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## **THE PROBLEM-BASED LEARNING MODULE: COMPUTER-AIDED PROFESSIONAL EDUCATION IN FORESTRY**

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A fundamental element of professional practice is the application of knowledge and skills to solve problems. Traditionally, foundation knowledge is taught independently of problem-solving (PS) skill development and the individual knowledge components are taught independently of each other. As a result, students are often unable to integrate knowledge across disciplines or to use foundation knowledge to solve new and complex problems. Professional problems are a powerful tool to help motivate and integrate learning. Problems create “teachable moments” where students recognize learning needs. Since students progress through problems differently, providing instruction at a time optimal for each individual student is a logistical challenge in large classes and distance education with limited library resources and access to instructors.

As with all skills, PS development requires practice and feedback. A large number of problems must be attempted and the student’s PS process examined, criticized and iteratively improved. Trying to infer the PS process from problem solutions is inefficient and ineffective. Instructors therefore usually also ask questions and observe students actually solving problems to identify roadblocks in the PS process or basic knowledge deficiencies. This approach is impractical with large groups and in distance education formats due to limited student contact with instructors.

Since this typifies our situation, we developed a software tool to help cope with the challenges it presents. We therefore identified a need for a software tool to: present a realistic professional problem; provide easy access to problem-related information and help in context and “just in time”; track and score student PS performance. This paper presents software to address these needs. It presents a problem in a natural form and a list of questions the student can ask to solve the problem. It contains both relevant and irrelevant questions, to avoid providing solution cues. The student moves through the problem naturally, asking questions and receiving answers. When help is needed in understanding the answers given or questions to be posed, the student accesses on-line technical help modules. A student’s “pathway” through the problem is tracked, recording the questions asked and their order, help files accessed and notes made when students are prompted to describe their reasons for asking a given question or taking an action (e.g., ordering a forest inventory for a woodlot). The pathway can then be scored according to various criteria such as time to complete the solution, cost of information used, quality of answer and environmental risk and compared to experts’ pathways. This software also has potential to be used for assessments of potential employees and continuing education needs.