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ABSTRACT

The National Council for Accreditation of Teacher Education (NCATE) Task Force on Technology and Teacher Education, a group of educators from diverse institutions and backgrounds, met three times during 1996-1997 to consider how NCATE could provide leadership and support in meeting the technology challenge facing teacher education institutions. Sections of this report present the task force's vision of what teachers must be able to do in order to take advantage of technology for instruction and student learning, identify current teacher education program deficiencies, and suggest what teacher education programs should do to correct the deficiencies. The following are recommendations for NCATE to: (1) stimulate more effective uses of technology in teacher education programs; (2) use technology to improve the existing accreditation process and to reconceptualize accreditation for the 21st century; and (3) improve and expand its own operations through greater uses of technology. Brief case studies that demonstrate innovative technology use in a variety of teacher preparation programs appear throughout the text. Appendixes include: a guide to the case studies used in the report; excerpts from NCATE accreditation standards on technology expectations; and nine attachments on accreditation data that could be available electronically to various stakeholders. (ND)

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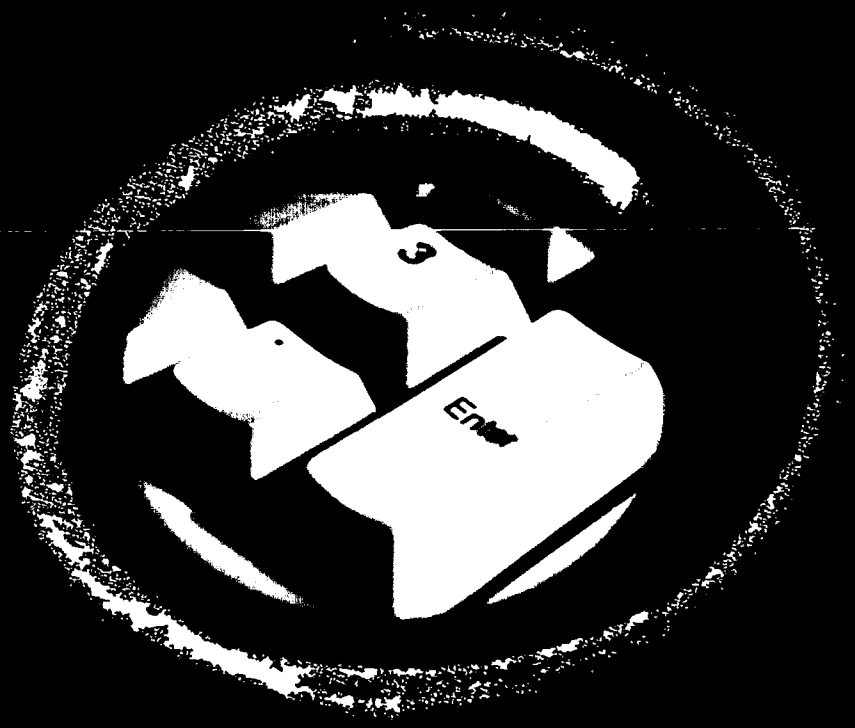

TECHNOLOGY AND THE NEW PROFESSIONAL TEACHER

PREPARING FOR THE 21st Century Classroom

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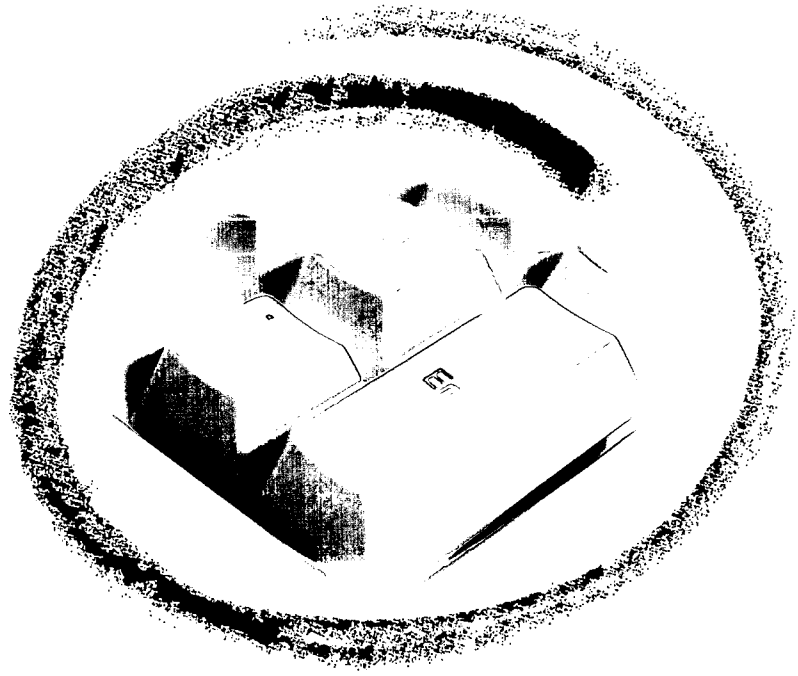

TECHNOLOGY AND THE NEW PROFESSIONAL TEACHER

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Acknowledgements

NCATE wishes to thank the **AT&T Foundation** for the grant which supported the Task Force on Technology and Teacher Education. Without this support, the work of the Task Force could not have been accomplished. The Task Force also wishes to thank the NCATE staff for their ideas, cooperation, and support. Special thanks go to Tracy Leal for making the arrangements for the Task Force meetings and for taking minutes of the meetings, and to Sean Smith, a doctoral student at the University of Virginia, for his research and attention to creating and maintaining a listserve for Task Force members to communicate with each other between meetings.

Table of Contents

A Message to NCATE Institutions, Board Members, Constituent Organizations and Friends

Before going to class, I access my e-mail to read responses from two instructors to questions I had, as well as four messages from fellow students. I get to my classes five minutes early to plug in my notebook computer and get organized. All our classrooms are linked to the Internet...I'm working on a portfolio project in the Language Arts class, and I'm in the process of scanning pictures into my Powerpoint presentation. We've all had the opportunity to develop electronic portfolios this semester and are getting ready to turn them into CD-ROMs.

Does this sound like the teacher preparation that you know? Does it sound like the teacher preparation of the future? Actually it is a chronicle of a day in the life of a current teacher candidate at Valley City State University in North Dakota. The university requires its students to own a notebook computer, and models the integration of technology into instruction.

Some schools of education are in the vanguard of introducing technology into teacher preparation. Many are featured in this report. Yet most schools of education have not yet fully integrated technology into their programs for preparing teachers. There is a long road ahead.

Two million new teachers will be hired over the next decade. Will these new teachers be comfortable and skilled in using technology? What will it take to transform schools of education so that faculty feel comfortable e-mailing students, using listserves for projects and instruction, and introducing candidates to software that enhances instruction? As technology moves from the periphery to the center in P-12 schools, so must it move from the periphery to the center in teacher preparation.

This report is the culmination of a year of deliberations by NCATE's Task Force on Technology and Teacher Education. NCATE commissioned the task force to help guide the development and implementation of technology expectations for teacher candidates and for accredited schools of education, and to guide the organization's use of technology in the accreditation process.

NCATE is in a unique position to provide leadership. In 1995, NCATE introduced technology expectations for schools of education. In 1997, NCATE is issuing this report, which recommends that NCATE emphasize technology as central to the teacher preparation process. In the year 2000, NCATE will introduce its latest set of accreditation standards which will undoubtedly raise the bar for the use of technology in teaching and learning in schools of education.

Just as NCATE expects accredited institutions to use technology in teaching and learning, its institutions should look to NCATE to use technology in the accreditation process. NCATE intends to streamline the accreditation process so that schools of education can send and receive information to each other and NCATE electronically, reducing paperwork and saving time, money and effort. We look forward to working with you as technology transforms education through this century and beyond.

President, National Council for
Accreditation of Teacher Education

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Introduction

It is impossible to deny the tremendous effect rapid technological growth has had on our society. This explosion of new technologies has changed the way we live – from the way we do business to the way we communicate with each other. Technological advancements are also affecting the way we teach and learn.

The business world demands that our schools prepare educated workers who can use technology effectively in the global marketplace. The president and vice president of the United States, governors, state legislatures, and other policy-making groups are increasingly convinced that technology is a central element of educational reform and improved student learning.

New skills needed in the workplace are catalysts that spur technology use in the classroom. Computer to student ratios have declined steadily from 50:1 in 1985 to 20:1 in 1990 to an estimated 9:1 in 1997, affecting traditional classroom practice and even the culture of the schools.

Student enrollment is growing at the same time that the nation's experienced teaching staff is declining, due to regular retirement. An estimated 2 million new teachers will be hired during the next decade. Classroom teachers hold the key to the effective use of technology to improve learning. But if teachers don't understand how to employ technology effectively to promote student learning, the billions of dollars being invested in educational technology initiatives will be wasted.

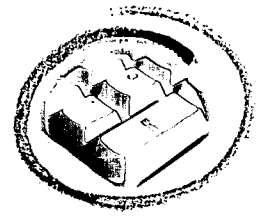
The nation's teacher education institutions must close the teaching and learning technology gap between where we are now and where we need to be. Although progress has been made and exemplary practices exist, recent research indicates that most teacher education programs have a long way to go.

Teacher education institutions must prepare their students to teach in tomorrow's classrooms. Rather than wait to see what tomorrow's classrooms will be like, they must experiment with the effective application of computer technology for teaching and learning in their own campus practice. Today's teacher candidates will teach tomorrow as they are taught today.

