The Ontario Advanced Forestry Program

by Laird Van Damme, R.P.F. and Kenneth M. Brown

Foresters use continuing professional education to keep abreast of new developments and adapt to changing job responsibilities. The demand for continuing professional education has grown recently in response to a public demand for forest management plans based on sound scientific principles and, as the level of involvement by diverse stakeholder groups has grown, foresters feel the need to increase their interpersonal effectiveness in complex, multi-perspective situations. In 1988, the Ontario Ministry of Natural Resources invited the School of Forestry at Lakehead University and the Faculty of Forestry at the University of Toronto to collaborate to design and implement a program of two-week intensive courses for mid-career foresters and other resource managers. The program has been successful during its first three years at reaching its target client base and there are positive indications that the program's educational objectives are being fulfilled. This article details the design and early track record of the Ontario Advanced Forestry Program (OAFP) that resulted from that collaboration.

Les forestiers utilisent la formation professionnelle continue pour être au courant des récents développements et pour pouvoir s'adapter aux changements de responsabilités dans leur emploi. La demande pour une formation professionnelle continue s'est accrue récemment en réponse à une demande du public d'obtention de plans d'aménagement forestier reposant sur des principes scientifiques éprouvés et, comme le niveau de participation des différents groupes d'intérêts a augmenté, les forestiers ont senti le besoin d'accroître leur efficacité interpersonnelle lors de situations complexes et pouvant être envisagées sous différents angles. En 1988, le Ministère des Richesses naturelles de l'Ontario a invité l'Ecole de Foresterie de l'Université Lakehead et la Faculté de Foresterie de l'Université de Toronto à collaborer à la conception et à l'implantation d'un programme de cours intensifs de deux semaines destiné aux forestiers chevronnés et aux autres gestionnaires des ressources. Le programme a réussi à atteindre avec succès au cours de ses trois premières années sa clientèle de base visée et des éléments positifs indiquent que les objectifs du programme en matière de formation sont atteints. Cet article décrit la conception ainsi que les résultats préliminaires du Programme de foresterie avancée en Ontario (PFAO) qui ont découlé de cette collaboration.

Introduction

Foresters use continuing professional education to keep abreast of new developments and adapt to changing job responsibilities. There are many sources for this education. Self directed study through reading technical books and journals is the most common source. Workshops and field trips are organized each year by many different agencies. Evening classes and fulltime postgraduate work at universities or colleges is available to practitioners. Unfortunately many individuals find it hard to allocate the time and organize their own study program.

The demand for continuing professional education has grown recently in response to two additional factors. First, forest stakeholders have become increasingly insistent that foresters be able to base their forest management plans on sound scientific principles. Second, as the level of involvement by diverse stakeholder groups has grown, foresters feel the need to increase their interpersonal effectiveness in complex, multi-perspective situations. In Ontario, attention has been drawn to both of these motivators as a result of the Ministry of the Environment Class Environmental Assessment Hearings which have been in session since 1985.

In 1988 the Ontario Ministry of Natural Resources (MNR) invited the School of Forestry at Lakehead University and the Faculty of Forestry at the University of Toronto to collaborate to design and implement a program of two-week intensive courses for mid-career foresters and other resource managers. Similar programs were first offered in the United States in the early 1970s and the silviculture institutes of Oregon and British Columbia currently enjoy considerable success. This article details the design and early track record

of the Ontario Advanced Forestry Program (OAFP) that resulted from that collaboration.

Overall Program Design

The initial OAFP curriculum committee consisted of faculty from the two partner universities, a representative of the Ontario Professional Foresters Association and representatives of the Ontario Ministry of Natural Resources. The committee first met in the spring of 1989.

At the first meeting, a MNR spokesman explained that the Ministry had two broad educational objectives in mind for the program: (1) to upgrade practitioners' knowledge of the scientific and technical basis for forestry practice, and (2) to increase practitioners' leadership skills. These objectives guided the initial design phase of the OAFP.

The basic design for the program was finalized in May, 1989 with the OAFP consisting of six 2-week modules:

- Module 1 — Autecology, Genetics and Population Ecology
- Module 2 — Integrated Forest Ecosystems
- Module 3 — Quantitative Decision Making
- Modules 4 & 5 — Silviculture I & II
- Module 6 — The Art of Professional Practice

It was also decided that the client base would generally be resource managers employed by (1) the Ontario Ministry of Natural Resources, (2) the forest products industry, and (3) other land resource agencies and private practitioners across Canada.

Program goal setting and evaluation is now handled through a steering committee consisting of senior managers in each client group and *ad hoc* curriculum committees comprising participants and leaders. This structure ensures that the entire client base is equally well served. The delivery of each module is the responsibility of individual module leaders. Module leaders exercise personal freedom to choose formats that they feel is the most useful.

Lakehead University, School of Forestry, Thunder Bay, Ontario P7B 5E1.

