

Short Paper

The Use of the Internet for Teaching Botany to Pharmacy Students

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An Internet site of botany has been proposed for some years to first-year pharmacy students of Lyon-I University (France) in order to help them supplement the information obtained from plenary lessons and lectures. After four years it seemed appropriate to evaluate the utilization of this site by students and check whether it responded to their expectations.

Keywords: Botany; Internet; New learning technologies; Pharmacy

INTRODUCTION

Although sometimes considered out of date, botany remains essential to pharmacists, especially for those who are in daily contact with the public in community pharmacies. Indeed, many molecules used in medical treatments originate in plants or are copied from plant-derived molecules. These are also essential to the composition of herb teas and infusions. Finally, pharmacists are very often asked for advice on herbs, extracts and toxic plants.

Learning botany requires some kind of visual support illustrating plant varieties and physiological or morphological characteristics. This has been made possible by the use of new learning technologies such as visual conferences or the Internet. These techniques associate written text and pictures, fundamental information and image, thus permitting a better approach to learning science of the plant world.

Botany students usually need pictures to illustrate their lessons. Some of them even find it difficult to note down every word during the lecture. They may miss important notions when the teacher speaks too fast or when their own attention decreases. This is why we found it interesting to provide them with elementary teaching material such as pictures of plants cited during the lesson, as well as a written digest of the lesson itself.

The botany on the Internet site of the Institut des Sciences Pharmaceutiques et Biologiques (ISPB) [<http://ispb.univ-lyon1.fr/cours/botanique/>] was

first conceived in 1997 when a pharmacy student preparing his thesis chose to set up the Internet site of the faculty (Tonthat, 1997). At first, only the answers of the recent student examinations and a short botanical bibliography were provided on this site. From September to November 1997, an abstract of each plenary lesson was added, on a weekly basis. This offered students the elementary information given during the lesson and provided links towards complementary information.

Finally, from December 1997, many pictures of plants as well as an extensive list of links towards the sites of biological and/or botanical interest were added.

THE BOTANY SITE: PRESENT SITUATION

The site now provides eight classes of information:

1. A botanical bibliography: a 100 documents have been listed, some of these with a short appreciation.
2. A list of links to sites of botanical interest.
3. The text of all botany exams taken in the ISPB since 1997.
4. An extensive summary of botany plenary lessons: the course deals with general botany, history, classification, evolution, main plant kingdom divisions, characteristics of Angiosperms.
5. Many photographs of plants (around 200 have been included to date).
6. The address of the teacher responsible for the site.
7. A glossary of main botanical terms.
8. Since November 2000, the questionnaires and corrected proofs of tests proposed by tutors who deliver educational support to first-year pharmacy students in Lyon (these embrace all subjects studied). This part was added to the botany site for convenience, the teacher

responsible for the site being also responsible for organizing this educational support.

Different software types were used for constructing the site: web pages are built with Dreamweaver 4 (Macromedia), pictures are taken with a Fuji camera (MS2700) and modified using PaintShopPro 4 (Jasc).

STUDENTS AND THE BOTANY WEBSITE

The website was first designed for first-year pharmacy students in order to help them handle the information delivered during plenary lessons. We rapidly observed that the site also received visits from other pharmacy students; indeed, botany is a very important part of their training since all French pharmacists must be able to identify plants. Although first perceived as a "gadget", the site soon became essential to many students who use it regularly. Students even ask for the updates when the weekly lessons are not added on time.

First-year students: The website first provides them pictures which they use as illustrative material. They also use it to check their notes and avoid misspelling or misunderstanding of words used during the lesson. Those who are more particularly interested in botany use the links provided in order to "find out more". The site also helps them to train for botany exams. Since November 2000, it has also offered them an opportunity to train in all other subjects, thanks to the tests proposed by tutors in charge of the educational support.

