

# FINDING EFFECTIVE WAYS TO PROVIDE KNOWLEDGE TO FOREST MANAGERS ABOUT NON-TIMBER FOREST PRODUCTS: A CASE-STUDY OF DISTANCE LEARNING APPROACHES

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**Abstract**—Many who grow or collect non-timber forest products (NTFPs) have been under-served in traditional forestry educational programs. It has often been difficult to determine the needs of this disparate group of stakeholders as collectors and growers are widely dispersed across the landscape, and not recognized as important stakeholders in formal cost forest management or forest products outreach programs. In most cases they may not attend or participate in traditional forestry education programs. Forest managers and extension agents, who serve this clientele, lack information and knowledge concerning NTFPs and are challenged to serve these stakeholders' needs. Distance learning methods may be an efficient and low cost way to teach collectors, growers and the extension agents that serve this group of stakeholders about how to manage and utilize NTFPs in a sustainable way. We examine, here, distance learning methods such as two-way television (video conferencing) and on-line courses to determine if they are appropriate for training those who harvest and utilize NTFPs.

## INTRODUCTION—WHAT IS DISTANCE LEARNING?

Universities have been seeking methods to better reach students across great distances, and to offer courses that are more convenient for a more mobile group of students. Students who lived and worked at great distance from their chosen educational institution and/or did not have the time or resources to attend educational programs were left with few alternatives. Many enrolled in correspondence courses. Assignments were mailed to students, who returned them to instructors for grading and comments by mail. This system was slow and had little flexibility to offer educational pedagogies that fit the needs of the student or the content of the course. Night classes or weekend-based courses followed and were more expensive, but offered learners who are job bound opportunities for continuing their education. However, these are less desirable if students have trouble traveling great distances to attend. Distance learning education techniques build on these needs; providing campus-based instruction and doing so at the convenience of both the instructor and student.

Instead of assembling students from dispersed locations in one place, distance learning courses reach students wherever they wish to live or study (Guri-Rosenblit 2005). Mobile life styles and working environments mean that educational programs offered need to be flexible in timing and location. As the costs of delivering and receiving traditional, in-person on-campus educational programs increased, cheaper methods, especially those that serve more geographically diverse audiences, became more desirable. Distance learning utilizes cost effective, electronic and on-line media to provide courses and bridges the gaps between the teacher (and educational institution) and students.

Within the past decade technologies have become available that enable institutions to meet these needs.

Distance learning can now match the needs of students and educational institutions and use technologies that are appropriate technologies to the learning opportunities. A variety of media may be used or adapted to the learning group needs and range from add-on functions in classrooms replacing face-to-face meetings with on-line learning encounters.

The instructor is positioned in a central location—no need to travel to serve the audiences. This technology seems appropriate for Federal agencies, such as the military, Forest Service and other Federal and State agencies with a high percentage of their personnel stationed in rural areas, but needing training for career development and to meet changes in the workplace. Distance learning seems to be a good fit for these students.

Earlier distance learning technologies included teachers distributing video tapes (now replaced by DVD) by mail to students, and the students reviewing them and then returning them with completed exams. A simpler method is the use of conference phone calls. These are being replaced using on-line (web-based) connections which enable one or many users to join a discussion. Recently a variety of web-based phone and video phone systems (i.e., SKYPE) offering inexpensive or free connections through the web have begun to be offered. These are making communication between students, and students with their teacher easier and more affordable.

In the past few decades, a variety of distance learning technologies, primarily web-based, have been introduced. One of the most common is interactive video-conferencing (“two-way television”). Students sit in a classroom served by cameras and monitors linked to similar equipment in other locations. The instructor(s) can work from a remote location. In addition to the live broadcast, the technology

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allows for use of slides, video and overhead projector. This has been a very effective way to involve several groups to discuss and work simultaneously.

Another common tool is the virtual chat room which gives the students the opportunity to conduct live conversations. It also serves as an on-line repository where the responses to all questions can be posted and referred to later by all the students. Many courses utilize a virtual library that has the capacity to store on-line numerous case studies, reading materials, video clips and other resources ready for easy access.