The NCATE Task Force on Technology and Teacher Education, a group of educators from diverse institutions and backgrounds, was assembled to consider ways that NCATE can provide leadership and support initiatives to meet the technology challenge facing teacher education institutions. The group met three times during 1996-1997 to identify and discuss the issues contained in this report. The first section of the report presents the task force's vision of what teachers must be able to do in order to take advantage of technology for instruction and student learning, identifies current teacher education program deficiencies, and suggests what teacher education programs need to do to correct the deficiencies and bring vision into reality.

The second section advances three broad recommendations regarding what NCATE can do to: (1) stimulate more effective uses of technology in teacher education programs, (2) use technology to improve the existing accreditation process and to reconceptualize accreditation for the 21st century, and (3) improve and expand its own operations through greater uses of technology. Brief case illustrations that demonstrate innovative technology use in a variety of teacher preparation programs appear throughout the text to highlight and illustrate points made in the report. They are listed in Appendix A along with related web sites.

The task force finds that a watershed for education and training has been created by rising costs for P-12 and higher education, by educational reform efforts at the state and federal levels, and by developments in modern information technology that have already affected the U.S. economy and society. Marginal efforts to improve teacher education will not satisfy the spirit of the times or the practical demands placed on education by the nation. Vigorous action by NCATE and its member institutions is necessary to effect substantial reform.



Impact of Technology on Teaching

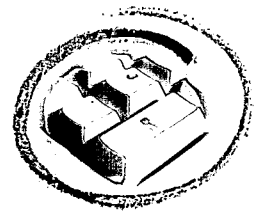
From time to time, someone invents a product or develops a practice which has an unforeseen and massive impact on society. The printing press, created by Johann Gutenberg approximately five and a half centuries ago, was such an invention. Who would have predicted that a press initially devoted to publishing the Bible and other religious texts would someday be seen as one of the forces undermining church authority? Who would have imagined that books, then owned by few and treasured as symbols of wealth and power, would someday be accessible to nearly everyone? And who could have foreseen a system of public schools organized primarily for the purpose of teaching children to read and to help them absorb the knowledge books contain?

The results of the printing press, and all of its modern successors, are so much a part of our lives it is difficult to imagine an existence without the ability to read, and the books, journals, and newspapers that support a reading public. It is also difficult to imagine how one could organize instruction without textbooks and various associated readings. For teachers and students alike, learning at all levels of education has been primarily a process of reading what experts have written, discussing what has been read, and listening to teachers explain or expand upon textbooks. In most cases, schooling has become a process for understanding, retaining, and reporting what is found on the printed page.

Inventions of the twentieth century have the potential to influence society as much as did the printing press. The computer, video, and telecommunications of various kinds are having an impact on every aspect of our society: work, leisure, entertainment, household tasks. These inventions are also transforming the way we approach knowledge and sources of expertise. Today, people are no longer required to read about an event; they can see media versions of it unfold before their own eyes and make their own interpretation. Consequently, the ability to obtain and interpret information quickly and accurately is even more important than in the past.

There is no longer a question about whether the new technology will be used in schools. Nearly everyone agrees that students must have access to computers, video, and other technology in the classroom. Many believe these technologies are necessary because competency in their use is an important feature of career preparation; others see equally important outcomes for civic participation. Most importantly, a growing research base confirms technology's potential for enhancing student achievement. What is less certain is how and when these technologies will change the nature of schooling itself. For example, the technologies are already providing an alternative curriculum for students that is scarcely acknowledged by the formal school curriculum. Nevertheless, they have been mainly employed as additions to the existing curriculum. Teachers are employed who know how to use them, but knowledge of and skill in the use of technology has not been necessary for all teachers. These attitudes are surely short-sighted if technology infusion is to take root.

The introduction of computers and other technologies into schools is occurring at the same time that three decades of research in the cognitive sciences, which has deepened our understanding of how people learn, is prompting a reappraisal of teaching practices. We know from this research that knowledge is not passively received, but actively constructed by learners from a base of prior knowledge, attitudes, and values. Dependence on a single source of information, typically a textbook, must give way to using a variety of information sources. As new technologies become more readily available and less expensive, they will likely serve as a catalyst for ensuring that new approaches to teaching gain a firm foothold in schools.



CASE ILLUSTRATION

The Multimedia Academy: Technology Applications in a Professional Development School

Phyllis Robershaw orients her group of student teachers at San Diego State University with these words, "Get in shape and be focused. You're about to enter the most exciting year of your career as a student. This year will transform you from learner to practitioner. Welcome to Clear View Professional Development School, a joint partnership with the Chula Vista Elementary School District and San Diego State University."

The student teachers begin their journey by participating in a weekly Multimedia Academy on the Clear View campus. This intense introduction to multimedia in education is taught by the staff at Clear View and former student teachers. A variety of media is introduced, such as scanners, laser disks, internet, music CD's, graphics and clip art, digital cameras, and various types of video input. The group will develop a presentation to "show off" on the last day. Besides student teachers, classroom teachers and administrators also enroll in the Academy, thus providing student teachers contact with the scope and spectrum of education, from preservice to new to veteran staff.

Once student teachers are placed in their classrooms, they conduct a group multimedia project with students at Clear View. By doing this, they get a realistic view of how their knowledge can guide students to use technology as a learning tool. Both students and student teachers benefit from this project; the former from small group guidance, the latter from actually practicing the use of technology tools embedded in a unit of study.

San Diego State University reaches out to embrace the extended school community at the Clear View site by involving its professors, graduate students, and the actual facility to connect the university to elementary classrooms. In a partnership with Cox Communication, two fiber-optic connections were established from the Clear View campus to the history department and into the electron microscope at San Diego State University. Students in grades 4-6 at Clear View engage in year-long inquiry with university personnel as part of a regular classroom unit of study. Clear View provides a distinct example of a professional development school using technology to expand the learning of students and teachers alike.

Despite the technology changes in society, being a teacher in American schools too often consists of helping children and youth acquire information from textbooks and acting as an additional source of expertise. Teachers are provided role models of this approach to teaching from kindergarten through graduate school; their teacher education courses provide hints for making textbook-oriented instruction interesting and productive, and as teaching interns, they both observe and practice instruction based upon mastering information found in books.

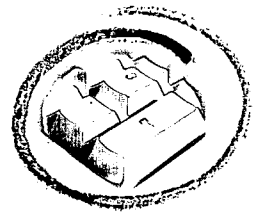
Teachers may be forgiven if they cling to old models of teaching that have served them well in the past. All of their formal instruction and role models were driven by traditional teaching practices. Breaking away from traditional approaches to instruction means taking risks and venturing into the unknown. But this is precisely what is needed at the present time. How must teachers adapt to take advantage of technology for instruction?

New Understandings

Teachers need to understand the deep impact technology is having on society as a whole: how technology has changed the nature of work, of communications, and our understanding of the development of knowledge.

New Approaches

Today, teachers must recognize that information is available from sources that go well beyond textbooks and teachers – mass media, communities, etc. and help students understand and make use of the many ways in which they can gain access to information. Teachers must employ a wide range of technological tools and software as part of their own instructional repertoire.



CASE ILLUSTRATION

Aligning Technology Practices in the Schools and the University

Future teachers take their cues from the practices they observe in classrooms during teaching practica and internships. If students are taught the latest technology uses as part of their teacher education programs, but don't see effective technology practices in the schools, they are unlikely to incorporate technology use in their own teaching. Schools are powerful socializing agencies that greatly affect new teachers' perceptions about what does and what doesn't work in practice. Recognizing this fact, the Curry School of Education at the University of Virginia and local school divisions have been working together for a number of years to ensure that preservice teachers encounter best practices in P-12 schools.

The Curry School of Education, Albemarle County Public Schools, and Charlottesville Public Schools have been collaborating on several projects designed to support one another and to align the technology efforts of each partner. The Technology Across the Curriculum (TAC) project is developing appropriate in-service educational technology standards based on the premise that appropriate uses of technologies differ by content area and grade level. For example, the Geometer's Sketchpad is an appropriate tool for a tenth-grade geometry teacher, but Kid Pix may be more appropriate for a kindergarten teacher. Teams of local teachers and faculty from different grade levels and content areas are jointly developing standards for in-service education. The Curry School, in turn, will make use of this information to identify content appropriate for integration in Curry School preservice courses.

In a related collaborative effort, Aileen Nonis, director of the Technology Infusion Project (TIP) and a graduate student in the Curry School, works with Becky Fisher, the Albemarle Schools technology coordinator, to pair preservice teachers with local classroom teachers. The preservice teachers are enrolled in an educational technology course that requires them to implement technology practices in real classrooms. Each team spends a semester identifying ways to appropriately integrate educational technologies into the specific classroom practices and curriculum of a participating teacher. The TIP program is jointly funded by the Curry School and the Albemarle Schools as an act of conscious symbiosis signaling that both partners benefit equally. The school division benefits through more effective technology integration in local classrooms, while the Curry School benefits because the program helps ensure that the technological practices observed by preservice teachers will be state of the art.

New Roles

Teachers should help students pursue their own inquiries, making use of technologies to find, organize, and interpret information, and to become reflective and critical about information quality and sources.

