two major French grammar websites one of which, *Pomme*, will be briefly described in the following lines, and will be used as an example of the application of those principles. It is very difficult to apply all the principles to one website, and, as with any language teaching material, *Pomme* adheres more tightly to some principles than to others.

Pomme is an interactive French grammar database, available at `http://www.pomme.ualberta.ca`. It covers the entire French grammar and presents exercises for most of the 300 or so rules. The rules are explained in simple, clear, and concise French. Many functions are built into the site, such as a keyword search, an index, a diagnostic test, and note-taking capabilities. The site also offers an individualized student page with additional functions such as a bookmark to the last rule visited, access to the log of the

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Fig. 1. Entry page of *Pomme*.

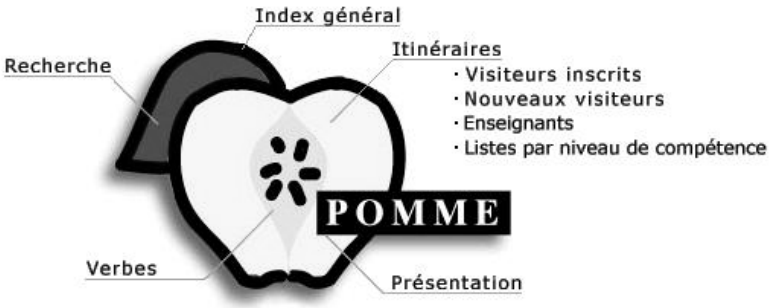


Fig. 2. Navigation tool of *Pomme*.

visits, and a list of rules to be studied as suggested by the result of a diagnostic test. Moreover, instructors can access their students' log to follow their progress. Details of the database structure and website can be found in Beaudoin (forthcoming).

Pomme was designed by a group of researchers led by the author of the present article. Educational principles were maintained and applied throughout the design, the production, and the validation processes. Many of these are principles of pedagogical design that apply to any teaching website. These will be presented first, followed by principles that are specific to grammar teaching.

2 General design principles

2.1 Simple, clear, and predictable design

Any website should have a simple and clear design (Lonfils & Vanparys, 2001; Ferney & Waller, 2001). Although it is tempting to cover a lot of material and fill the page with

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texts, images, buttons, and functions, white space is in fact essential to the legibility of the content (Williams, 1994). Having white space and few navigational elements are characteristic traits that help the user to focus on the material (Kristof & Satran, 1995). The navigational elements should also be consistent throughout the site, in location, in function, and in look (Lonfils & Vanparys, 2001). Any change in the design is interpreted by the user as having a meaning (Chanier, 2000). Choosing a *leitmotiv* or a leading metaphor that is used throughout the site is a good way to ensure consistency (Laboz, 2001). It also facilitates the design as it provides ideas for navigational tools. However, one has to be careful to think of the associations evoked by the metaphor, and not push the metaphor over tasteful limits. The consistency also helps the visitors to keep track of their current location within the site.

This principle was applied in *Pomme* ("apple" in French) from the start. The name was suggested by my son, then three years old, and reinforces the notion that grammar is associated with elementary school, sometimes symbolized by an apple. Apples are found throughout the world and they symbolize simplicity. The symbol was also appropriate because five navigational elements had to be constantly available, and the apple has five main parts: the skin, the flesh, the core, the seeds, and the leaf (one could add the stalk, although it combines with the leaf). The home page thus presents a beautiful red apple. Upon entering the site, the main menu is designed around a cut apple, which remains present at all times in the site, initially as the center of attention until the visitor enters a given part of the site, and then at the top of the window in a smaller version. Navigational tools remain the same in both cases, except that the access to a presentation of the site becomes the help, which is only needed once the visitor has entered the core parts of the site. The text content is presented in the lower right frame. There is ample white space, and texts are kept as short as possible. The necessity of keeping the texts short forced us to split the rules into small conceptual units, which will be discussed later in the article. Contextual functions, such as access from exercises to the specific grammar rule they illustrate, are presented on the left frame.