Internet or on-line discussion board messages are posted over time for future use. These “synchronous chats” can be live or have delayed participation. These are accessed through web sites at any time to review the discussion. Internet-based course management systems assure that all students have 24 hour access to materials and can add materials, participate in discussions, and retrieve and submit documents (including quizzes).

We also need to define the NTFP stakeholders. Knowing who they are and how they might be reached through educational programs is critical to our examination of distance learning techniques. Non-timber forest products include all the flora and fauna of the forests, except for timber, pulp and other wood products. NTFPS are collected usually in small quantities from forest land and may include edible forest products (berries, nuts, etc.), floral or decorative products (dried flowers, vines, bark, etc.), medicinal or dietary supplements (ginseng, black cohosh, etc.), specialty wood products (carvings, turnings, and products made from lesser known timber species), and ecosystem services (recreation, ecotourism, agro-tourism, etc.). Each product has differing seasons for production, processing, and marketing, and different product qualities that dictate individual production, and marketing strategies.

With this diversity of products and markets, NTFP stakeholder training needs differ greatly between regions. The training needs of NTFP stakeholders are varied—i.e., how to learn how to start a NTFP business for those who do not have access locally to a business school, or how to produce NTFPs without a specialty crops program in the area. In addition, some stakeholders lack higher education, and many can't afford computers or lack adequate access to the Internet. NTFP stakeholders are most likely geographically spread out, often living and working in remote, rural areas. They are not often able to relocate to pursue study opportunities due to the distance from educational institutions or training centers. Many have differing and non-traditional learning needs—some wish to learn skills to grow or propagate NTFPs, while others want to learn about marketing or business establishment.

This is an expanding group of learners. The number of people interested in learning more about NTFPs is expanding. Many landowners who recently, as an investment in a future residential or vacation home spot, have invested in a small piece of forest land and have looked for new and expanded sources of income to support these investments. Distance learning seems appropriate for these NTFPs stakeholders, as it can serve single students or engage in small groups and is very effective for large dispersed groups of students.

The goal of this paper is to explore different methods of distance learning and reflect on which ones might be most applicable to address NTFP stakeholder needs. What follows in the next section is a review of distance learning programs with the emphasis on those that might be most useful for technology transfer to NTFP stakeholders.

## **BACKGROUND**

Efforts of Virginia Tech to transfer knowledge about NTFPs began with involvement in traditional workshops and extension publications in the mid-1990s. In 1997, a Virginia Tech/Forest Service collaboration made its first venture into distance learning specifically focused on NTFP stakeholders when it installed tutorials on the NTFP (special forest products) website (Hammett and others 2001) providing simple instructions on the economics, production and marketing of important NTFPs. The plan was to provide a series of tutorials that help landowners manage and entrepreneurs utilize common and economically viable NTFPs (Hammett and Jones 1998). Two test tutorials “Writing Business Plans for Wild Harvest Sector” and “Growing Slippery Elm” were posted, with plans to post others after evaluation of the first two. While both tutorials were well visited the level of user response was not up to our expectations, and we decided not to add others. However, this experience helped us see the potential for on-line education in the NTFP sector. Many users provided comments on these tutorials and a few suggested topics for additional tutorials (see paper by Chamberlain and others in these proceedings), but additional tutorials seemed unnecessary.

What is the history of the use of distance learning in natural resources? To find this out we first did a literature review to locate information and research associated with the use of distance learning in natural resources and more specifically as it had been used with NTFPs. Our search yielded few pertinent papers and reports that offered examples that may be appropriate for the needs of NTFP stakeholders. Downing and Finley (2005) surveyed landowners to assess their preference in delivery of educational programs and found that video conference delivery was the least desirable of the “passive” methods of delivery.

Next, we sought to find those in the natural resources field that are working with distance learning. Many of the examples in our search were found in the agriculture sector (i.e., Lippert and others 1998), but we tried to focus our attention in the natural resources sector. Such examples in forestry and forest management seem to have merit when looking for programs that might be appropriate for NTFP stakeholders.

