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Basic Botany On-Line: A Training Tool for the Master Gardener Program

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Abstract
A team of educators and Web designers at Oregon State University developed a non-credit, on-line training module for the Oregon Master Gardener program. The project goal was to increase accessibility to the Master Gardener program and is the first step in developing similar modules for other topics covered in the Master Gardener training. The 48 Master Gardener participants felt the module was a useful training tool. They also noted that the convenience of completing the material at their own pace and during a time that fit into their schedule made this type of training tool useful to them.

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Background

Extension educators throughout the country are increasing their use of the World Wide Web (DeYoung, Harris, & Larsen, 1995; Lippert, Plank, Camberato, & Chastain, 1998), including using the Web to deliver Extension educational information and programming to clients (Tennessen, PonTell, Romine, & Motheral, 1997). This information can be delivered locally, regionally, or even nationally, which greatly increases the number of clients Extension educators can reach. An equally important benefit is that these clients have the opportunity to access this information at their convenience, thereby removing the constraints of time and location.

Adults make up a large percentage of the clients served by Extension, including participants from the Master Gardener (MG) program. As learners, adults bring a unique set of characteristics to any learning environment, one of which is a preference for a more learner-directed education style (Wilkes & Burnham, 1991). Knowles

(1973) further elaborated on characteristics of adult learners, including that:

1. Adults are self-directed learners;

2. Adults seek to build on their previous experiences as they learn;

3. Adults have specific learning needs generated by real-life tasks; and

4. Adults wish to learn skills and/or knowledge that they can apply immediately in real-life situations.

Computer-based instruction may be one way in which Extension can reach larger audiences and create a learning environment compatible with some adult learners.

In 1986, Kulik, Kulik, and Shwalb noted that computer-based instruction has the potential to increase learning, increase retention of participants, decrease expenditures, and decrease the time required for training. Although all of these can be considered benefits, the challenge remains to create a quality on-line learning experience rather than to simply deliver information.

On-Line Master Gardener Training

In 1999, over 940 new MG member received 48-66 hours of initial training at 19 different sites throughout Oregon. The popularity of this Extension program, as evidenced by large annual training classes, has resulted in a shortage of traditional classroom space.

This growth led a team of educators and Web designers at OSU to develop a non-credit, on-line training module for the MG program. Creating this module, which is based on a required component of the annual training program, was the first step in making the 48-66 hours of training available online. Having the entire training available online will dramatically increase learner access to the MG program and allow them to complete the training asynchronously. In addition to classroom limitations, reductions in faculty and travel budgets associated with program delivery have made it difficult to effectively deliver quality training on a statewide basis.

Methodology

The on-line training module <http://osu.orst.edu/extension/mg/botany/> is comprised primarily of text from the Basic Botany chapter in the Oregon-Washington Master Gardener handbook that was modified slightly to meet Web publication criteria. Other module components include:

- A clickable glossary with a pronunciation guide;
- On-line quizzes for each section;
- An on-line discussion group;
- Links to additional educational resources on the Web;
- Three multimedia components, including a welcome video from the instructor;
- Two animations; and
- Numerous photographs and line drawings.

The module is a series of knowledge-based and problem-based learning components. All components of the module are linked via loop navigation icons so learners can readily reinforce their learning and analytical skills.

Development of the module required approximately 14 weeks following the project schedule delineated in Table 1.

Table 1.
Timeline for developing the Oregon State University Master Gardener program Basic Botany on-line training module.

Timeframe	Tasks

Project Inception	
Weeks 1-3	Developed site map, working with editors of the content and providers of photos and other media
Weeks 4-8	Created individual pages with modified text from the Oregon-Washington Master Gardener handbook; put photos and graphics into Web formats; selected and tested links to related Web resources; tested multi-media interfaces on multiple platform, browser, and hardware configurations; configured quizzes, glossary, image gallery, message board, etc.
Weeks 9-10	Completed copy-editing, link-checking, and optimized code for all pages and supplemental resources to make site compliant with ADA Web guidelines
Week 11	Tested design with test group of Master Gardeners
Weeks 12-13	Incorporated changes gained from user testing
Week 14	Completed final review and linked the site to a live Internet location

Pilot Testing the Module

To determine the effectiveness of this new learning tool, it was evaluated twice during the development phase. The first evaluation was completed by 16 veteran MG members using a 27-question survey. The survey was divided into five sections to evaluate:

1. Technical issues;
2. Organization of the module;
3. Presentation/navigation throughout the module;
4. Content/language; and
5. User satisfaction.