2.2 Interactivity

Interactivity can be defined as the possibility of mutual influence between two systems (Notaise *et al.* (1995); see also Chanier (2000), Plass (1998) and Chapelle (2000), amongst others). It can be actualized in a number of ways by the computer: adapting to the visitor's preferences, showing evidence of action when the visitor does something on the computer, automatic correction, and providing feedback, however basic. The mutual influence should be durable to have optimal effects (Beaudoin, 2003). A computer system that needs to be constantly reset rapidly becomes frustrating. Similarly, a user should be able to adapt to the computer system's idiosyncrasies if the interface is consistent. Cartier (1989) defines three levels of interactivity (many other authors establish similar distinctions; for other examples, see Felix (1999)). The basic level is called reactive; it involves a system that reacts directly to actions performed by the other system. It typically corresponds to functional interactivity (Paquelin, 2002). The second level, selective, describes a system that maintains a representation of some information on the other system in order to react appropriately. At the third level of interactivity, active, a system can maintain a sophisticated level of information on the other system in order to interpret its behavior in

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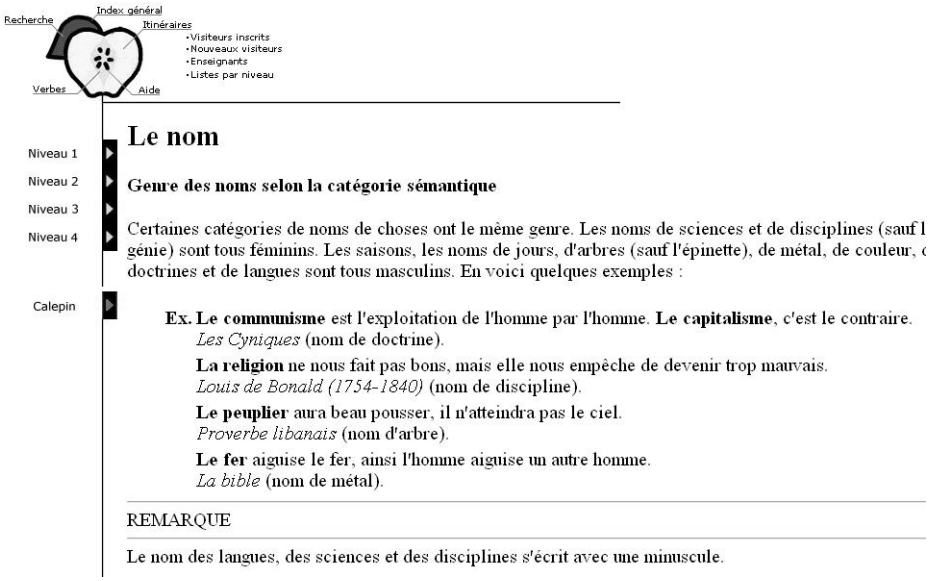


Fig. 3. Example of a grammatical rule with navigational tool.

light of previous actions in similar circumstances. In sum, an interactive system should take into consideration many aspects of the learner (Meunier, 2000).

Pomme is built primarily as a hypertext space, where information can be accessed in a number of different ways: the general index, the search engine, the cross-reference links at the bottom of most pages, the hyperlinks within the text of the rules, the list of pre-established curricula, to name a few. However, the level of interactivity of *Pomme* corresponds roughly to the second level in that it includes functional interactivity such as automatic correction, choice of the language of the interface, note taking capabilities, and feedback, but also intentional interactivity, such as in the diagnostic test, the adaptive curriculum, and access to the individual learning path (parcours pédagogique). In most cases, the information on a relevant rule is available in two or three clicks.