Many Forest Service personnel are dispersed across the country and often posted in rural areas far from the nearest college campus. Many of these personnel seek, in the short-term, courses that raise their skill levels, while others wish to earn a masters degree. Virginia Tech is collaborating with the Forest Service in a major distance learning project that provides on-line courses taught by Virginia Tech faculty. For many Forest Service employees distance learning seems very reasonable for serving those working in outlying areas without access to college campuses or other learning sites (Evans 2006). We formed a consortium of several universities to provide courses not available at Virginia Tech. This example will be examined in more detail later in this paper.

Over the past several years Virginia Tech has been involved in developing and presenting several types of distance learning activities; both through its regular academic programs and offering a wide range of non-credit courses. Virginia Tech's Institute of Distributed and Distance learning (IDDL) was set up to provide the course development, management, and other support to VT faculty that match the needs of their audiences (in this case, the students) (Evans 2006). This group is representative of other technology assistance organizations that can provide support to NTFP specialists wishing to use these new technologies for training programs.

Early distance learning techniques included sending out content on tapes of lectures to students for their review (more recently CDs or DVDs have been used). Experts were hired (as they are still) to give lectures which were then sent out to subscribers on tape. This technology continues to be used by accreditation agencies to keep professionals skilled or up-to-date on current issues. Earlier methods included broadcasting the lessons through traditional television stations and with the instructors receiving questions through telephone—much like current talk shows are operated. Newer, web-based technologies have replaced many of these programs. The concept is the same, only the delivery mechanisms have changed.

We queried several universities that offer natural resource courses on-line, and decided to stick with examining our own experience for lessons learned which appear to be appropriate for possible development of NTFP on-line training. We selected three examples from Virginia Tech's distance learning experience to help us examine the benefits

of distance learning for NTFP stakeholders. The first highlights the Virginia Tech - Forest Service joint venture which offers a graduate degree program through distance learning. The second example is The Global Seminar which uses distance learning technologies to reach students worldwide. The last one examines the Royal Roads/Virginia Tech collaboration to offer an on-line NTFP course.

## SELECTED DISTANCE LEARNING ACTIVITIES

We learned of several institutions in the region, at varying levels of emphasis, which are beginning distance learning programs. Few offered courses that included content focused on non-timber forest products. However many may provide lessons for the NTFP community.

Enabling two-way communications between forest managers and NTFP stakeholders is also a concern. Each distance learning technique was reviewed to better understand its effectiveness and looked for ways to improve access to information for NTFP stakeholders. Technology transfer programs will be more successful if they first ascertain NTFP stakeholders' needs to help design and implement technical assistance that is appropriate. The case study discusses issues, opportunities, challenges and potential for distance learning methods to get information and knowledge to this diverse clientele. What follows is a review of selected distance learning techniques in use today that serve the forestry, forest products, and related natural resource communities.

Regular teaching of courses on-line and through other distance learning methods has been a regular feature at Virginia Tech over the past decade. Several courses in many disciplines have been modified to be presented through distance learning (i.e., Global Issues in Natural Resources), while several new courses have been developed for distance learning delivery. The course offers skills in decision making for mid-level managers in natural resources.

Reaching tree farmers through video conferencing using two-way television events are cost effective. During 2000, Virginia Tech, several other academic institutions, and forestry agencies organized a major video conference discussion on forest certification that reached practitioners across the country. The Master Tree Farmer Program has used video conferencing to reach hundreds of subscribers. The most recent included a segment on NTFPs during the spring of 2004. Both programs simultaneously reached scores of participants in dozens of locations. In each case recording and distributing the conference extends the benefit to others who may not have been in attendance at the live conference.

Academic institutions are moving quickly to distance learning as a more cost effective and niche market for their

course. Business and then Engineering programs were first to embrace distance learning. They were proactive, especially in filling the needs of mid-level professionals who wished to sharpen or update their skills with a few courses, or gain advancement with an additional degree (i.e., a professional certificate or a master's degree). As the educational market got more competitive, distance learning was found to be an effective tool to widen the geographic area from which universities could recruit students. They no longer had to recruit students only within commuting distance. Another advantage is that students could take the courses when they wished, or from home. With new technologies, students can join a video conference from their home, or be part of on-line courses that include streaming videos and on-line video chats so that students no longer need access to video conferencing equipped space.