The first module was offered in September, 1990. A trilateral agreement between the MNR, Lakehead University and the University of Toronto's School of Continuing Studies was reached on April 1, 1991 that provided seed money for the administration of the OAFP. Tuition is charged to participants to recover all operating expenses.

Detailed Profile of the Current Program Curriculum

The OAFP curriculum covers two domains of practice which we have labelled biophysical and human. These domains coincide with the resource manager's work environment consisting of the forest environment interacting with a social framework. They also coincide with the dual program objectives that have evolved over the last few years.

The current program objectives are described by the following anticipated outcomes. (1) The objective of the first five modules is to upgrade the participants' knowledge of the science and technical basis for managing forest ecosystems from which society derives a multitude of benefits. In this way they will become more capable of solving technical problems associated with the management of natural resources. (2) The final module is designed to increase the managers' knowledge of their self, others and techniques that are combined to help solve messy problems that involve individuals, groups, organizations and even large social systems.

Figure 1 illustrates how the modules and their topics are related to each other within the two domains of practice. The overlap of module topics illustrates the integrated approach fostered by the module leaders. The topic coverage and anticipated outcomes for each module is described below in greater detail.

Modules 1 (Autecology, Genetics and Population Ecology) and 2 (Integrated Forest Ecosystems) provide coverage of current scientific thinking about the various components of forest ecosystems. Module 1 reviews the basic geomorphology, climatology, biology and fundamentals of evolutionary and population ecology. This review considers small-scale parts and processes such as DNA and meiosis, soil and weathering to large scale phenomena like glaciation and patterns of geographic genetic variation.

Module 2 continues a detailed study of plant and animal population ecology. There is a focus upon nutrient cycling, carbon balances and study of community and landscape ecology. Participants come to know the current scientific thinking about forest ecosystems and appreciate the intricacies of these systems.

Modules 4 (Silviculture I) and 5 (Silviculture II) go on to consider the management of forest ecosystems from a silvicultural perspective. Module 4 uses a classic prescriptive approach to silviculture focusing on the stand level with specific examples in the even-aged boreal forests. Module 5

Figure 1. Conceptual diagrams of current OAFP curriculum.

continues by reviewing prescriptive silviculture of the tolerant hardwoods of central Ontario. The latter part of Module 5 begins looking at groups of stands and large forest tracts in a dynamic framework. A heavy emphasis is placed upon human culture, wildlife and biodiversity values in the context of land use decisions and "amelioratory" silviculture. This aspect of management and associated social values link the human and biophysical worlds together. This linkage is part of the art of forestry designed to complement the science base of Modules 1 and 2. Participants learn to forecast stand and forest responses to human and natural caused disturbances in a socioeconomic framework.

A detailed examination of the various ways of quantifying the relationship between the human and biophysical domains of practice is the basis of *Module 3 (Quantitative Decision Making)*. Areas of study include probability theory, statistics and operations research topics (e.g., linear programming and heuristic simulation). A comprehensive overview of economics builds a realistic business perspective into the arts and science framework of resource management. Participants gain new metaphors and upgrade their quantitative problem solving skills necessary for rational decision making.

Module 6 (The Art of Professional Practice) is completely devoted to the human and social system side of resource management problem solving. During the module, participants gain insight into individual and organizational behaviour. A partial list of topics includes structured problem solving; creativity; systems thinking; psychological type and its effects on such things as learning, interpersonal behaviour, and leadership; group dynamics and team building; reflective thinking and learning from experience; organizational learning; and collaborative inquiry into difficult interpersonal and social problems. By the end of the module, participants have gained a lot of insight into stakeholder conflicts and they have acquired a kit of tools for analyzing, structuring, and facilitating solutions to such problems.

Participants experience all forms of educational activities over the duration of six modules. Delivery style and course materials vary to suit course objectives. More than 80 expert instructors have been involved with the program to date. Eighteen text books and approximately 6000 pages of reprints are combined with numerous audio visual aids, field trips, case studies and computer simulation tools to build the participants' learning resource base.

Participants experience all forms of educational activities over the course of the six modules.

Participants live and learn together during each course, often in a retreat setting. They then return to their work situation until the next module begins. Participants could finish the whole program following the sequence of modules in 15 months (as the program designers intended) or they can spread out their participation over two or more program years. Participants see this opportunity for flexibility as a great advantage.

Evaluation of Participant Progress

(a) Knowledge Outcomes

Recall of scientific and technical information is evaluated primarily in Modules 1, 2, and 3. These outcomes are tested via mid-course and final exams. Modules 4 and 5 test for factual information recall to a lesser extent. Module 6 has less to do with factual knowledge than the other Modules and consequently factual knowledge outcomes are hardly measured in this Module.