2.3 Accommodation to different learning styles

Many learning style taxonomies have been developed, Briggs Myers and Kolb being the most frequent ones. I prefer Kolb's model because of its simplicity. Four different learning styles have been identified by Kolb (1976). Although most learners follow a combination of styles, we can summarize the learning styles as follows:

Converger
Abstract conceptualization + active experimentation

- can focus on deduction and reasoning to solve problem
- strong in practical application of concepts
- narrow interests
- appreciates search capabilities

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Assimilator
Abstract conceptualization + reflective observation
- strong at inductive reasoning
- strong ability to create theories
- interested in abstract concepts rather than people
- appreciates a clear structure

Accommodator
Concrete experience + active experimentation
- greatest strength is doing things
- more of a risk taker
- performs well on the spot
- solves problems intuitively
- appreciates a list of suggestions

Diverger
Concrete experience + reflective observation
- creative
- good at generating ideas
- good at seeing things from different angles
- interested in people
- broad cultural interests
- appreciates the possibility to explore

Learners exhibiting these styles generally learn differently (Kolb, 1984), which leads to a different use of language learning sites, hence the importance of providing different ways for learners to build knowledge.

Pomme has tried to accommodate the four learning styles by providing different ways to access the information and by catering the layout to the typical use preferred by each learning style. The Search functions, for example, have been designed for Converger learners because they allows unstructured investigative navigation. The Diverger learners may also be interested in the search functions, but cross-reference links at the bottom of grammar rules will also appeal to them. The General Index will appeal to the Assimilator learners because it provides a structured but unrestricted access to information. These learners will also appreciate the search by theme developed in exercises, the content-based exercises, and the cross-reference links. The lists of rules by levels of competence and the individualized curriculum were built with the Accommodator learner in mind, who prefers to systematically cover relevant material, and only that material. By providing different ways to access the information, the website can enhance the learning experience for learners with different learning styles.

2.4 Possibility to review covered material and past performance

It is important for learners to keep track of the ground covered throughout their learning process in order to get an idea of what was learned and with what degree of success, to adjust their learning strategies (Bandura, 1997), and to set and maintain realistic goals

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(Locke & Latham, 1990). Reviewing their own learning path is an essential part of the learners' reflection on the learning process because it raises consciousness of the goals and increases learners' autonomy (Lamy & Goodfellow, 1998).

Pomme includes three ways to track the learning path. First, the learner can always go back to the page last visited through a direct tab in the individualized page. Second, a log of all pages visited is available from the individualized page. It includes a chronological list of all rules and exercises accessed, along with the results for the former. A direct link to each rule and exercise is available within the log. The learners can thus use the log information to review past performance in order to set goals and to adjust strategies. It can also be accessed to facilitate reviewing of the material already studied. Learners can provide instructors access to the log by entering their name in the personal information page. Access can be given to more than one instructor by writing each of their names separated by a space in the instructor field. The information presented to the instructors is identical to the logs viewed by the learner. Lastly, the learner can also take notes and review them later. This feature encourages reflective learning and provides a structure for meta cognition.

3 Design principles specific to teaching grammar

3.1 Providing scaffolding of concepts through subdivision of the material

Grammar is comprised of a large number of interdependent but autonomous concepts. It is, for example, imperative in French to be able to identify adjectives in order to be able to make the agreement with surrounding nouns, which in turn is another concept. Furthermore, general rules may be mastered without knowing the exceptions or the specific rules. This is why grammar is best seen as a web of concepts; a perfect candidate for hypertext format such as the Internet. By parsing the concepts into discrete elements and establishing links between them, we are able to organize the material to accommodate various levels of competence and provide a scaffolding of concepts. This allows the learner to establish relationships between concepts that are difficult to achieve with printed material because of the linear layout of the material. By organizing the concepts into a hypertext format, we can also limit information overload (Kirsh, 2000), especially if the website offers various ways to access the material.