Courses may be separated into those for degree granting programs and non-academic or professional programs. Land grant institutions are mandated by law to provide outreach programs for landowners and natural resource practitioners and skill development programs for foresters and other natural resource professionals. It seems appropriate for some of the outreach programs to serve as models for training NTFP stakeholders.

North Carolina State University (NCSU) has widely publicized several graduate-level courses it offers through a combination of on-line and video conferencing methods on subjects such as wood chemistry and wood anatomy (but no courses as of yet are offered on non-timber forest products). NCSU has also developed and now offers several on-line courses in forestry and related subjects ([www.distance.ncsu.edu](http://www.distance.ncsu.edu)).

Several technologies are used in distance learning. Delivery modes include on-line courses, video conferencing courses, DVD/Video, or audio CD courses. Video conferencing involves holding a class meeting using video to connect the students and the instructor and is becoming quite popular. Students congregate in a class room that is equipped with television and cameras with sound equipment rigged for two-way or multi-location broadcast. The instructor can be in his or her office or with another group of students. Technology now also allows for individuals in some cases to join such a video conference from their own computers. This method is closest to traditional, in-person, extension programs (workshops and short courses) and thereby may hold much promise for providing courses to NTFP stakeholders.

The Instructional Technology Council (ITC), which provides leadership, information and resources to expand and enhance distance learning through the effective use of technology, defines distance education as "the process of extending learning, or delivering instructional resource-sharing opportunities, to locations away from a classroom,

building or site, to another classroom, building or site by using video, audio, computer, multimedia communications, or some combination of these with other traditional delivery methods". ITC proposes that users of distance education opportunities are older and most work during the traditional classroom hours. Distance Education students require flexible learning schedules and demand professional development opportunities and classes to help them keep up with today's ever-changing work environment. ITC indicates that the main reason for students to select distance education as a delivery method is that they want to learn at their own pace, and at times and locations that are convenient (Instructional Technology Council 2006).

Of the universities delivering any natural resource courses on-line, only one provides a course with focus on non-timber forest products. However, several of our colleagues are developing or have offered courses in natural resources. For instance, at the University of Tennessee, one faculty member is coordinating a group of on-line courses in forestry. The University of Florida has offered a set of interstate courses on-line to the natural resources community. And Clemson University and Mississippi State have offered courses in taxation using distance learning.

At Virginia Tech traditional outreach programs such as the Master Logger Training Program and other similar programs have been increasing their web presence. We have also used video conferencing to connect two or more classes around the state to interact on subjects related to sustainable natural resource management and utilization. On-line chats (incorporated in earlier versions of the web site as bulletin boards) have been found as good ways to have "live" discussion about methods and issues related to forestry and forest products.

Distance learning seems to be an effective way for instructors that have niche course or teaching specialties to provide these when they can't travel to serve students groups. NTFPs are a good example of such a niche subject. Through distance learning we can incorporate guest speakers from other locations and not be solely dependent on the local instructors. What follows are three distance learning experiences at Virginia Tech that may offer examples for setting up an on-line training for NTFP stakeholders.

### **Natural Resources Distance Learning Consortium**

The Natural Resources Distance Learning Consortium portal was initially developed by the College of Natural Resources, Virginia Tech and the Forest Service. It was designed to deliver course information to web-based learners, particularly those at non-campus locations especially those working on remote areas of the National Forest System (Natural Resources Distance Learning Consortium 2006). It has expanded to include web-based courses from many

natural resource programs, from Land Grant, McIntire-Stennis designated, and other universities. The Consortium provides upper-division undergraduate and graduate distance learning education to anyone interested in natural resources and managing their uses. The consortium offers full college credit graduate courses, certificates of study, and graduate professional degree programs (Evans 2006). The consortium will include a course on NTFPs currently being developed at Virginia Tech reflecting interest shown by the students in the program.