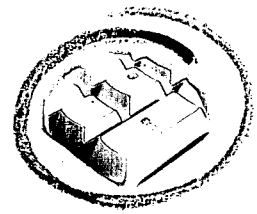
New Forms of Professional Development

Teachers must participate in formal courses, some of which may be delivered in non-traditional ways, e.g., via telecommunications; they must also become part of ongoing, informal learning communities with other professionals who share their interests and concerns.

New Attitudes

Finally, teachers need an "attitude" that is fearless in the use of technology, encourages them to take risks, and inspires them to become lifelong learners.

Once, a teacher who was well prepared in the subject she taught, experienced in the design of interesting classroom activities, and on top of information conveyed by the textbook, could contemplate a long career in teaching without having to change her style or practice very much. Those days are over.



The new technology will transform the role of the teacher as thoroughly as did the introduction of printed textbooks. More than in the past, teachers must become advisors to student inquirers, helping them to frame questions for productive investigation, directing them toward information and interpretive sources, helping them to judge the quality of the information they obtain, and coaching them in ways to present their findings effectively to others. This will require teachers to become even better prepared in the content of the subjects they teach, and the means by which the content can be taught and learned.

Challenges to Teacher Education

Re-educating the existing teaching force will not be easy and will require extensive professional development over many years. The problem will be greatly compounded if those teachers entering the profession now and in the future have not been adequately prepared to use new technology.

Public attention has been focused on the reform of elementary and secondary schools without attending to the preservice preparation of teachers who will work in these schools. However, with an estimated need for 2 million new teachers over the next decade to replace retiring teachers and to meet increased student enrollment, well-designed preservice teacher education is a critical factor in reforming our schools.

Responsibility for preservice teacher education is not limited to a college or department of education within

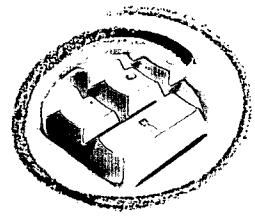
CASE ILLUSTRATION

State Policy: Texas's School-Based Teacher Education Technology Initiative

Professor Howard Jones communicates from his office or home computer with students who are working in three area elementary schools as part of the University of Houston's field-based teacher education program. Students forward lesson plans and assignments for review, share their concerns, and ask for advice or personal time to talk face to face or by phone. Jones and his colleagues at the University of Houston are in e-mail contact with their students, who work in more than 30 area elementary and secondary schools. Other colleagues at Texas Southern University, the University of St. Thomas and Houston Baptist University – all members, with the University of Houston, of the Houston Consortium of Urban Centers for Professional Development and Technology – similarly communicate with their students, either from the schools in which students are working or from wherever the students can access a computer.

The Houston Consortium is among many beneficiaries of the Texas Legislature's investment of more than $25 million over the past several years to encourage teacher education institutions to make their preparation programs more field-based and technology-intensive. Grants are made to teacher education institutions so they can develop their own technology capacities and the technology capabilities of area elementary and secondary schools, and to support the offering of methodology courses on-site in those schools. Faculty and students work together in technology-enriched school environments.

Preliminary data indicate that pupils in these schools show increased achievement on statewide tests in mathematics, reading, and writing – and that 43% of the experienced teachers in these schools report changing their teaching practices because of involvement in the program.



a university. In general, teachers take more courses in general education and in their academic majors and minors than they do in professional studies. Any effort to remake teacher education must consider all of the undergraduate and graduate experience of teachers, as the case illustrations on pages 6 and 7 demonstrate.

To what degree are higher education institutions meeting their responsibility for preparing tomorrow's classroom teachers? Bluntly, a majority of teacher preparation programs are falling far short of what needs to be done. Not using technology much in their own research and teaching, teacher education faculty have insufficient understanding of the demands on classroom teachers to incorporate technology into their teaching. Many do not fully appreciate the impact technology is having on the way work is accomplished. They undervalue the significance of technology and treat it as merely another topic about which teachers should be informed. As a result, colleges and universities are making the same mistake that was made by P-12 schools; they treat "technology" as a special addition to the teacher education curriculum – requiring specially prepared faculty and specially equipped classrooms – but not a topic that needs to be incorporated across the entire teacher education program. Consequently, teachers-in-training are provided instruction in "computer literacy" and are shown examples of computer software, but they rarely are required to apply technology in their courses and are denied role models of faculty employing technology in their own work.

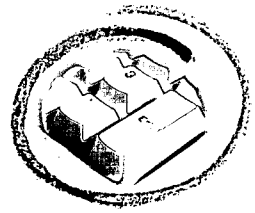
CASE ILLUSTRATION

TECHNOLOGY-BASED STUDENT WORK: THE CREATION OF "BILLIE'S STORY"

In May of 1996 six prospective elementary teachers at Vanderbilt's Peabody College participated in an experimental course that brought together molecular biology, science methods, and technology. A major course requirement was the design and development of an interactive multimedia program that they could use subsequently for their own student teaching. The course was jointly taught by Angelo Collins, a science education professor, and Todd Geary, a molecular biology professor. The goal of this month-long course was to provide these future teachers with the opportunity to develop a theory and practice of teaching science, featuring sophisticated uses of technology, while simultaneously learning substantial content in molecular biology.

The six students worked collaboratively and produced a multimedia CD-ROM about a fictional student named Billie, a fifth grader with the genetic disorder known as cystic fibrosis. The "Billie's Story" CD-ROM included extensive information on genetics, gene therapy, detection and diagnosis, treatment, and medical ethics, especially as they relate to understanding the cystic fibrosis disorder. In designing the multimedia program and conducting their research for the project, the students made extensive use of the World Wide Web and subsequently included hot links to applicable web sites. The students also planned how they would use their program with middle school students and then carried through with this during their subsequent practicum placements. In addition to creating the CD-ROM, the students made extensive use of an electronic journal for daily reflection on the process of linking science content to theory and practice, with a special focus on issues related to using technology in the classroom.

At the end of the course the students showcased "Billie's Story" in a public exhibition attended by numerous faculty, fellow students, practicing classroom teachers, and university administrators including the Chancellor of Vanderbilt. Audiences that have seen "Billie's Story" have been impressed by the intellectual and pedagogical quality of the student product. Many students stated that the experience was the highlight of their educational careers. The students urged the faculty and administration to repeat the course and to provide additional opportunities for students to do similar projects in other classes. The students' message was clearly heard – a similar integrated course experience is scheduled to be offered again; technology-based design projects have been included in other courses as well.



CASE ILLUSTRATION

Technology as a Catalyst in the Reform of Teacher Education and Arts & Sciences

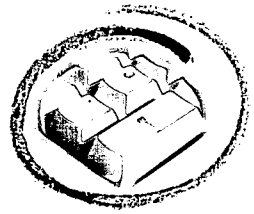
At the University of Hartford, faculty in both Arts and Sciences and Education are using advanced educational technologies to transform their curricula. Faculty members are being trained in multimedia authoring because it facilitates the development of learning environments that are sensory-rich and discovery-oriented, and incorporate powerful assessment tools. The premise of this faculty development effort is that faculty members could incorporate pedagogical innovations if given a chance to refashion their content area with multimedia authoring technology.

As faculty members try new teaching styles and model the use of new technology, students are taking creative initiatives. For example, some elementary education students are using their knowledge of multimedia authoring to help urban elementary students create projects and portfolios. In Mary Rearick's Language Arts course, one student created an interactive multimedia package, demonstrated the package in class, and built into it a curriculum for high school biology students. Another student took the class on a museum tour through the World Wide Web. After seeing those individual efforts, three students worked together to collect information for a mini-unit on India. They bookmarked documents on Indian society, sculpture, politics, and geography, then asked their peers to work in teams of two to take notes on their topic. The students then met in grade-level teams to discuss the technical skills and practical knowledge that were needed to design the assignment and complete the task. The students concluded that the most effective teachers were those whose use of technology was adapted to their students' need for information and skill development, yet who also provided opportunities for exploration, inquiry, and application of knowledge.

The University of Hartford faculty are only beginning to recognize the potential and feel the enthusiasm for how such uses of technology enhance learning.

The reasons for these deficiencies in teacher education programs are relatively easy to explain, if difficult to excuse. First of all, many teacher education programs lack the hardware and software essential to strong programs. Teacher education programs often are given low priority for special technology funding on their campuses and therefore are denied essential technology. Second, many teacher education faculty lack the knowledge and skill to incorporate technology into their own teaching. Similar to P-12 teachers, they have not been provided the training they need to use technology successfully. Third, a majority of teacher education departments and colleges have not been able to invest in the technical support required to maintain a high quality technology program. Fourth, some higher education faculty are out of touch with what is happening in schools. They have little understanding of the vast changes that are occurring in P-12 classrooms as a result of the introduction of technology and how they must change their own instruction to stay abreast of changes in the schools. Finally, teacher education programs are driven by an academic culture that rewards and recognizes individuality among faculty.

There are few incentives for bringing faculty together around a common vision about what the teacher education program should be. There may be individual faculty who believe that more emphasis should be given to the role of technology, but in any program it is likely that faculty who either oppose technology altogether or who at least do not wish it to be a priority are present as well. Furthermore, development of technological applications of software, while extremely time-consuming, is often not as highly valued for tenure as is more traditional publication and research. Too, because college faculty also are expected to be experts in their own fields, there is little or no tradition of identifying absences of knowledge and skill among college faculty and providing faculty development to overcome these deficiencies.



What Is To Be Done?