Scaffolding is one of the most important principles underlying the creation of *Pomme*. After using and building static French grammar websites, I came to the realization that only a database structure offers the power to allow the user to access information in a satisfying way. The first step in building *Pomme* was to parse French grammar into clearly identified autonomous rules. I obtained the permission to 'webbify' and modify a well-known French grammar textbook (Ollivier, 1992), and subdivided it into approximately 320 concepts. I then revised each of the grammar rules and had my revisions reviewed by a linguist specializing in French grammar. By manipulating the concepts and trying to establish relationships among them, we were able to reduce the list to approximately 300 rules. Almost half of the material was rewritten in the revision process. Each rule was classified according to a general grammatical aspect, such as adjective, adverb, and each rule was given a title and assigned keywords. The keywords, established from the rule content, rule titles, and common mistakes made by learners,

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are used for searches. The rules within a grammatical aspect were then given an order based on the sequence in which a number of textbooks introduce each concept. This order is used to present the rules within each grammatical aspect in the General Index. It is also reflected in the arrangement of the questions in the diagnostic test and in the list of rules by level of competence. Finally, cross-references among rules were created to allow users to rapidly access the information from one rule to the other. The cross-references are listed at the end of the rules.

3.2 Deductive or inductive grammar

Much of the discussion in grammar teaching revolves around whether we should explicitly teach grammar or let the learners discover the rules on their own through personal exploration of the language (Burgess & Etherington, 2002). In the first approach, the learner is taught the rules and presented with examples whereas in the second, the learners are shown texts containing the grammatical structures and guided to infer the rules by building and verifying hypotheses (Scott, 1992). A combination of the two approaches is also common. The success of either approach may well depend on learning styles (Beaudoin, 2003) or on the rules to be learned (Scott, 1989).

Pomme clearly favors an inductive type of grammar. One has to keep in mind that a learner searching through a grammar reference is actively looking for an answer, even if the question itself is not always precise. However, we tried to provide the opportunity to discover the rules by providing identification exercises for the first rule of each grammatical aspect, which constitutes an overview of the aspect. These exercises include most cases to be explained in more specific rules, but learners are asked to identify the elements under scope. They will notice the application of the more specific rules if they are ready for it.

3.3 Exploratory mode vs preset mode

Another debate dividing the teaching of grammar is whether the learners should learn through an established linear curriculum or through exploration. McBride and Seago (1997) maintain that hypertext grammar allows both teaching modes. Manning (1996) supports exploratory learning of grammar. Since both modes are possible with hypertext grammar, there is no reason to confine oneself to either. A combination of both modes may be better than either alone (Hall, 1998). This, however, is difficult to achieve in simple HTML format because of limited search capabilities; interactive database structures are better suited for true exploration (Beaudoin, submitted).

Pomme allows for both modes. Exploration is promoted through the Search function, the hyperlinks embedded in the grammar rules, and the cross-references at the end of most rules. The linear teaching mode is actualized in the structure of each component of the General Index, in the rule order given in the individualized curriculum, and in the lists by level of competence.

3.4 Significant and content-based exercises

Grammar has long been looked at as a boring school subject by most French learners, both as a first and a second language. One of the main causes of this negative image is