The Consortium offers courses originating at those institutions that specialize in particular subject areas (i.e., VT offers eastern hardwood courses, The University of Idaho teaches forest ecosystem and wild land fire management courses, and Northern Arizona University offers through the Consortium courses related to recreation). Each of the universities working together with the others offers the courses it can best provide. These institutions are spread across the US, offering collaboration opportunities with several Forest Service units, and other government agencies. This widens the geographic presence of the Consortium and makes it more effective in serving students across a wide range of needs.

An initial survey at VT found a low percentage of universities offering natural resources courses on-line. Only 4.5 percent of universities with an on-line presence delivered natural resource education courses (Personal communication. 2006. Dr. Gary Evans, Director of the Natural Resources Distance Learning Consortium, Northern Virginia Center, Virginia Tech, Falls Church, VA.). Over three thousand courses were reviewed, only one had substantial NTFP content—Alternative Forest Products offered at Oregon State University. Another course entitled Non-timber Forest Products Culture and Management has recently been introduced at Oregon State (Oregon State 2006). Neither of these courses addresses the needs of those interested in NTFP marketing and business development or the NTFPs found in the Eastern US.

The Consortium offers three options for learning: individual courses, as needed; courses clumped into Certificates of Accomplishment (usually 9 – 12 credits); and a degree, Master of Natural Resources (30 - 33 credits). Both these options may not be appropriate for NTFP stakeholders.

The Forest Service and other government agencies that post personnel in remote areas are the initial target audience. The consortium works closely with the target agency to ensure courses fit needs of personnel, and seeks to serve other agencies across large areas (Personal communication. 2006. Dr. Gary Evans, Director of the Natural Resources Distance Learning Consortium, Northern Virginia Center, Virginia Tech, Falls Church, VA). Based on these contacts with agencies an on-line NTFP course is being developed and will be offered during the fall of 2007.

## **The Global Seminar**

The cornerstone of our distance learning experience at Virginia Tech is The Global Seminar, a course that combines on-line and video conferencing techniques through which teams of students discuss four to six cases (focused on topics such as biodiversity conservation, forest-based livelihoods, and natural resource sustainability) during a semester. This course has been an excellent way to get several of our faculty and students exposed to the potential of distance learning. It has also exposed teams of students in agriculture and natural resources to key issues in natural resources, and to connect them with teams across the globe ranging from China to Africa.

A course using distance learning technologies focused on environment and sustainability now is being taught at VT. The Global Seminar started 1997 at Cornell, now is based at the Virginia College of Osteopathic Medicine (VCOM), and Virginia Tech. The course is active at a total of 35 universities, community colleges, and high schools—located worldwide in Africa, Asia, Australia, Europe, and the Americas. Student teams within clusters of 4-6 schools (across regions, languages, and cultures) study and discuss the same set of cases. The course utilizes a variety of distance learning technologies including video conferences, on-line chats, email, an on-line library (case studies, resource materials, etc.) and sharing documents through a web site.

Once the schools are grouped in clusters, one school's team is selected to lead each one of the cases to be discussed. There is ample opportunity for interaction as each team leads the discussion of a case, choosing the questions for and leading an on-line chat, and setting up and leading the video conference. The class web site is shared between members of the group where background materials are posted. The virtual chat, virtual library, discussion board and all other on-line features are managed on the Blackboard platform. These collaborations across schools and cultures offer an example of what may be possible in a course for NTFP stakeholders.

Instructors select from the long list of cases and resource materials posted on-line and may add other materials to the web site so they are accessible to the students. The Global Seminar virtual library of cases includes several that deal with issues associated with NTFPs (i.e., biodiversity, bio-prospecting for the pharmaceutical industry). In particular, the case on agro-forestry examines the use of NTFPs in the Chesapeake Watershed as part of the discussion on water quality and resource sustainability.

