Unified Modeling Language and K-12

Borrowing Proven Technologies to Empower Problem-Solving Abilities

Maureen Hall, University of Massachusetts Dartmouth, United States of America

Abstract: Our paper introduces an idea of adapting in K-12 education modeling with Unified Modeling Language as a specific technology that is well-defined, widely accepted, and has a proven success record in the field of software engineering. The choice of UML was motivated by its enormous relevance to development of problem solving skills. In the best learning environments, students are provided with engaging learning opportunities that require the application of developed analytical skills in defining and solving problems. Problem solving skills and analytical skills in particular should be learned and continuously mastered by a person through the entire period of education and later through his or her professional career. Obviously, the first years of education have the strongest impact on an individual ,and, for a majority of students, determine the range of choices open to them later on in life. This phenomenon is especially evident at college level. Students in K-12 are gradually given more responsibility for the learning process, but they are still monitored by teachers and parents to ensure their success. There is a support system built into K-12 education to help students with challenges and allow them to meet the established standards. Upon entering college, students and their parents may have a rude awakening. At this point, the responsibility for the learning process is placed almost entirely on the student. The monitoring and support systems are of much smaller order of magnitude and strongly rely on the initiative of a student to seek assistance. It is at this moment that students and their professors may discover how inadequate the preparation of the freshman class for challenges of problem solving in a demanding college level course. The premise of this paper is that analytical skills can be improved in K-12 by adopting a suitable form of technology. To prove our point, we chose Unified Modeling Language (UML) as a specific technology that is well-defined, widely accepted, and has a proven success record in the field of software engineering. The choice of UML was motivated by its enormous relevance to development of problem solving skills which is greatly needed in K-12 education. Evaluation of the impact of using UML in K-12 classroom setting will involve a group of K-8 students in Massachusetts who are preparing for the writing portion of their English MCAS (Massachusetts Comprehensive Assessment System) tests. The centerpiece of her proposed course improvement focuses developing a service learning component in response to an authentic need in the local community and integrates this service through coursework. The authentic need in the community involves K-8 students who are underperforming on the writing portion of the MCAS tests; their writing skills need to improve. A pilot study for using UML in K-12 education will be conducted through an integrated service learning component of EDU 612 Teaching Elementary and Middle School Writing, a course that Maureen Hall teaches at UMass Dartmouth. Hall is working on a course improvement project sponsored through UMass Dartmouth's Center for Teaching Excellence. As a professional development provider for EDU 612 student participants, Bergandy will provide a series of training sessions showing them how they can facilitate their students' writing projects using UML. In part, UML will be used as a vehicle for providing students and teachers with dynamic entry points for creating written pieces. Using UML will also help to represent facts, visually express causal and temporal relationships, and represent events and activities in the context of facts (participants, environment). The overall goal is to improve students' writing skills through integrating UML into writing teachers' pedagogies. Though we could have chosen a K-12 math or science classroom for this pilot study, we chose an English classroom to highlight the importance and transferability of analytical skills in an area perceived to be far withdrawn from technology and science.

Keywords: Technology, K-12, Teacher Training, Problem Solving, Analytical Skills, Modeling, Writing Instruction

Introduction

UNDERSTANDING OF THE relationship between tools and problem solving is a high level objective of many research programs. Some of the key questions to be answered concerning the relationship between tools and problem solving are:

- How tools change the behavior of an individual in pursuit of a solution to particular problem?
- How tools aid in organizing, comprehending and presenting the information?
- How tools impact the efficiency and effectiveness of problem solving process?
- What is the impact of using tools on the quality of the solution?
- How the problem solving process creates new requirements for tools?
- What are the social implications of using tools in problem solving?

http://www.Learning-Journal.com, ISSN 1447-9494

Our project addresses the relationship between tools and problem solving in context of K-12 education. The rationale for this project stems from the following three assertions:

- K-12 students struggle with inadequate problem solving skills
- K-12 teachers struggle in defining their role as effective facilitators of technology in their teaching
- Software industry has a large body of knowledge and tools for problem solving

All three of these assertions are fundamental to our project; the first two assertions define the problem to be addressed by the project, and the third assertion represents the vehicle for solving the problem (see Figure 1.). Our project pursues the adaptation of Unified Modeling Language (UML) to be used as a specific technology for enhancing problem solving skills of K-12 students.