The survey was formatted into a 5-point Likert scale (Likert, 1932) where 1=highly positive ranking and 5=highly negative ranking.

A second group of seven volunteers participated in a usability test in a computer classroom to determine "user friendliness" of the module. Participants navigated through the module while a research team member monitored their progress. Participants then answered open-ended questions including:

- What they liked or disliked about the module,
- Areas that were easy to navigate,
- Areas that were difficult to navigate, sections of the module they thought should be expanded, and

- Components of the module they did not find useful.

Based on comments and suggestions from these two groups the research team made modifications before the module was used in the 2000 annual training.

Implementation

In January 2000, 32 new MG trainees self-selected to complete their botany training using this on-line module. They were given 2 weeks to complete the module online and at their own pace. At the end of that period, they received via mail the same 27-question Likert scale survey, with two additional questions related to an introductory video clip and two animations, and were asked to complete and return the survey.

Results and Discussion

Overall, participants in the test group felt the on-line botany module was a useful training tool for the Oregon MG program (total overall survey average: 1.56, n=16) and that it would be a useful addition to the annual training (Table 2). Written comments on the survey highlighted that the option to complete the module at their own pace and from home made this method of program delivery beneficial. And, although some of the participants enjoyed using the on-line discussion group and email to post questions to the group of on-line learners and the instructor, the group as a whole did not feel that these features helped them connect with the other learners or the course instructor.

Evaluations from the 32 new MG trainees who received their botany training online were similar to those of the test group (total overall survey average: 1.94, n=32) (Table 2). In the user satisfaction category, responses to the two questions on the introductory video clip and animations revealed need for more work in this area. The research team was interested in whether or not the participants could access these multimedia features and if they felt these features enhanced the quality of the module. Most users had difficulty accessing the multimedia features, and they did not feel the features enhanced their learning (4.1 and 4.0, respectively). The research team is exploring new software options to make multimedia components easier to use by a wider variety of users.

Table 2.
Average Score for Each Category from the Survey Completed by a Test Group of Veteran Master Gardeners and a Group of New Master Gardener Trainees

Survey Category	Veteran MGs (n=16)	New MG Trainees (n=32)
Technical: 2 questions	1.2 [z]	1.5
Organization: 6 questions	1.6	2.4
Presentation /navigation: 6 questions	1.7	1.8
Content/language: 8 questions	1.3	1.5
User Satisfaction: 5 questions test group; 7 questions new trainee group	2.0	2.5

Total overall survey average	1.56	1.94
Evaluation using a 5 point Likert scale (Likert, 1932) where 1=highly positive ranking; 5=highly negative ranking.		

Summary and Conclusions

The overall ranking of 1.94 (1= highly positive and 2= positive) suggests the initial offering of an on-line training module for Oregon MGs was successful. Participants particularly like the flexibility of completing the training asynchronously. And, although the module included components to make it more interactive (on-line discussion board, video clip, and animations), these were not features that the participants found particularly useful. This may in part be because they needed more instruction on how to use the features or because their computer systems were not capable of running the software associated with the video clip and animations. More research on computer capabilities of Oregon MGs would help to answer some of these questions.

The usability testing conducted in a computer classroom provided the research team with valuable feedback on the module and highlighted areas that needed improvement. A number of issues the team took for granted (e.g., knowing how to use a browser, typical placement of forward and back arrows, how frames work) needed to be modified or explained better to help the learners. Additionally, color schemes and page layouts were also modified before the module was offered to the new trainees. The pilot testing, usability testing, and subsequent changes before the module was implemented were key components to making this project successful.

The complexity of this project required a team of professionals, each with a unique skill set and area of expertise. Team members included a subject matter specialist, education designer, publication specialist, Web specialist, Web graphics designer, Web animation developer, Web accessibility specialist, evaluation specialist, and proof-readers. This initial project capitalized on skills of members from both the Horticulture Department and the Department of Extension and Experiment Station Communications. Development of future modules will also require this type of collaborative work.

We are continuing to further develop on-line training options for Oregon Master Gardeners. Creating on-line training modules based on content from the Oregon-Washington Master Gardener Handbook creates an opportunity to greatly increase accessibility to the Oregon State University Master Gardener program. An ultimate goal is to develop training options for new volunteers that are more flexible than traditional classroom delivery, yet still provide a high-quality learning experience.

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