## **On-Line for-credit Courses**

While there are now hundreds of natural resource related courses taught on-line, we found very few examples of

using distance learning techniques for NTFP related subject areas. An on-line NTFP course designed to improve forest managers' skills was one of several international NTFP outreach programs examined. In 2004 Canada's Royal Roads University in British Columbia with Virginia Tech organized the first on-line course on non-timber forest products. Representatives from Canada, Germany, India, Nepal, Russia and the United States assisted in pioneering this on-line course designed for foresters, forest students and managers around the world. Led by Royal Roads University in British Columbia in collaboration with Virginia Tech and the International Forestry Students Association (IFSA), the team developed a pilot for a new international course on management of NTFPs. The development phase was funded by the International Partnership for Forestry Education and Canada's International Development Research Centre through the University of British Columbia. The project's steering group includes representatives of the Government of India, the Georg-August University in Goettingen, Germany, and the IUCN, The World Conservation Union, representative in Moscow. As with any course development effort, such cross-agency input will help ensure that the course is appropriate for the target stakeholders.

This regional on-line course "An introduction to non-timber forest products in sustainable forest management" is planned for worldwide application, but the pilot will be delivered in India. It is designed to provide those responsible for forest management with a broad perspective on the social, economic, and environmental issues that surround the sustainable utilization of non-timber forest products (NTFP), also known as "non wood products". NTFPs are of major importance in tropical and sub-tropical countries and are being recognized as a significant contributor to rural economic diversification and forest conservation in temperate and boreal regions, as well. The course is designed in a modular format so that elements can be "mixed and matched" to meet the needs of specific audiences. The first is generic worldwide (what are NTFPs, trade in NTFPs, etc.). The second is generic to a bio region (tropical, sub tropical etc.)

The third is specific to a geographic region (India and Nepal) and focuses on the problems and opportunities in that region. For example, the pilot course's three modules address "global", "tropical/sub-tropical" and Indian sub-continent issues. Other versions of the course could include "temperate/boreal" and a variety of regional modules, such as Northern Europe, China, North America or Sub-Saharan Africa. Testing of this course will provide experience that helpful in developing on-line NTFP training in the US.

This semester-long (16 weeks) course is directed to students who are field technicians. Each student completes a project that is focused as much as possible on a situation at their

work sites (i.e., market study or a production study for NTFP in their working area), and will hopefully contribute to their work. This approach might offer content appropriate for a US-based course.

Few other US-based for-credit courses were found in our search that may serve as example NTFP courses. As previously mentioned, at Oregon State University a new one credit course, SNR 533: Alternative Forest Products, covers the integration of "non-timber forest product (NTFP) management into the broader context of sustainable natural resource management" in the Pacific Northwest region (see course syllabus, Oregon State University 2006). Virginia Tech is proposing an on-line course in NTFPs for undergraduate and graduate credit. The course will focus on issues relevant to NTFPs in the Eastern US with some Pacific Northwest and International Examples.

## **DISCUSSION—CHALLENGES AND OPPORTUNITIES**

The challenges to offering courses on-line to NTFP stakeholders are many. First and most important is the technology may not be appropriate for this group of students. The "digital divide or lack of access by students to computers and the Internet may prevent students from participating in on-line classes. This may be a particular problem in rural areas and makes offering courses for many NTFP stakeholders problematic. In addition, technology failures can impact the effectiveness of courses. Computers and software are not foolproof. A key obstacle to presenting NTFP related courses on-line is the lack of acceptance by many stakeholders to using the Internet. The Internet is just not for everyone. Reluctance to use computers in general or the Internet as a learning tool is not well documented, but is difficult to overcome. Lastly, even with the growing amount of technology in place, still many landowners prefer hands on and face to face or interactive methods such as traditional short courses (Johnson and Baker 2006).

Many NTFP stakeholders find live discussion and more traditional methods such as face to face sessions best suited to meet their learning needs. One method that may be most suitable for NTFP collectors and processors is to present content through a "hybrid course" – one that combines both distance learning techniques and in-class (in person) sessions. The possibility of offering content through face-to-face activities on-line is improving (McCray 2000). Centra and other communication programs now available offer great potential for on-line class interaction at low cost. For example, we use it at Virginia Tech to teach technical writing (in English) to Chinese speaking students in Taiwan. Another example is The Global Seminar where video conferencing (face-to-face contact) is used on an occasional basis (4 to 5 times) each semester.