(b) Understanding Outcomes

Interest in "understanding outcomes" is high in all Modules. In Modules 1 and 2, participants come to understand how phenomena such as plant succession and genetic improvement work in terms of underlying biological mechanisms. In Module 3, participants learn to understand the basis for practical quantitative procedures such as data analysis, experimental design, and process optimization. In Modules 4 and 5 the emphasis is on understanding the principles of silviculture in terms of the underlying biological processes explained in Modules 1 and 2 within the context of integrated resource management. In Module 6, participants seek to understand themselves and others in terms of psychological factors, they wish to understand how to frame and solve problems, and they wish to understand social phenomena such as organizational learning.

Evaluation of participants' understanding is achieved by measuring their ability to use their factual knowledge to solve practical problems. Such evaluation comes in many forms. In-class dialogue between instructors and participants takes place frequently in all modules. Instructors use such feedback to pace and redirect their effort. Participants use these

same experiences to test their own understanding. Problem-solving homework and problems on midterm and final exams provide participants and instructors with further evidence of the level of understanding. Module 6 relies upon group discussion, role playing and simulations. These activities give participants much opportunity for self and informal peer evaluation.

(c) Skills Outcomes

Skills development is a major objective of Module 3, and interest in skills continues through to the end of the Program. Module 3 improves quantitative skills and "computer literacy". In Modules 4 and 5, the skills of interest are those associated with the diagnosis of silvicultural problems and the prescription of silvicultural treatments. Module 5 also considers the many facets of integrated resource management planning. In Module 6, the skills addressed are those associated with generic problem solving, interpersonal transactions, and the diagnosis and skilful response to human and social problems of professional practice. Participants maintain "reflective journals" during the modules in which they are able to practice self-evaluation. Peer evaluation through debates and seminars is also a part of many modules.

(d) Attitudes and Values Outcomes

Attitudes and values outcomes are of major interest in modules 5 and 6. In Module 5 participants are introduced to cultural and social value issues through a series of awareness lectures. In Module 6 participants use critical analysis of their own case studies and a variety of workshop activities to discover and confront the values upon which their own interpersonal theories of action are based. Through these activities, most participants discover that their behaviour is generally competitive, and in the longrun their actions may be ineffective or even counterproductive.

Participants are then introduced to an alternative, collaborative/cooperative theory of action and they are encouraged to experiment with its use through various workshop activities. Of special interest is the relationship between the values and attitudes that individuals actually use and the effectiveness of the organization which they comprise.

The success of Module 6 depends upon the maintenance of a high level of trust and mutual support among the participants. By the beginning of Module 6, however, the OAFP participants have become a team with just these attributes.

Evaluation of Program Impact

The OAFP has been successful in reaching the target client base. Figure 2 shows the pattern of enrolment across the first three program years. Each unit along the Y axis represents one person enrolled in one module. The capacity is set at 150 units each year which equates to 25 participants per module.

Participants sponsored by the Ontario Ministry of Natural Resources form the core of the OAFP but sponsorship by other agencies is growing. The background of the participants broadens each year to include more biologists and others to complement the core of foresters and forest technicians.

Figure 2. OAFP enrolment

A survey of participants is taken at the conclusion of each module. Respondents feel that the program improves their understanding of their daily practice. The program content and style assist their decision-making ability and contribute toward an enhanced management skill level. Participants expressed satisfaction that their expectations of the program were being fully addressed. Many participants cited their desire to manage forests in an ecological framework which required the advanced training and new strategies presented in the modules.

Jensen (1989) studied the supervisor (sponsor) responses to questions about the effectiveness of Oregon's Silviculture Institute after ten years of operation. Supervisors described the program as having significant impact upon the effectiveness of their silvicultural programs. This impact ranged from a reported operational savings from \$80,000-\$280,000 dollars per year to a less tangible 'open mindedness' that enhances the agency's work environment.

Similar evaluations are planned for the OAFP beginning in the fourth year. The Ontario Professional Foresters Association may have a role to play in gauging the impact of the OAFP upon the professional abilities of its members. This possibility is being considered.

The impact of the OAFP has had on the transfer of materials and teaching techniques into the undergraduate forestry programs at Lakehead University, the University of Toronto and the Environmental Biology Program at the University of Guelph been greater and more immediate than anticipated. Module leaders report that their university teaching has been enriched by their involvement in the OAFP. Two undergraduate courses have been completely redesigned as a result of the OAFP experience. We can

expect a similar effect to occur with other research based institutions that contribute instructors to the OAFP.

Where do we go from Here?

Individuals completing the program's six modules so far have been issued certificates of completion by both Universities. Modules are not credits for existing university courses; however, linkages with existing university courses are being created. For example, Lakehead University will offer a Master of Forestry degree program for the first time beginning in September 1992. Individuals who qualify for graduate studies may receive advanced standing in some of the Masters of Forestry requirements.

The educational needs of resource technicians, forest workers and interested laypersons also requires urgent consideration. In this way, the evolution of forestry practice can be assured by the commitment, cooperation and continuing education of everyone engaged in resource management.

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References

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