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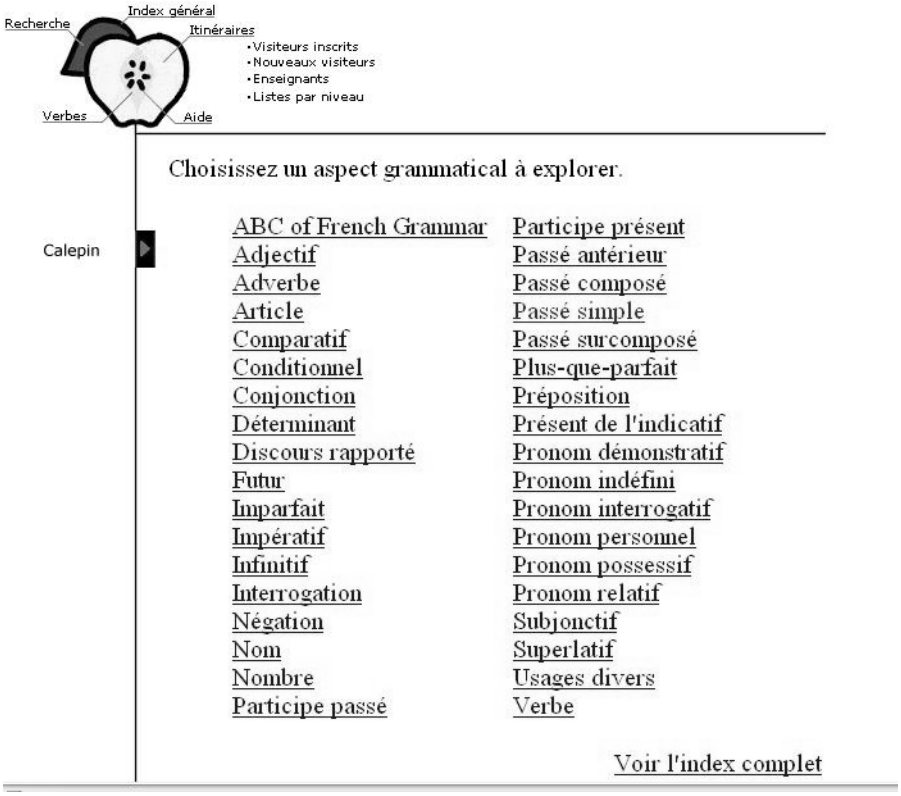


Fig. 4. General table of contents.

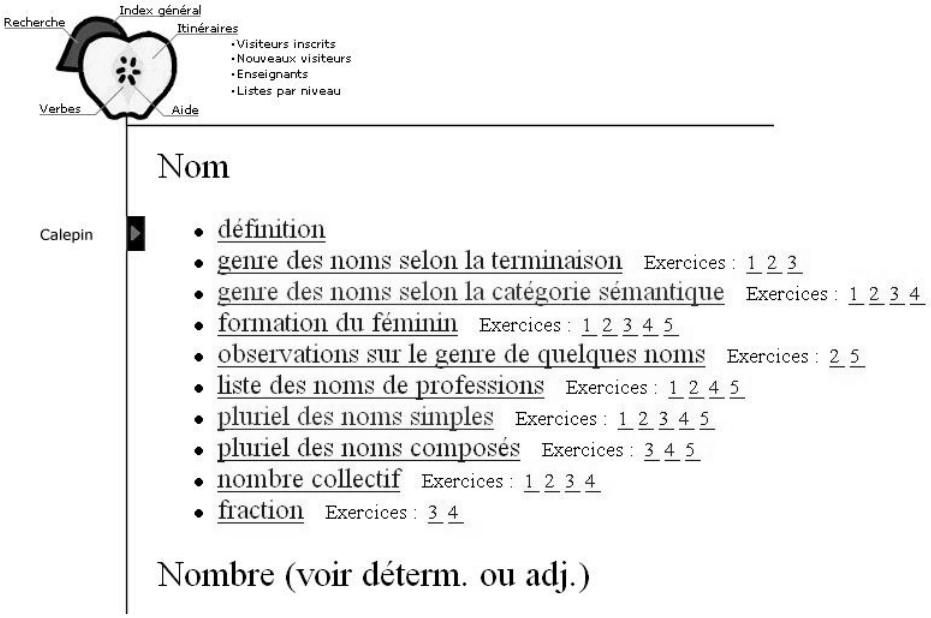


Fig. 5. Example of a specific table of contents.