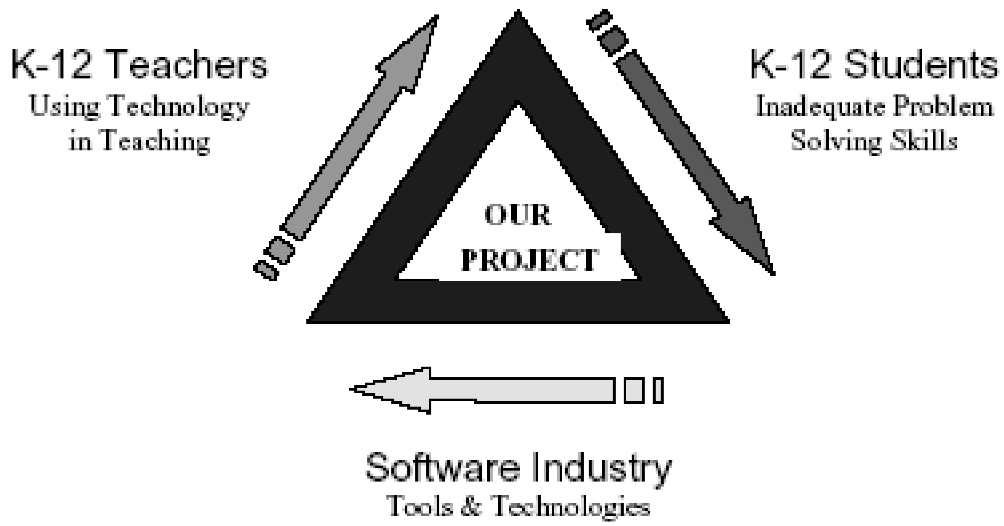

Figure 1: UML and K-12 Project

We have chosen a specific technology (UML) that is well-defined, widely accepted, and has a proven success record in the field of software engineering. The selection of UML was also motivated by its enormous relevance to the development of problem-solving skills.

This paper presents a vision and rationale for a large comprehensive multi-phase project. The project studies the impact of using modeling tools and methodologies to enhance teaching and learning of analytical and problem-solving skills in K-12 public school systems. The first phase involves a funded pilot study of middle school students and teachers in New Bedford, Massachusetts. This first phase focuses on using UML to improve writing skills. For both formative and summative evaluation, this project is driven by an assessment process, which has a detailed plan. Later in this paper, assessment goals for implementation have been articulated for this project.

K-12 Students – Inadequate Problem Solving Skills

In the best learning environments, students are provided with engaging learning opportunities that require the application of developed analytical skills in defining and solving problems. Problem solving skills and analytical skills in particular should be learned and continuously mastered by a person through the entire period of education and later through his or her professional career. Obviously, the first years of education have the strongest impact on an individual, and, for a majority of students, determine the range of choices open to them later on in life. This phenomenon is especially evident at the college and university level. Students in K-12 are gradually given more responsibility for the learning process, but they are still monitored by teachers and parents to ensure their success. There is a support system built into K-12 education to help students with challenges and allow them to meet the established standards. Upon entering higher education, students and their parents may have a rude awakening. At this point, the responsibility for the learning process is placed almost entirely on the student. The monitoring and support systems are of much smaller order of magnitude and strongly rely on the initiative of a student to seek assistance. It is at this moment that students and their professors may discover how inadequate the preparation of the freshman class for challenges of problem solving in a demanding college level course.

The evidence of the problem is most obvious in the disciplines where analytical skills are critical.