Second- and fifth-year students: Botany is not only studied by the first-year pharmacy students, it is also widely revisited during the second and fifth years. A few students then come back to the fundamental part of the site in order to update their botanical expertise. Most of them, however, just use the pictures which make it possible for them to learn essential plants and train for identification tests.

TABLE I

<p>The Centre de Documentation du Pôle Scientifique de l'Université Catholique de l'Ouest (a Resource Center of the Scientific Pole, (2001) department of Angers private university dedicated to testing scientific Internet sites) granted a very satisfactory 18/20 in their rating assessment. <i>tela-botanica</i>, a network of French botanists (<i>tela-botanica</i>, 2001)</p> <p>Biome Natural Selection Gateway, a project of the British universities of Oxford and Reading in collaboration with the Natural History Museum of London (Biome Natural Selection, 2001)</p>

INTEREST OF THE SITE FOR PERSONS OUTSIDE THE ISPB

Many visitors come from outside the ISPB. They consult the site for different purposes (as revealed by the e-mail messages which they send to the author). French visitors find it convenient for learning botany, as it is one of the very few websites written in French. The site provides pictures of plants that can be downloaded for further use. A number of people working for environmental agencies, in education, architecture and horticulture have written to ask permission to use pictures; permission is generally granted, provided it is for a non profit-making purpose. A lot of pictures from the site can thus be found in different horticulture sites, for example, "Jardin! l'Encyclopédie" [<http://nature.jardin.fr>]. Pharmacists sometimes consult the site to check the accuracy of their botanical knowledge and identify plants. The site thus plays a part in continuing professional development. We have also had private individuals asking for botanical or gardening advice.

EVALUATION

Between 70 and 100 visitors sign up every day. Most student visitors have further contacts with the author, either by e-mail or directly at the end of the lessons. They have expressed their high

interest in the content of the site and the help it provides (Reynaud, 1998).

Links to the botany site of the ISPB have been made by several broad-spectrum directories ("Yahoo!", for example) in addition to those directories specializing in biological science.

The French scientific journal *La Recherche* quoted it in its December 2000 issue (La Recherche, 2000). The site was also mentioned by "Eureka", a French journal popularizing science (D'Abbundo and Forget, 2001). The project received an approving review from different information professionals with subject expertise (see Table I). The educational interest of the site was also lately acknowledged by Educasource, a service for electronic teaching programs from the French Ministry of Education.*

PERSPECTIVES

In its present form, the botany site seems convenient for students. However, it requires improvements that have mostly been suggested by non student visitors. Some modifications have been made or are currently underway. For example, a new and less severe paging incorporating "Flash" animations; the inclusion of the lesson plan on the left part of the main window, with links to the different parts of the text; and the inclusion of a glossary of botanical terms with some images. Finally, the structure of the site will be simplified, with images and schemes that are referred to by internal links, being incorporated in the main text.

CONCLUSION

New learning technologies, such as the Internet, provide a very attractive tool for teaching and assisting learning in botany. Technology can

make it easy to display photographs of complete plants, as well as of detailed elements, that can be complemented by text explanations. Students are now well aware of the educative interest in computers and computerized devices (such as CD-ROMs or the Internet) and that these devices may bring them as much information as plenary lessons or books. This specific benefit to students must not be underestimated.

Another particular interest of the Internet is that sites are permanently in progress. Contrary to books, for example, they need not be totally completed before they are published since new information can be included whenever is needed. Regular updates are even highly recommended, as they will show that the site is "alive" and can be relied upon. Most visitors find it very unpleasant to connect to sites that were built some time (months or even years) ago and never updated since. Finally, we have seen that the Internet can also be a valuable source of continuing professional training for pharmacists.

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The author is Maître de Conférences at the ISPB, Faculty of Pharmacy, Lyon-I University, where he teaches Botany to pharmacy students. He has been engaged with new learning technologies (for example, CD-ROMs and Internet design) for some years in an attempt to render botany more attractive and easy to learn.