There are many technical improvements on the horizon that will lead to more Internet access and at reasonable cost. Wireless technology is increasingly available in smaller towns and through cell phone companies. Libraries, airports, and other public buildings are often venues for free wireless Internet access. This will make courses more accessible and cheaper to provide.

Technology transfer serving NTFP stakeholders will grow with the increased collaboration between organizations (i.e., forestry schools, on-the-ground groups that are working in NTFPs). These collaborations will help bridge gaps and offer “help course” technical areas where there are few resources or instructors available in that technical area (Evans 2006).

What do programs that operate on-line courses use to evaluate course effectiveness? On-line efforts to supply content may be effective for NTFP stakeholders who have regular access to the Internet. The concern is the lack of Internet access (or “digital divide”) for many NTFP stakeholders. In short these participants may be difficult to reach without regular access to the Internet. Reaching them through computer hook ups in local libraries or other public institutions may be the answer.

What are the constraints that we found to development and use of distance learning courses by NTFP stakeholders? The technology may be expensive to purchase and install and needs regular technical servicing (Walstad and others 2003) and this not always available especially in rural settings. This “high tech” equipment is quickly becoming part of mainstream educational programs, but still is not appropriate for remote settings. Access to small regional academic institutions (i.e., community colleges) may be the answer to bridging these gaps. This is compounded when you consider that funding and other resources for purchasing computer equipment, or paying to support building new on-line courses, or conversion of existing traditional courses into on-line courses is beyond the budgets of smaller colleges.

## CONCLUSIONS

Distance learning is a significant part of the menu of available learning methodologies and offers great potential for technology transfer to NTFP stakeholders. However, this comes with some additional costs that educational institutions and students must be willing to bear. North Carolina State University suggests that their on-line students have ready access to adequate computers with the proper browser and audio capabilities, and the ability to communicate via e-mail (Southern Regional Extension Forestry 2006). Instructors need also learn how to use these technologies increasing the frequency of their e-mail use and providing important course materials on-line.

Distance learning seems very applicable for NTFP stakeholders (i.e., landowners, and forestry extension practitioners). But these stakeholders must commit to access to and to the use various distance learning methods. This seems very possible when looking at examples where distance learning techniques have successfully served difficult to reach students over great distances. There are many examples of distance learning applications that are successful in spite of slow access to the Internet, less than fluent English speaking capacity, timing trouble due to various time zones, and gaps in access to technology. Most of the participants in The Global Seminar course do not speak English as their native language yet they are successful in this course which is based entirely on cases and discussion in English. With the proper teaching pedagogies NTFP courses can cater to the needs of most NTFP stakeholders.

Technology is developing quickly to facilitate access to courses in an increasing number of venue types. Voice transmission programs (such as Centra) are also becoming easier to use, and less costly to operate. With reasonable Internet access, on-line classes can be conducted utilizing slides, voice and in some cases short videos.

There is great need to evaluate current systems to learn which aspects would be appropriate for NTFP courses. Learner preparedness, access to delivery systems, communications and interaction with faculty and peers are all concerns when developing effective on-line courses (Lockee and others 2002).

Size and location of organizations providing educational opportunities is no longer an issue. Larger universities are now “competing” with smaller colleges for students not just in their own back yard or within commuting distance to campus, but across the country. Small forest landowners and service providers (harvesters, workers, etc.) can now access courses in many regions (i.e., New England, see Foster and Cranch 2001).

Several international examples of distance learning should be used for guidance. Beginning in 1996 The Global Seminar, formed as a consortium of educational institutions that are concerned with the future of our planet in terms of the environment and a sustainable food supply. The Global Seminar engages students in key issues pertaining to the sustainability of our environment and food system and uses on-line communication tools to support discussion among students, faculty and international leaders across several cultures and languages. The course fosters discussion of open-ended cases are designed to impart critical thinking skills and could have application for an audience of NTFP stakeholders.

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