Enrollments in science, mathematics and engineering programs are dropping. The drop-out rates in these programs are very high reaching sometimes 40% range. Some other indirect evidence of this problem involves the increased numbers of foreign nationals "imported" to US by companies to perform technology & science intensive jobs and many such jobs being outsourced overseas.

The role of analytical skills is well recognized in the domains of science and technology but greatly underestimated in many others. Analytical skills represent the roots of effective communication, comprehension, creativity, and basic quality of life. Giving and following instructions requires analytical skills to determine the relationship between assigned activities (including their order and possible parallelism), the participants, and the environment to be impacted by these activities. Any form of communication including oral, written, or based on images involves the use of analytical skills in the process of expression and comprehension of the message.

K-12 Teachers – Using Technology in Teaching

Before student learning can improve, teachers must be trained and given ongoing support in order to successfully integrate technology into their teaching. K-12 students in the Information Age possess technological skills that are far beyond the average teachers' knowledge of the same technology.

Teachers need to acquire and adequate set of technological skills, but their role should focus on providing direction and harnessing students' skills for creative and independent problem-solving based thinking and learning. Teachers' lack of knowledge and skills should not be the inhibiting factor keeping students from using and developing skills to leverage their learning.

Along with knowledge and skills, teachers' attitudes or affect are incredibly important in relation to success in the integration of technology into their teaching and learning spaces:

> The transformation of classroom technology from hardware, software, and connections into tools for teaching and learning depends on knowledgeable and enthusiastic teachers who are motivated and prepared to put technology to work on behalf of their students. (Darling-Hammond& Berry, 1998, p.7)

The process of technology adaptation in the classroom should be driven by the K-12 constituency. This presents new opportunities, which require drastic changes for how the stakeholders in K-12 view and use technology. It is no longer sufficient for educators to treat technology merely as a supplier of equipment and tools for the classroom. Instead, technology needs to be recognized as a reliable source of proven methodologies and processes that can be adapted in education. Furthermore, the limitations of technology in the near future are "likely to be less a result of technological limitations than a result of limited human imagination and the constraints of old habits and social structures." (Kaput, 1992, p.515) This is what our project addresses. Through support for K-12 teachers, we will work to train teachers in ways that can enlarge their imaginations for how technology can enhance student learning in their teaching and learning spaces.

This represents a change of paradigm in using technology for K-12 education that will provide new opportunities to improve students' analytical and problem-solving skills. The premise of this paper is that analytical skills can be improved in K-12 by adopting a suitable form of technology. Kaput (1992) points out the issues involved in this paradigm shift:

> new technologies …as frequently re-energizing age-old questions. These include questions regarding educational goals, appropriate pedagogical strategies, and underlying beliefs about the nature of subject matter, the nature of learners and learning, and the relation between knowledge and knower (p. 516).

Technology cannot be simply added on to an existing set of teaching and learning strategies. It must be integrated carefully and thoughtfully into the K-12 classroom in order to impact and change the ways in which teachers teach, and, in turn, the modes in which students learn.

The work outlined in this paper builds upon many research studies have explored how integrating technology into K-12 education has impacted student learning. Several empirical studies have examined how the use of technology affected students who were considered below grade-level or non college-bound. Positive findings in terms of productivity and development of higher order thinking and analytical skills came out of these empirical studies (Hopson, 2002; Cradler & McNabb 2002).

Addressing the Problem – Software Tools and Technologies

Within the technological world, there is a body of knowledge involving methodologies, tools, and processes that were developed to solve complex problems. Those methodologies, tools, and processes, which have a proven track record of success, should be evaluated, redesigned, and adapted for use in K-12 education.

UML, the technology chosen for our project, is used in the software industry to graphically represent information used in the design process. Use of graphical representation of the facts in the teaching/learning process is not new. Maps for capturing the information about concepts and their mutual relationships are widely accepted in the teaching community.(White, R., & Gunstone, R. 1992; Wandersee, J.1990; Zhang, C. 2005) The concept map is a directed graph, where the nodes represent concepts and edges (connecting the nodes) represent the relationships between the concepts. The edges can be labeled with the names and possibly with additional information describing the relationship. While it is true that there are tools currently available on the market and used in K-12 education that automate drawing of the maps, facilitate storage of information about facts and relationships, and provide libraries of attractive icons students can use to represent concepts in the maps, more development is needed. Many tools currently used in K-12 lack the sophistication that UML can provide.