Bringing about the needed changes in teacher education programs will not be easy. Change will not occur by simply adding a course or recruiting a new faculty member who understands technology. What is required is a transformation of the culture of teacher education, one in which technology is seen as changing relationships between students and teachers and between learners and knowledge, as the case illustration below demonstrates.

Case Illustration

A Day in the Life of a Current Teacher Education Student

Before going to class I access my "e-mail" to read responses from two instructors regarding clarification of assignments, four messages from fellow students, and a message from my mom who lives on the opposite side of the state. I make revisions for my part of our cooperative learning group's Powerpoint presentation for a class later in the week. I am scheduled for three classes today.

I try to get to all my classes five minutes early to plug in my notebook computer and to get organized. All our classrooms have power sources and are linked directly to the Internet. The instructor uses a teaching station set up in the front of the classroom so he can project information on a 54-inch television screen.

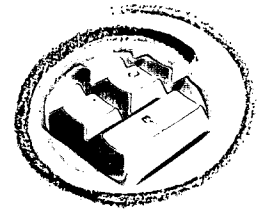
I use my laptop in my first class to take notes from the Powerpoint presentation the professor is giving. I'm creating a web page for this class and later this week I'll videotape myself teaching a mathematics lesson. Then I'll digitize the video clip and link it to my mathematics web page.

In my next class, the students are working in cooperative learning groups using the WWW to find information for a research project.

I'm working on a portfolio project in my Language Arts class, and the other students and I are in the process of scanning pictures into our Powerpoint presentations. We have all had the opportunity to develop electronic portfolios this semester and we are getting ready to complete them so that we can turn them into a CD-ROM. We will present our portfolio projects to the rest of the class during finals week. Each of us has been compiling digitized video of lessons taught, various scanned pictures, and other pertinent information that will help us to demonstrate what we have learned in the class this past semester.

Having a notebook computer and access to the Internet in my dorm room and in every classroom has raised the level of my academic performance by making it much quicker and easier for me to complete work assignments and to keep in contact with professors and other students. The knowledge I have gained by using notebook computers will definitely help me in my teaching, and I'm proud to be one of the first students to graduate from a notebook campus!

(Valley City State University, North Dakota, is one of the few universities that require all of its students to own a notebook computer.)



While change will be difficult, it cannot be avoided or postponed if teacher education programs are to serve the needs of schools. Here are a few steps teacher education programs should take.

Creating a Vision

Teacher education programs should be guided by a vision of what their programs might become if they took full advantage of information technology. For example, teacher education programs devote substantial time and expense to providing "early experiences" for their students. These typically involve sending students individually or in groups to spend time in school classrooms observing teachers. Sometimes these experiences are tightly linked to the instruction taking place in the university classroom, but illustrative examples of theory in practice can rarely be planned and cannot be analyzed as they occur. Two-way interactive video allows teacher education students to observe a P-12 class from their university classroom. Their professor can point to events that deserve special consideration, without interfering with the P-12 class, as is demonstrated in the case illustration below.

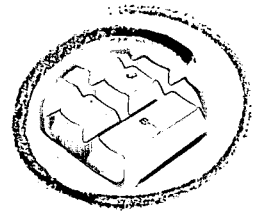
CASE ILLUSTRATION

Enhancing Teacher Education Through the Use of Interactive Technology

Classroom observation is a standard component of teacher education programs. Traditionally, teacher candidates sit in the back of the classroom, trying to be unobtrusive. As more and more classroom teachers incorporate cooperative learning and small group activities and move away from direct instruction, observers have difficulty seeing and hearing interactions between and among students and teachers.

At the University of Northern Iowa (UNI), this problem has been addressed by the use of television-mediated observation. UNI has used a televised observation system for the past six years to transmit via fiber optic link live broadcasts from the Price Laboratory School, a P-12 school located on campus, to a room located in the education center a quarter of a mile away. The mobile production unit with two cameras and several microphones can be moved into any of 48 locations throughout the laboratory school to originate a live broadcast. Cameras can follow individual students, the movement of the teacher, and/or students working in small groups. The teacher being observed wears a wireless microphone to facilitate mobility, and desktop microphones are placed strategically so conversations between students can be heard. Research on the effectiveness of the system has found that teacher candidates' ability to identify and report verbal interactions in the classroom increases by up to 20 percent when compared to direct observation of a classroom.

After watching a lesson on television with their professor, the students participate in a question-answer session with the laboratory school teacher by using push-to-talk microphones. Questions generally center around the lesson plan, student interaction, classroom discipline and management, and instructional strategies. Unlike traditional classroom observations in which each observer typically sees a different classroom than classmates, and the professor usually sees none of the same classrooms, the television system allows candidates and professor to share observations and interpretations with one another and with the classroom teacher who taught the lesson.



Technology can also serve as the catalyst for reconsidering the entire architecture of teacher education: e.g., how, when, and where candidates will acquire the knowledge and skills they need; and the linkage between preservice and in-service professional development. The integration of technology should be accomplished in relation to other efforts to reform teacher preparation, not as a separate reform initiative.

No vision about the future of teacher education is likely to prove useful if it is not closely tied to a set of assumptions about the future of schooling and the impact of technology on school instruction. This visionary process is one that must remain fluid and subject to amendment as conditions and opportunities change. The job is not to create a vision statement that remains fixed for years; the task is to begin a process in which the faculty begin to dream about the kinds of schools and teacher education programs society requires and how to obtain them. Above all, the process demands a faculty prepared to experiment and to try new ideas.

Developing a Plan

With a vision in hand, the teacher education faculty need to plan how their vision can be realized. The "plan" must be more than a technology acquisition plan that focuses on how to acquire, allocate, and amortize hardware and software. The plan must be tightly linked to other planning processes in the college and include suggestions for integrating technology across the curriculum, for providing faculty development, and for building the support structure the program will require. Steps for reallocations within the existing budget as well as ideas for seeking external funds are also a part of a good plan. The budget planning process must also include the recurrent costs associated with technologies – which include maintenance as well as upgrading.

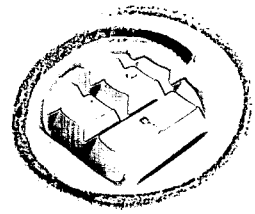
Perhaps the most important part of a sound plan is the specified outcomes for the students who are enrolled in the teacher education program. What knowledge, skills, and attitudes will they acquire from the teacher education program that are essential for them to perform successfully in technology-enriched P-12 classrooms?

Vanderbilt's Peabody College has developed an excellent conceptual model of the way courses and curriculum and student learning can be transformed via technology. Teacher candidates can progress along a continuum, starting as consumers of technology (reliance on faculty-developed applications) to become producers of technology-based applications for use in their teaching. The case illustration on page 11 and the related graphic on page 12 describe the continuum of candidate progress and competence in using technology as a teaching tool.

In addition, teacher education programs should pay careful attention to the National Standards for Technology in Teacher Preparation, developed by the International Society for Technology in Education (ISTE). ISTE recommends that all teachers acquire competencies in basic computer/technology operations, in personal and professional uses of technology, and in the application of technology for instruction. Few, if any, teacher education programs are currently meeting all of these standards. Few schools or departments of education will be able to achieve their plans and to reach their visions in a brief period. Therefore, plans must remain flexible in order to take advantage of new and unforeseen circumstances: new technology, new faculty, new funding opportunities. What is important is to have a plan that is directed toward the vision with the flexibility to alter the plan appropriately as efforts take place. Continuous and systematic planning is more important than achieving a final plan.

Allowing Experimentation

Perhaps the best way the faculty can inspire teachers-in-training to use technology is to cast themselves as learners and to experiment fearlessly in the applications of technology. The teacher education faculty can make themselves role models of lifelong learning if they create for themselves situations in which they must learn from each other and from their students. Except at the level of graduate seminars, faculty are not accustomed to place themselves in situations where they are members of a learning group. College faculty can lean upon more skilled faculty colleagues who can coach them while they improve their own abilities. Such efforts demonstrate a model of teaching behavior that should be encouraged among P-12 teachers.