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that exercises accompanying the grammatical rules were most often repetitive and free of any coherent information content. This practice was highly criticized by many researchers and language instructors (Chun & Bandl, 1992), which led many to reduce the importance of grammar in the curriculum (Dulay *et al.*, 1982); another reaction was to create "significant" and/or "authentic" material. There are a number of problems with both of these approaches. First, material that is significant for one learner is not for the other. Second, it is difficult to find authentic material that is relevant for languages learners in exogenous situations (Blanc & Hamers, 1989). Third, it is very difficult to find authentic material that is grammatically valuable (Felix, 1999). Fourth, it is very difficult to publish language teaching resources that are authentic and significant because the material ages rapidly and quickly becomes insignificant. Felix (1999) favours the notion of coherent narrative instead of significant material. The distinction lies in the fact that a coherent narrative is a text written for grammatical purposes from authentic material.

Pomme includes approximately 500 exercises. Each exercise is linked to a specific rule and focuses on it. Each rule may have up to five exercises of different levels of difficulty. Five levels of difficulty were established on linguistic criteria: vocabulary, syntactic structure, and anaphoric distance. Almost all the exercises are coherent informative narratives with Canada as a central theme, and cover history, politics, geography, people, etc. This theme was chosen largely because Canada is increasingly popular as a field of study all over the world. A limited number of exercises are fiction texts or drills based on lists. The user can do a search for exercises according to themes or obtain the complete list of themes covered in the lower portion of the Search page.

4 Evaluation

The *Pomme* website has been used extensively by individuals and by entire classes. It has been the focus of four successive evaluations with surveys and discussion groups. The first two evaluation sessions were carried out during the developmental phase of the project by external research groups under the supervision of Dr. Stanley Varnhagen (ATL, University of Alberta), and the last two by the author during the final stage of the development.

The first session revealed numerous problems with the design and functions, some minor, some major. Most of these were solved in the following weeks. The second session pointed only to a few minor problems that have since been corrected. The third evaluation was carried out in July 2001 with a group of seven second-language learners of all levels for one hour a day for ten days. Asked to provide their general appreciation of the site, four were very positive, three were positive. As for the ease of navigation, two found it very easy, four found it easy, and one found it somewhat difficult. Graphic design was appreciated: three were very positive and four were positive. The website was not very well accessed during that time because of copyright constraints, which have since been lifted. The last evaluation session was carried out in January-February 2004 with 24 subjects who used the website as the main grammar material in an advanced writing French course. Asked to provide their general appreciation of the site, 75% were very positive, 20.8% were positive, and 4.1% were neutral. Regarding the ease of navigation, 22.7% found it very easy, 59.1% found it easy, 13.6% somewhat

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difficult, 4.5% difficult, and two subjects did not answer the question. On graphic design, 20.8% were very positive, 50% were positive, 25% were neutral, and 4% were very negative (1 subject). The most frequently used functions are the general index and the diagnostic grammar test. The grammar explanations were judged to be very easy to understand by 37.5% of the subjects, easy by 50%, and somewhat difficult by 12.5%. Furthermore, 83.3% of them qualified the level of difficulty appropriate for their level while 12.5% found them too difficult (one subject did not try the exercises). It can thus be concluded that users appreciate Pomme.

5 Conclusion

In conclusion, building intelligent French grammar websites based on design and pedagogical principles is important because grammar is a crucial facet of learning French and because such websites offer possibilities that printed material does not. In addition to the fact that websites are easier and cheaper to update, they offer interactivity, adaptability, and a range of ways to organize and access information. This article summarized eight principles that should guide the conception of grammar websites. Some principles presented here have been implemented in various ways in a number of existing extensive French grammar websites such as *Le Français interactif* (Blyth *et al*., 2001) or *Griff* (Beaudoin, 1999). However, because *Pomme* is based on an interactive database (Beaudoin, forthcoming) and because its development was based on these principles from the beginning, it offers more interactivity and adaptability than the other sites. It also provides more flexibility in ways of accessing the information to build French grammar knowledge. Further research should focus on ways of increasing the interactivity of French grammar websites, possibly through the use of interactive databases, which are, in my opinion, valuable tools in achieving this goal.

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