Concept maps and semantic networking have been studied for over two decades as potential tools for assessment of comprehension. (Novak, J. and D. Gowin, 2004; Ruiz-Primo, M. and R. Shavelson 1996; Ruiz-Primo, M., Shultz, S., Li, M. and R. Shavelson 2001) Concept maps (as graphs) are a perfect representation of information for computer automated scoring and evaluation. Many tools have been developed to address this issue including web-based tools utilizing hierarchical concept maps. (D. Luckie, J. McCray Batzli, S. Harrison, D. Ebert-May; 2003).

Although much attention has been given in the learning community to the modeling of concepts and their relationships in general, no adequate attention has been paid to modeling of events and their temporal and casual relationships including parallelism. This type of modeling has its own set of methodologies, notations, and tools. In the domain of comprehension, reasoning about cause and effect, as well as about order of events in time play the most critical roles. Concept maps are not the best suited as a representation for expressing such relationships. Unified Modeling Language (UML) used in computer industry for specification and design of software provides a wide spectrum of diagrams allowing for modeling of a wide spectrum of static (structural) properties of concepts as well as modeling of the entire spectrum of dynamic (behavioral) properties of concepts and their instances.

The issue of modeling/problem representation is critical to software engineering. To address this need, several visual modeling languages were developed and used in the software design process in the period from mid 1970s through 1980s. In early 1990s it became evident that some standardization of modeling languages was needed. UML (Unified Modeling Language) was developed in mid 1990s and approved as industry standard in fall of 1997 (Fowler, 2003).

UML is a comprehensive graphical language supporting modeling of structural (static) properties as well as behavioral (dynamic) properties of systems. Modeling of structural (static) properties of systems involves modeling of concepts (classes) including specification of their attributes and provided services. Structural models include information about wide range of possible relationships between concepts (classes) including generalization/specialization ("is kind of"), association ("knows"), aggregation ("consists of/contains"), and several types of dependencies. Dynamic models describe behavior of the system allowing for representation of states of entities (objects as instances of concepts/classes), transitions between states triggered by events and conditions, activities performed within the states and upon transitions, causal and temporal relationships between activities including possible parallelism. The dynamic model is specified within constraints of the static model (structure). In other words, behavior of an object takes place within its structure. This fact is clearly reflected in modeling processes with UML.

Our proposed solution for improving students' analytical skills in the K-12 arena involves using Unified Modeling Language (UML) as a methodology/tool for analysis of problems and design of valid solutions. This approach makes sense for the following reasons:

- The use of UML in analysis processes facilitates comprehension/understanding of the problem and represents the first and necessary step in solving any problem. The use of UML in design process facilitates solving problems in stages by applying a level of abstraction compatible with the problem domain (category of problem).
- UML facilitates effective communication between individuals and organizations through the use of standardized and well-supported form of notation (UML) as a vehicle for analyzing, expressing, and presenting problems and solutions.
- Use of graphical notation (UML) as the framework/skeleton for information assists an individual with navigation through facts and relationships pertaining to the problem at hand. This frees the "intellectual resources" on finding solutions as opposed to retaining the current state of the problem-solving process.

- UML also provides opportunities for different stakeholders to "talk through the problem" by using diagrams to help illuminate or address the problem. For effective communication, it is critical to choose a model for the problem that all involved parties can understand and use it with ease. Notation (UML) complements natural language in facilitating effective communication that can transcend differences in organizational culture including language and other barriers.