CASE ILLUSTRATION

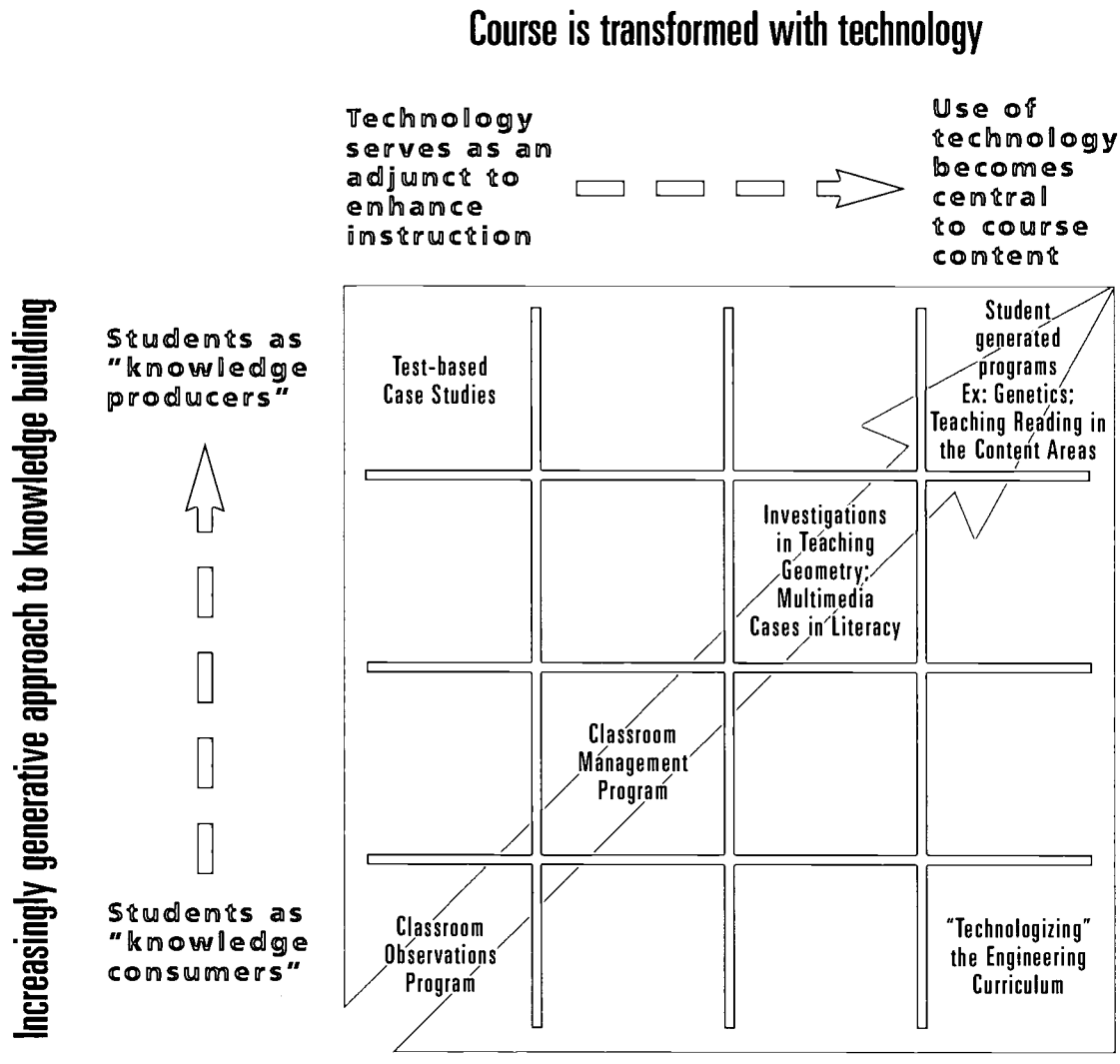
Transforming Learning: Technology Integration Across the Teacher Education Curriculum

The faculty of Vanderbilt's Peabody College have taken on the task of transforming many of their courses so that prospective teachers systematically experience the power of information technologies to support learning and teaching. A primary goal is to ensure that future teachers are thoroughly introduced to various information technologies and that they become comfortable and capable with those technologies. A second goal is to model highly effective and innovative teaching that is enabled by information technologies – teaching that promotes greater student learning. To accomplish these goals, faculty have redesigned their courses to make extensive use of multimedia video materials and other digital resources. Faculty regularly use technology in their teaching and students are routinely given in-class and out-of-class assignments that require extensive use of technological tools such as networking, research using the World Wide Web, and control and production of integrated multimedia programs.

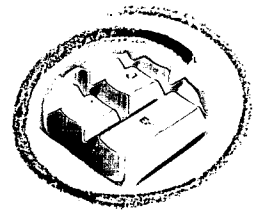
The introduction of technology into the Peabody teacher education program currently includes multiple, sequenced courses and learning experiences that begin with the introductory courses and range through advanced methods courses. The learning experiences of Peabody teacher education students are represented by the diagonal shown in the graphic on the following page.

Peabody students now have multiple opportunities to progress from being "consumers to producers" of technology-based applications. Movement along this dimension is always from reliance on faculty-developed instructional technology applications and toward learning environments that provide greater opportunity and support for student development of their own technology-based content applications, especially those that can become part of their subsequent instructional practice. This progression in the acquisition of knowledge and competence is done in the context of courses that have themselves been partially to wholly transformed as a result of embedded technology applications.

The overall result of combining the two dimensions of course redesign is a gradual and progressive increase in the sophistication and complexity of the technology-based applications that students experience over a series of courses. This "journey" over time and courses has many facets, including an increased sophistication in what students are expected to do with materials made available to them via technology, how such material is presented, how they use technology to help them construct and display their knowledge, and finally, how they use technology to conduct their own teaching. The end product will be new teachers who are not just technologically skilled but teachers who understand how, when, and why to use technology to support their teaching and their students' learning. A byproduct of this redesign enterprise is a teacher education faculty who share these same characteristics.



From: James W. Pellegrino & Janice E. Altman (1997). Information Technology and Teacher Preparation: Some Critical Issues and Illustrative Solutions. Peabody Journal of Education, 72 (1), 89-121.



It is not necessary for all faculty members to exploit every technology in their classes. Nor is it necessary for faculty to reach consensus on how technology should best be employed. The fact is that we are in the early stages of understanding how technology can be used most effectively to support teaching and learning. Given the circumstances, it is best if many pedagogical approaches are tested, several theories of learning applied, and a variety of technologies are used. The results of each experiment should be assessed carefully. Encouraging faculty to be reflective about their work and evaluate results of instruction can also advance an important domain of knowledge, while building faculty competence.

This is not a time when teacher education programs can confidently predict how technology will change the profession. This is a time of transition, which calls for experimentation.

Taking a Comprehensive Approach

If teacher education programs adopt a vision of what they wish to accomplish and become, and specify technology's role in support of this vision, and if they encourage an attitude of experimentation in which the teacher education faculty and the teachers-in-training learn to use the technology effectively together, then the other factors that must change will logically follow. These include:

- An appropriate infrastructure that allows powerful applications of technology to occur. For example, the technical infrastructure must not only accommodate uses on campus but also allow distance learning connections with P-12 schools and teacher education programs in other colleges and universities, as the following case illustration demonstrates.

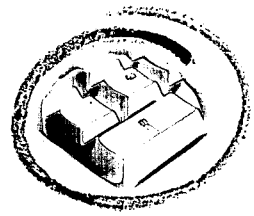
CASE ILLUSTRATION

Facilities Do Make a Difference: Wendell W. Wright Education Building, Indiana University

When Carlos Ovando wants to provide his Hoosier students with a multicultural experience in a Texas barrio, he "transports" them to Texas by means of a virtual field trip, using interactive video. Linda Mabry meets her graduate course in evaluation only once a week; between meetings, she confers with her students through e-mail. William Boone employs interactive video to teach his popular, in-service "hands-on science" course simultaneously to teachers in three different middle schools in separate parts of the state. Marianne Mitchell observes her doctoral students during their practica in counseling psychology from a television monitor in her office, while video recording each session for later debriefing with her students. And Lee Ehman connects his students in an undergraduate technology education course by e-mail to elementary school students and their teachers; the undergraduates pose historical puzzles to the younger students, who in turn use texts and reference materials, as well as their friends, siblings, and parents, to help solve the puzzles.

These and other Indiana University professors have become more effective instructors because of an extraordinary new facility, the Wendell W. Wright Education Building, and the technical infrastructure that supports it. The Wright Education Building, opened in 1992, was built with a mission in mind: to provide the education faculty, staff, and students an advanced technology environment in which to work while offering visitors a showcase where they may study ways technology can be employed to support teaching and learning. The 189,000 square foot building houses the School of Education, the education library, and the Center for Excellence in Education, a research and development facility whose mission is to explore appropriate applications of technology in education.

Throughout the Wright Education Building, students, faculty, and staff have easy access to nearly 700 computers and other technologies. A well-trained support staff ensures that the complex facility and its equipment are well maintained and up to date. Special instruction is offered as needed to keep faculty and staff current on new software and other instructional applications. As a result, Indiana University faculty are able to teach in ways they may have only dreamed about in the past.



- Incentives for faculty in terms of release time for professional development, new course development, and recognition for experimental teaching at times of tenure and merit review (see the case illustration on page 15);
- Technical support that provides reliable maintenance of existing equipment and assistance for new software applications;
- Sufficient access to technology for faculty and students;
- Better linkage to P-12 schools and to other sectors of the university or community where students receive portions of their training (see the case illustration below);
- Continuing relationships with corporations and foundations for funds to support innovations in teacher education.

Colleges and universities must use a multifaceted approach for implementing technology, developing technology use by faculty and staff, continually upgrading facilities and equipment, and maintaining ongoing involvement with elementary and secondary schools and businesses. All facets are important and should be a part of the education unit's vision and plan.

CASE ILLUSTRATION

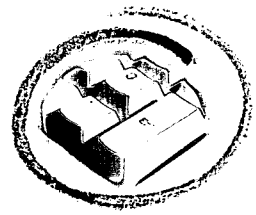
Applying Technology Practices in Schools and the University

Jeff listens intently as his professor explains how to create an effective electronic presentation. He is becoming confident in his ability to use computers effectively in a classroom after having hands-on experience with word processors, databases, spreadsheets, the Internet and email, instructional software, and presentation software. He has not only learned the skills he needs to use these software packages, but he has also learned how to plan lessons that use these tools effectively in the teaching/learning process.

Tomorrow he begins the first day of his technology fieldwork internship in a public school. As a part of the basic instruction on integrating computer technology into the teaching/learning process, Boise State University students have the opportunity to spend 15 hours in a classroom with five or more computers and a teacher who knows or is learning how to use them effectively. He will work with students at the age level and in the content area that he is preparing to teach.