Assessment and Evaluation Overview

In order to develop and improve any educational program, clear learning goals for assessment and evaluation must be developed. The following section outlines the assessment and evaluation process designed specifically for this project. As we are providing an instructional program to train teachers to utilize new technologies, we are mainly interested in how these teachers experience the training modules and how it has affected their pedagogical approaches, and student learning. For this phase of the project, student learning will be measured by standardized tests in place in Massachusetts; we do not need to design measures for student learning outcomes as a result of our teacher training.

Description of Phase One of the Project

The goal of our project is to determine the impact of using proven modeling methodologies and languages in K-12 instruction focused on improving analytical and problem solving skills of students. Our project will provide training for teachers in how to use the software and suggest modes and instructional approaches. The more specific and immediate goal is to explore using Unified Modeling Language (UML) in context preparing a group of K-8 students in Massachusetts for the writing portion of their English MCAS (Massachusetts Comprehensive Assessment System) tests.

Our project utilizes Shaffer's theoretical underpinnings to inform our use of UML in the K-12 classroom setting. Our pilot study engages students in a community-oriented writing project, and, through the use of UML, students will develop professional skills.

Shaffer's (2004) pedagogical praxis theory utilizes technology as a tool to make connections between students and society in meaningful ways. The premise is that information technologies can provide scaffolding for students to actively participate in and make meaning in community life.

Stakeholders' Needs

Any well-developed assessment and evaluation program is designed in response to the specific needs of the stakeholders involved. Keeping communication channels open and functioning is paramount in order to effectively develop the instructional activities and to bring about innovation in teaching and learning. For this program, our stakeholders include students, teachers, school administrators, and the research community. We have identified the following stakeholders and their respective needs.

K-12 Students' Needs

Students need to learn how to classify, describe, and relate facts in the process of solving a specific problem. In addition, students need tools that supplement verbal representation with graphical representation allowing for more effective storage, retrieval, and manipulation of facts. Furthermore, students need to be encouraged and empowered to learn and use analytical skills across all subjects of their study.

K-12 Teachers' Needs

School Administrators' Needs

School administrators must be willing to explore alternative professional development strategies with their teachers to bring about the best results in student learning.

Research Community Needs

New ideas and approaches are needed for effectively teaching analytical skills. What is currently being done does not produce adequate results. The K-12 educational community needs to leverage proven technologies and methodologies that are effective in aiding analytical and design processes in commercial setting and adapt them for use in classroom settings.

As in any quality assessment process, we are aiming for a better understanding of the problem and ways in which the problem can be addressed effectively. The most general objective is to positively impact the practices of teaching and learning. For our project, assessment and evaluation is viewed as a continuous process with short-term, medium-term, and long-term goals.

The short-term goals of assessment are to:

- Determine how teachers envision using UML in the teaching process
- Evaluate the learning curve of teachers as non-technical users of UML modeling language

- Determine what form of support would be required by teachers to use UML effectively and consistently in teaching problem solving skills

The medium-term goals of assessment are to:

- Determine how students use UML as an aid in solving problems
- Determine the most effective use of UML in teaching analytical and problem solving skills
- Evaluate teaching materials
- Determine effectiveness of the support system provided for teachers and students

The long-term goals of assessment are to:

- Determine effectiveness of using UML and other modeling tools as a vehicle for improving teaching of analytical and problem solving skills
- Determine effectiveness of using UML and other modeling tools on improving students' analytical and problem solving skills

The findings of our assessment process will be used to shape how teachers teach and how students learn in the context of using technology to enhance analytical and problem-solving skills.