The school in which Jeff will assist has a special relationship with Boise State University. All of the computers in that school are there as the result of the university's initiative, called the Technology Outreach Program, to place used computers donated by private individuals, businesses, and government in public school classrooms. The school to which Jeff will go for his internship is a rural school of 500 students, eighty-five percent of whom are Hispanic. The school has virtually no money of its own to buy computers, but receives $30,000 per year from the state for technology initiatives.

Because of the university's recycling program and technology interns, the school now has five computers in every classroom, an entire staff in technology training, and internship students to assist in classrooms while teachers and students are learning to use the technology. When either the teachers or the internship students are "stumped" by a computer or technology related curriculum problem, they can call the hotline maintained by the university for technical support. Jeff will leave Boise State University ready to face the challenges of the 21st century classroom.



CASE ILLUSTRATION

TECHNOLOGY TRAINING FOR TEACHER EDUCATION PROFESSORS

Imagine spring semester 1998 in the teacher education program at the University of Maryland at College Park (UMCP).

Students in Social Studies Methods, having earlier downloaded the course syllabus from the World Wide Web, are researching Library of Congress and Archive web sites and composing instructionally oriented web pages of their own about infamous historical figures who have "gotten a raw deal" in historical treatments.

Students in Secondary Science Methods are designing a virtual walk through environmentally sensitive wetlands on Maryland's Eastern Shore and are preparing to export it to the web for science class analysis and discussion around the state, which they will facilitate.

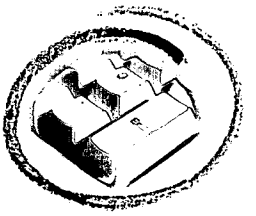
Students in Secondary English Methods are compiling, selecting, and editing high school student submissions and publishing an on-line journal of adolescent writing.

Students in the Elementary Block Methods courses are moderating a teleconference of international elementary teachers and teacher education students aimed at identifying, synthesizing, and infusing models of multicultural education into homogeneous, rural classrooms.

Students in Foreign Language Methods are continuing dialogues with native speaker web-pals in foreign countries with whom they study and exchange cultural lore.

Why is such a flurry of technologically based instructional activity taking place in the College of Education at UMCP? The reason is that the teacher education faculty are engaged in professional development aimed at: 1) developing fundamental technical skills to facilitate learning in technologically enhanced classrooms; 2) researching and applying pedagogically rich project-based strategies to employ technology in their classrooms and curricula; and 3) developing meaningful and authentic problem-solving activities in content-relevant areas. The first phase of the training focused on the Internet and computer-mediated communications, and was taught by assistant professor Ann Margaret McKillop during the 1997 spring semester. Training for the 1997-98 school year will highlight computer "mindtools" and hypermedia/multimedia.

The technology training provides opportunities for faculty members to engage in and create learning activities they plan to use in their teacher education courses. They will develop a course syllabus that contains specific technologically related learning activities and assignments. Faculty members will modify a current course syllabus as they learn new technology applications, and creatively construct technology-rich learning environments for their students. The professional development of future teachers is, of course, the ultimate goal. That is why it is critical that teacher educators have sound instruction in technologically related applications and situated-learning pedagogy. The University of Maryland at College Park has taken that big first step.



Realizing the Vision for Technology Use: NCATE's Role

These technology challenges for teacher education offer a parallel challenge to NCATE in its efforts to shape and lead teacher education reform overall. Through the accreditation process, NCATE is advancing reforms to ensure quality in the preparation of our nation's teachers. NCATE is committed to the vision of "the new professional teacher... an individual who enters teaching on the first day of autonomous practice with a foundation of knowledge and skills – a true professional."

Increasingly central to the role of the new professional teacher is the ability to employ technology to improve student learning and to employ technology in the many facets of professional work. This will require new understandings, new approaches, new roles, new forms of professional growth, and new attitudes.

NCATE is potentially one of the most important agents in ensuring that new teacher graduates know how to employ educational technology effectively. Through its accreditation function and by assuming supportive and consultative roles, NCATE can play a vital part in realizing the vision of technology's potential for improving America's schools. However, for NCATE to exert its influence in this process, many changes and initiatives must be undertaken. The existence of this task force is evidence that NCATE recognizes and accepts this responsibility.

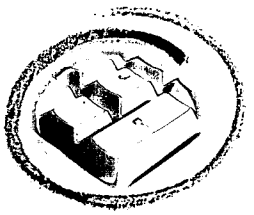
In accordance with its charge, the Task Force on Technology and Teacher Education makes the following recommendations, which its members believe will provide NCATE with direction in helping to create the kind of technology-proficient new professional teacher that has been envisioned in the preceding pages. These recommendations will help assure that the vision held by the task force members for technology use in schools is supported by the schools and colleges of education that prepare the new professional teacher.

The Task Force on Technology and Teacher Education recommendations address three major areas: 1) NCATE's leadership role in stimulating more effective use of technology in teacher education programs; 2) using technology to improve the existing accreditation process and to reconceptualize accreditation for the 21st century; and 3) improving NCATE's internal operations through greater and more effective uses of technology.

Recommendations for Stimulating Effective Use of Technology in Teacher Education

1. NCATE should require schools, colleges, and departments of education to have a vision and plan for technology that reinforces their conceptual model for teacher education. In building its conceptual framework, each institution should indicate how it is attending to the way it believes technology will have an impact on P-12 schools and on its own teacher education program. The institution's vision should be accompanied by a plan indicating how its vision will be realized. Details of the plan and the precise statement of the vision may vary greatly from one institution to another; what is important is that each institution has a process in place to attend to the opportunities available to it through technology.

Components of the technology plan could include such items as the goals, objectives, and outcomes for technology use; how equipment and software will be acquired; how technology priorities will be established; how faculty and staff development will occur; how the college efforts will link to and be reinforced by public school initiatives and plans; how connection to the Internet will occur; how technology can support a continuous improvement model of teacher education; and what the education unit expects of its teacher education graduates regarding technology competence.



CASE ILLUSTRATION

PERFORMANCE-BASED TECHNOLOGY COMPETENCIES FOR TEACHER CANDIDATES

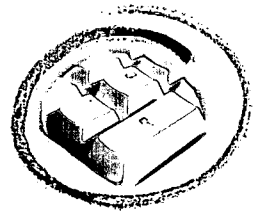
The teacher education students eagerly look to the front of the classroom as Amanda takes her position near the electronic podium. One of the other students begins videotaping her microteaching lesson for Amanda to review and critique later. She dims the lights slightly and the presentation begins with a computer graphic displayed on a 5' x 7' screen that clearly outlines the goals and objectives of her presentation. Amanda then switches to a brief video clip of a recent satellite teleconference on learning disorders. The video clip features an interview with a student struggling with a learning disability. The students are mesmerized, and are drawn into the topic as they identify with the student being interviewed.

Amanda shifts technologies again, displaying a copy of the morning paper on the Elmo visual presenter, citing the dramatic rise in students identified as learning disabled in Illinois. After briefly returning to the computer graphic as a reference point in her presentation, Amanda accesses an Internet web page that contains references and resource materials for teachers and learning disabled students. The entire class is focused and involved throughout the presentation and lively discussion she has incorporated into her lesson. After class, students linger around the electronic podium to ask questions of Amanda and to request that she post a copy of her materials on the class web page. The instructor thanks Amanda for her report and indicates he will share the ideas and resource materials with his other class as well.

Amanda is a prospective teacher in the College of Education and Human Services at Western Illinois University where, with the help of a $500,000 grant from the Ameritech Corporation, the faculty set out in 1994 to integrate technology into the teacher education program. From this effort, technology competencies were identified and formed the basis for developing 20 curricular modules that were integrated throughout the teacher education program. These modules address six major areas of technology competencies: 1) instructional design; 2) computer applications; 3) telecommunications; 4) distance learning; 5) interactive multimedia; and 6) instructional video. Facilities were transformed to make use of the technologies, and faculty members underwent extensive training in use of the technologies themselves. As a result of all these efforts, Amanda and her student colleagues at Western Illinois University have begun developing the technology skills necessary to be 21st century teachers.

2. NCATE, working with other professional organizations such as the American Association of Colleges for Teacher Education (AACTE), should encourage each school, college, and department of education to establish and explore the use of modern communications technology in carrying out its various functions and responsibilities. It should be a goal to have every NCATE-accredited institution accessible through the World Wide Web. Web technology can be used to provide information about programs, faculty, courses, and the conceptual model for preparing teachers; to promote and enhance communication between and among faculty and students; to provide students with access to learning resources; and to facilitate the accreditation process, to name but a few uses. Education units at NCATE-accredited institutions should be leading the way in the multiple uses of web technology. Graduates of these institutions should be thoroughly skilled in professional and classroom applications of web technology.

3. NCATE, working with other professional organizations such as AACTE, should identify and make available to all interested institutions exemplary practices of technology use in the preparation of teachers for the 21st century. There is a need for institutions just starting along the technology trail to learn from other institutions that have already addressed some of the issues and found some answers. NCATE might list on its web page institutions that have been cited or iden-



tified as having exemplary practices in technology (this could also occur in other areas in addition to technology), with hyperlinks to the web pages of the identified institutions where more information on the innovation or exemplary practice could be found.

NCATE's web page could help to create benchmarks of exemplary practice in a variety of institutions. These models can stimulate visions of the future; give examples of effective planning processes; provide demonstrations of new technology applications; and showcase examples of a changing teacher education culture that promotes curriculum experimentation, collaborative learning, faculty development, and better linkages to P-12 schools, other units within the college or university, and the larger community. NCATE could also direct teacher educators to resources available from organizations conducting research on technology and teacher education.

Recommendations for Using Technology to Improve the Accreditation Process

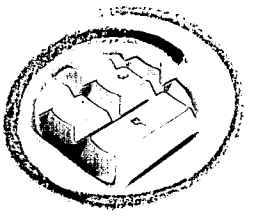
The committee makes two major sets of recommendations regarding the use of technology to improve the accreditation process. The first relates to the use of technology to improve or otherwise enhance the accreditation process as it is currently being performed. These recommendations relate to making accreditation more efficient and less costly, or to adding information sources or displays that are not readily accomplished by the current means. These recommendations are made to improve or expand NCATE accreditation through current technologies and those that we foresee in the near future.

The second set of recommendations relates to fundamentally reshaping what the accreditation process looks like and what it is designed to accomplish. These recommendations relate to the "technology generation after next" in which NCATE is not encumbered by what accreditation is now or the limits of current technologies. These recommendations urge NCATE to assume a future-oriented stance, one in which issues of technology use are thoroughly embedded in the fabric of models for teaching, learning, and teacher education. Thus, these new accreditation standards and processes would have a strong influence on how NCATE institutions conduct their business and evaluate their own progress. NCATE can be a lever for technology reform, as it has been in other such areas as multiculturalism and conceptual models of teacher education.

In essence, the committee recommends that NCATE undertake two processes: 1) to make better use of technology within the current accreditation processes, and 2) to undertake a new, developmental effort, separately funded and voluntarily selected by institutions that want to engage in such a process and would benefit from it. These institutions would help NCATE rethink and redesign teacher education accreditation for the early 21st century.

Improving the Current Accreditation Process

1. NCATE should revise its standards to require institutions to articulate, as part of their conceptual model, the role they envision technology will play in the preparation of teacher candidates and how these candidates are expected to use technology when they assume teaching responsibilities in elementary and secondary schools.
The members of the task force believe strongly that technology can and should affect how teachers are prepared and how they carry out their teaching roles. Consequently, task force members believe that



expectations for technology use should be a part of the standards, not just present as indicators. We are past the time when schools, colleges, and departments of education that are extremely deficient in preparing teachers to use technology should be allowed to prepare teachers for the 21st century. Appendix B lists current technology expectations for accredited schools of education.

2. NCATE should establish pilot projects with a few institutions to implement and evaluate state-of-the-art uses of technology in the current accreditation process. A number of universities are already technologically sophisticated and willing to engage in exploring how these technologies could be used to improve the existing accreditation process. Some examples might include displaying faculty vitae, providing electronic copies of the catalog and course syllabi, using electronic portfolios of teacher education students to determine if content standards are being met, using digital school portfolio software that enable education units to "tell their stories" in representational and creative ways, using interactive television (ITV) as a way of interviewing teacher education graduates and school officials located at a distance from the main campus, using chat rooms to involve more faculty members in discussions with the Board of Examiners (BOE), using web technology to facilitate joint NCATE/state visits in partnership states, and providing reconceptualized exhibit rooms that are available on-line to BOE members, thus allowing them to spend more

CASE ILLUSTRATION

Using Technology to Improve and Enhance Accreditation Visits

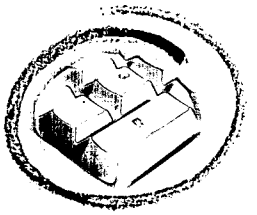
Professor Brown is at his computer in his faculty office at a West Coast university. Ms. Smith is at a computer in the instructional media center in her rural elementary school in Michigan. This afternoon, by coincidence, both are reading accreditation/approval materials on the Eastern Michigan University (EMU) NCATE/state web site.

Professor Brown soon will be visiting EMU as a member of an NCATE Board of Examiners team for a continuing accreditation visit. Unlike his previous BOE experiences, he has received no printed materials from EMU. Instead, he has reviewed a large quantity of supporting materials, including what is usually found in "exhibits," on the WWW. The web site is searchable by topic and he can trace references to a special project that he didn't fully understand from the limited reference to it in the continuing accreditation report.

Ms. Smith will also be visiting EMU at the same time Professor Brown is there, but as a member of a state team that will be reviewing on a program-by-program basis. She, too, has received no materials from EMU, but she has found on the web site the completed state forms, catalog materials, advising sheets, syllabi, and the like for the programs that she knows she will be responsible for reviewing on site. Because she can do so much of her preparation and "paper review" ahead of time, she has identified certain faculty members she wants to interview and certain classes she wants to visit in order to understand better a particular teaching method that is used.

Professor Brown and Ms. Smith have learned from the schedule of activities for the site visit that on Monday afternoon they will be interviewing a group of advanced students, several hundred miles away, by two-way interactive video. On Tuesday afternoon, they will interview a group of cooperating teachers, all of whom are logged on simultaneously, via an e-mail "caucus." A department head will be out of state during the visit, but can be reached at any time during the site visit by e-mail to answer questions.

Consistent with recommendations contained in this report, Eastern Michigan University is pioneering the use of web technology to improve and enhance the timeliness and quality of communication between the education unit and accreditation examiners.



time during the visit talking to people rather than reading paper documents in an exhibit room. Appendix C provides a display of types of information that could be transmitted electronically during accreditation reviews.

These pilot projects should be conducted both by institutions seeking initial accreditation and those pursuing continuing accreditation. A systematic evaluation component should be incorporated into these pilot projects. Every effort should be made to include in these pilot projects a diversity of institutional types.

3. NCATE should encourage the various principals in the accreditation process to use electronic means to communicate and to store and retrieve data. For example, institutions could submit Institutional Reports on disk or in electronic form, such as web page templates; BOE reports could be submitted electronically; and the annual Joint Data Collection System could be submitted using a web page template. [See Appendix C]

4. NCATE should continue to expand its web site as it identifies additional functions and sources of information that can be made available through web technology. As NCATE's use of web technology develops and expands, every effort should be made to include mechanisms for monitoring the most frequently accessed information sources.

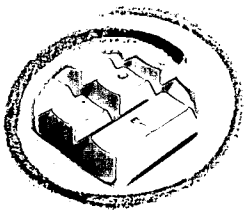
5. NCATE should pilot the use of electronic folio reviews in the accreditation process. Institutions must submit folios of their curricula to specialized professional associations to determine if the curricula meet the association's standards. Currently, these folios are submitted in paper form. NCATE should implement a pilot test use of electronic folio reviews via the WWW, including the training of folio preparers, folio reviewers, and state partnership personnel. The task force recommends that NCATE work with one or more of its constituent organizations to pilot test this process.

Reconceptualizing the Assumptions and Process of Accreditation

NCATE, through its accreditation process, must take a leadership role in assisting schools, colleges, and departments of education in preparing teachers for the 21st century. The classrooms of the 21st century will be dynamic and subject to constant change. The preparation of teachers for those classrooms of tomorrow will be critical in helping to transform teaching and learning. We are at a unique moment in time, one that requires NCATE to provide leadership to nudge institutions toward setting and meeting higher standards in the preparation of teachers. This process is dynamic, not static. As one task force member stated, "NCATE is accrediting a moving target. The situation may be likened to training the pilots while the plane is still being built."

The task force members believe that NCATE needs to initiate a process for examining the assumptions and practices of the current accreditation system. Quality assurance is likely to remain the primary function of accreditation, but how NCATE will ensure that the institutions it accredits establish and maintain quality will almost certainly change over time. Performance-based licensure and technology use are certain to have ramifications for how accreditation is implemented. The task force strongly urges NCATE to implement a "break the mold" perspective to push the boundaries of current accreditation practice to see what might be feasible and desirable for accreditation in the 21st century.

NCATE should begin a process to develop a new model of accreditation for the 21st century that would incorporate conceptual and pragmatic issues related to information technologies, teaching and learning, and teacher education. NCATE should invite institutions that are willing to participate in an exploratory continuing accreditation process with NCATE to develop new standards and to examine a fundamentally different accreditation model and process, one in which technology plays a major role. One example might focus on how technology can assist in the move to performance-based licensing and accreditation. (Performance-based licensing refers to a system by which state teaching licenses are granted or denied based on the assessment of an individual's teaching performance, while performance-based accreditation means that accreditation decisions will be based in part on information about the performance of candidates and institutions in meeting specified standards.) As more states explore the possibilities of performance-based licensing and accreditation, technology will play a critical role in the assessment process. Still another possibility is to work with software developers to create software/network environments that are specifically designed to the particular needs of new accreditation processes. What the specific accreditation model might look like cannot be anticipated by this task force, but new and exciting possibilities should emerge from the process.



Improving NCATE's Operations Through Better Use of Technology

1. Develop a strategic information technology plan. At the present time NCATE does not have a strategic information technology plan to help guide the organization in carrying out its business. NCATE has employed a consultant firm to assist in the development of a data base, but has not developed a fully functional strategic information technology plan. The strategic information technology plan should support NCATE's business and programmatic activities, and should serve as:

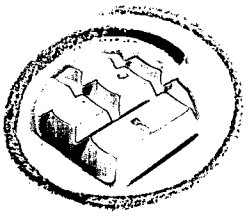
- a vehicle for discussing and building consensus on a definition of problems, relative and absolute priorities of solutions, preferred technologies, organizational structures, and other related factors;
- justification for future expenditures, demonstrating that specific initiatives are conceived as part of a coherent whole, that alternatives have been considered, and that forethought and consideration are present;
- a road map to guide future information management activities; and
- a yardstick for measuring future progress, since the plan will indicate the specific activities that should be under way at any point.