In short-term the results of the assessment will be used to:

- Define and plan the initial scope of using UML by students
- Design initial materials and training for student use
- Design initial support system for teachers and students to aid teaching-learning process using UML

In medium-term the results will be used to:

- Proof the correlation between using UML and improving problem solving skills among K-12 students
- Identify the patterns in students' problem solving process aided by use of UML for various age groups in K-12 system. Knowledge of such patterns will play a critical role in designing lesson plans, teaching materials, and possibly entire programs of study
- Define teaching guidelines and supporting materials for teaching problem solving using UML

In long-term the results will be used to:

- Launch a wide-range program for problem solving education involving multiple school districts
- Defining a baseline for projects involving use of technologies with a proven industrial track record in K-12 education
- The development of a short-term detailed assessment plan, including design of assessment instruments is underway

One unique aspect of the project is its focus on both cognitive and affective learning. Multiple modes for data collection will be used to ensure rigor of project's findings. Surveys, teacher interviews, and classroom observations represent three data sources that will be utilized. We have designed questions in our data collection instruments that address teachers' cognitive and affective learning. Without the interest, appreciation, and motivation (affective) to learn how UML can enhance instruction and student learning, there can be no significant gains in the cognitive parts of learning involved. In other words, if teachers do not find value or have an interest in learning new techniques and how to use new technology, limited changes will occur in the ways in which teachers teach and students learn. (Hall, 2005).

There are two aspects to our future conclusions and recommendations. One aspect concerns the improvement of the teaching process. Second aspect concerns the direction of the future research on using modeling as an aid in teaching analytical and problem solving skills. Direction taken with respect to both of these aspects will depend on the results of the first phase/cycle of the assessment process.

Evaluation of Phase One -- Pilot Study

Though a K-12 math or science classroom would be a more obvious target for this type of pilot study, an English classroom was chosen to highlight the importance and transferability of analytical skills in an area perceived to be far withdrawn from technology and science.

Concluding Remarks and Future Work

Changes that technology brings about in teaching are similar and reminiscent of the changes in writing practices in response to word processing and how e-mail changed communication strategies. Word processor first provided a writer with ability to easily edit and efficiently reorganize text. Later on, it provided a user with spelling and grammar checking. Finally, word processors included templates for widely used document types. Word processing had two major effects on writing:

- It put focus on contents and composition by automating and thus trivializing the manipulation of the form (layout, paragraph, font).

- It contributed to overall improvement in quality of writing, where decisions for changes to text can be made solely based on "objectives of writing," and not on the cost of executing such changes. For example, decision about switching the order of two paragraphs to improve a document may be too costly when using typewriter. The document will remain "as is" and considered "good enough". The cost of changing the order of two paragraphs when using word processor is negligibly small. Here, decision of leaving the document "as is" would not be "acceptable".

Using UML for modeling solutions will have similar effect on problem solving. Tools supporting UML support model manipulation/editing similar to text manipulation/editing supported by word processors. They take away the burden of mechanics of modeling (expressing your thoughts) and allowing the user to focus on problem solving process. Such tools offer a well recognized set of solutions to common problems known as Design Patterns. Such patterns can be injected on demand in-to the overall solution of a larger problem solved by the user. This has much larger significance than using document templates in word processing. UML tools can check the model for consistency and semantic correctness. This is analogous to spelling and grammar checking in word processor.

If our approach for using UML in improving analytical skills of students in context of writing proves effective, numerous areas of K-12 education may also provide appropriate venues for the continuation of this technology transfer. Among others:

- UML could aid changes in Mathematics curriculum to highlight the process of solving problems as opposed to focusing only on the solution itself.
- UML could improve Science education by facilitating the planning and analysis of experiments.
- UML can be utilized in integrated curriculum projects with emphasis on multi-faceted, multi-disciplinary approaches to problem solving.
- UML could improve business education as it provides organizational and behavioral modeling.

The integration of UML as a tool in K-12 education presents a dynamic opportunity to improve students' analytical skills and simultaneously elevate the process of learning as opposed to simply focusing on the product. UML has the potential as a tool to help students learn how to learn, which is transferable knowledge for unlimited settings.

Our project has long reaching goals but is in its preliminary stages. The first phase of the project has received support through the Chancellor's Public Service Grant at the University of Massachusetts at Dartmouth. This first phase involves training teachers how to use UML and provide ongoing support as they integrate this technology into their teaching and learning spaces.

Relevant Note about Co-Authors

It is important to note that the co-authors of this proposed paper represent two very different disciplines. Dr. Jan Bergandy is a faculty member in the Computer Science Department and has expertise in software engineering.

In the past five years, Dr. Jan Bergandy has been involved in promoting the use of object technology (including UML) across the curriculum. In 2001 he received his first funding from The Commonwealth Information Technology Initiative (CITI). Since 2001 he has worked with faculty providing assistance with their program involving object technology.

Currently he is a PI on another CITI grant funded by their "Information Technology Across the Curriculum" program to develop, in cooperation with Charlton School of Business, a minor in E-commerce at UMD. Since 2001 he has given presentations and organized panel discussions at numerous CITI sponsored conferences promoting object technology across curriculum.

Dr. Maureen Hall is a faculty member of the Education Department; her expertise is in English Education and professional development of K-12 teachers in terms of differentiated instruction and assessment. Dr. Hall brings her expertise and experience with professional development for teachers. In addition to her teaching and research activities, she currently works as a consultant in partnership with several local area schools and organizations.

References

Cradler, J. & McNabb, M. (2002). How does technology influence student earning? *Learning and Leading with Technology* (46-49). Oregon: International Society for Technology in Education, Publishers.

Darling-Hammond, L. and Berry, B. (1998). Investing in teaching: The dividend is student achievement, *Education Week*.

Fowler, M. (2003). *UML distilled: A brief guide to the standard object modeling language.* New York: Addison-Wesley.

Hall, P. (2005). Bridging the heart and mind: Community as a device for linking cognitive and affective learning. *Journal of Cognitive Affective Learning*, 1. (Spring 2005), 8-12.

Hopson, M. (2002). Using a technology-enriched environment to improve higher order thinking skills. In D. Ayersman & W. Reed (Eds.) *The Journal of Research on Technology in Education.* (109-119. Oregon: International Society for Technology in Education, Publishers.

Kaput, J. (1992). Technology and mathematics education. In D.A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 515-556). New York: Simon & Schuster Macmillan.

Luckie, D., McCray, J., Batzli, S., Harrison, and D. Ebert-May. (2003). Concept-connector tools for online learning in science; *International Journal of Learning*, Volume 10.

Novak, J., and D. Gowin. (2004). *Learning how to learn*. New York: Cambridge University Press.

Ruiz-Primo, M., Schultz S., Li M., and R. Shavelson. (2001). Comparison of the reliability and validity of scores from two concept-mapping techniques. *Journal of Research in Science Teaching* No. 38.

Ruiz-Primo, M. and R. Shavelson. (1996). Problems and issues in the use of concept maps in science assessment, *Journal of Research in Science Teaching* No. 33.

Shaffer, D.W. (2004). Pedagogical praxis: The professions as models for postindustrial education. *Teachers College Record* Volume 106 Number 7, 2004, p. 1401-1421. http://www.tcrecord.org . ID Number: 11577, Date Accessed: 7/22/2006 1:31:57 PM

Wandersee, J. (1990). Concept mapping and the cartography of cognition. *Journal of Research in Science Teaching*.

White, R., & Gunstone, R.(1992). Probing understanding. London: The Falmer Press.

Zhang, C. (2005). Using concept maps to help with student writing. Eleventh International Literacy and Education Research Network Conference on Learning, Havana, Cuba., June 2004; *International Journal of Learning* Vol. 11.

Resources

Object Management Group – Unified Modeling Language (UML); www.uml.org

IBM Corporation, UML Resource Center, www.ibm.com/software/rational/uml/

About the Author

Dr. Maureen Hall

Dr. Maureen Hall's teaching history began in 1988. Dr. Hall began her teaching career in the public schools of northern New Hampshire, where she taught seventh and eighth grade English and social studies for five years. For the next five years, she taught English and U.S. History at the high school level in southern New Hampshire. After these experiences, Dr. Hall attended the University of Virginia for a MA in English (with a concentration in American Studies) and a Ph.D. in English Education. She is in her third year at UMass Dartmouth and teaches both undergraduate and graduate students.