The strategic information technology plan should define the information needs, the applications, and the supporting technical environment that NCATE wants to have in place in the near future; and contain a strategy and timetable, covering three to five years, for the implementation of the new information systems and associated technology.

2. Clarify the criteria for the selection of Board of Examiners (BOE) and Unit Accreditation Board (UAB) members, and incorporate technology issues into their training. NCATE should ensure that these board members possess basic technology competencies, such as word processing, navigating the web, e-mail use, and navigating a CD-ROM. As more of the accreditation process makes use of technology, it is essential that BOE and UAB members be sensitive to technology issues and be able to apply standards relating to technology in an effective manner. One way in which examiners can play a powerful role as visitors to a campus is by asking questions of key administrators regarding allocations of funds that have been set aside for technology infrastructure, for faculty development, and for technical support.

NCATE could develop case-based training materials that would utilize technology and multimedia to support a variety of learning/training goals, including training in what the various standards mean and how different cases might be evaluated. Such cases might also be shared with institutions seeking initial accreditation to help them better understand the accreditation process and how judgments and decisions are made.

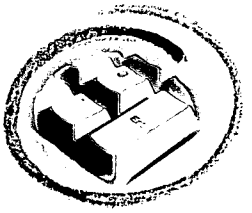
3. Examine and redefine the Joint Data Collection System (JDCS) to ensure that it collects the most important and useful data, which can then be easily accessed for aggregate analysis. There is a general sense among task force members that the data currently collected could be improved to aid teacher education. NCATE and AACTE should seriously rethink the JDCS, determine what purposes it is intended to serve, and what ongoing analyses are needed. This reconsidered purpose would then support a redesign to make effective use of technology and electronic data entry or submission. For example, NCATE and AACTE should ensure that data collected are in a standard format. This could be accomplished by formatting disks or providing web-based templates, and asking institutions to fill in the data rather than use paper reports. Use of key words will make searching and analysis easier and more powerful. NCATE and AACTE should also work with the various state departments of education to coordinate their data needs with those of the states to reduce duplication of effort.



Conclusion

Underfunding of technology efforts in teacher education remains a serious problem for many NCATE-accredited institutions, while at the same time both state and federal governments are expending huge amounts of money to initiate technology infusion into the elementary and secondary schools of our nation. NCATE can play a key advocacy role by working with policymakers at state and federal levels to help them understand the significance of teacher education for the effective implementation of technology in P-12 schools, and by securing their support for public and private investments for technology applications in teacher education. NCATE should also initiate discussions with state departments of education regarding licensure issues relating to technology and teacher competence. In pursuing these and other activities, NCATE should continue to collaborate with other teacher education organizations, especially the American Association of Colleges for Teacher Education, Association of Teacher Educators, International Society for Technology in Education, Association for Educational Communications and Technology, and the International Technology Education Association.

NCATE is in a unique leadership position to help advance the use of technology in teacher education. Graduates of teacher education programs must be prepared to make productive use of technology in their professional lives and use technology to help students learn more effectively. There is much to be learned about how best to accomplish this goal. NCATE and its constituent organizations and institutions can enter into a cooperative venture to advance knowledge of how to prepare teachers for the learning environments of tomorrow through effective accreditation practice.



APPENDIX A

Guide to Case Illustrations of Technology Use in Teacher Education

The Task Force solicited from a variety of teacher education institutions brief case illustrations that demonstrate innovative technology use in teacher education programs. These cases are distributed throughout the report to illustrate some of the points made in the text.

Web sites for the institutions featured in the case illustrations are identified. Some web sites specifically refer to the topic of the case illustration; many are the sites for the school, college, or department of education – which the user can contact for more information.

The Multimedia Academy: Technology Applications in a Professional Development School – a joint partnership with Chula Vista Elementary School District and San Diego State University, p.3. http://edweb.sdsu.edu

Aligning Technology Practices in the Schools and the University – efforts between the Curry School of Education, University of Virginia, and local school divisions, to support one another in technology initiatives, p.4. http://curry.edschool.virginia.edu

State Policy: Texas' School-Based Teacher Education Technology Initiative, p.5. http://coe.uh.edu/pdts

Technology-Based Student Work: The Creation of "Billie's Story" – an interdisciplinary course in molecular biology, science methods and technology which produced a CD-ROM about a fifth grader with a genetic disorder (Vanderbilt's Peabody College), p.6. http://peabody.vanderbilt.edu/GPC

Technology as a Catalyst in the Reform of Teacher Education and Arts & Sciences at the University of Hartford, p.7. http://icet.hartford.edu

A Day in the Life of a Current Teacher Education Student – at Valley City State University, North Dakota, where all students are required to own a notebook computer, p.8. http://www.vcsu.nodak.edu/offices/itc/notebooks

Enhancing Teacher Education Through the Use of Interactive Technology – using television-mediated observation of a P-12 Laboratory School and the teacher education program at the University of Northern Iowa, p.9. http://www.uni.edu.coe

Transforming Learning: Technology Integration Across the Teacher Education Curriculum – sequencing technology experiences across the teacher education curriculum at Peabody College, Vanderbilt University, to provide opportunities for students to progress from being consumers to producers of technology-based applications, p.11. http://peabody.vanderbilt.edu/GPC

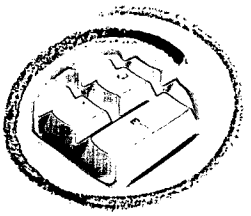
Facilities Do Make a Difference: Wendell W. Wright Education Building at Indiana University, p.13. http://cee.indiana.edu

Applying Technology Practices in Schools and the University – technology fieldwork internships between rural schools and Boise State University, p.14. http://coehp.idbsu.edu/BSUTop/BSUTop.htm

Technology Training for Teacher Education Professors – at the University of Maryland, College Park, p.15. http://www.inform.umd.edu/EDUC

Performance-Based Technology Competencies for Teacher Candidates – using technology modules in Western Illinois University's teacher education program, p.17. http://www.wiu.edu/users/miitt

Using Technology to Improve and Enhance Accreditation Visits – a visit to Eastern Michigan University's web site, p.19. http://education.acad.emich.edu/NCATE



APPENDIX B

Current Technology Expectations for Accredited Schools of Education

Following are the areas in the NCATE accreditation standards with expectations for knowledge and use of technology:

NCATE's accreditation standard I.C.1, *Content Studies for Initial Teacher Preparation*, expects candidates to "complete a sequence of courses and/or experiences to develop an understanding of the structure, skills, core concepts, ideas, values, facts, methods of inquiry, and uses of technology for the subjects they plan to teach."

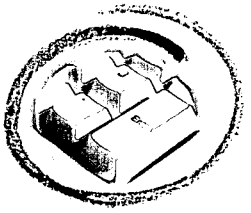
NCATE's accreditation standard I.D.2, *Professional and Pedagogical Studies*, expects that professional studies for all teacher candidates include knowledge and experiences with "educational technology, including the use of computer and related technologies in instruction, assessment and professional productivity."

In NCATE's Standard III.A, *Professional Education Faculty Qualifications*, an indicator has been added stating that "faculty are knowledgeable about current practice related to the use of computers and technology and integrate them in their teaching and scholarship."

Standard IV. B, *Resources for Teaching and Scholarship*, expects that "higher-education faculty and candidates have training in and access to education-related electronic information, video resources, computer hardware, software, related technologies, and other similar resources," and "media, software, and materials collections are identifiable, relevant, accessible, and systematically reviewed to make acquisition decisions."

Standard IV.C, *Resources for Operating the Unit*, expects that equipment and budgetary resources are sufficient to fulfill the mission of the school of education and to offer quality programs. An indicator states that "facilities and equipment are functional and well maintained. They support computing, educational communications, and educational and instructional technology at least at the level of other units in the institution."

In addition to these standards for the entire school of education, NCATE recognizes three sets of technology standards for use in accredited institutions. In 1991, the new standards of the International Society for Technology in Education (ISTE) were approved for the preparation of school computer literacy teachers and specialists. These standards set high expectations for the preparation of computer science and computer literacy teachers, as well as for preparation of individuals for technology leadership positions at the district, state or regional level. NCATE has also recognized the standards of the Association for Educational Communications and Technology (ACET) as they prepare professionals to help teachers integrate technology into their work, and the International Technology Education Association/Council on Technology Teacher Education (ITEA/CTTE) for their work in preparing technology education teachers. Too, new standards for educational administrators, recently developed under the auspices of the National Policy Board for Educational Administration, include specific expectations for the use of technology in instruction, evaluation, and administration.



APPENDIX C

Accreditation Data That Could Be Available Electronically To Various Stakeholders

Attachment 1: NCATE National Office

Attachment 2: Unit Accreditation Board

Attachment 3: Board of Examiners

Attachment 4: Parties Related to Initial Accreditation Visits

Attachment 5: Parties Related to Continuing Accreditation Visits

Attachment 6: Constituent Members of NCATE

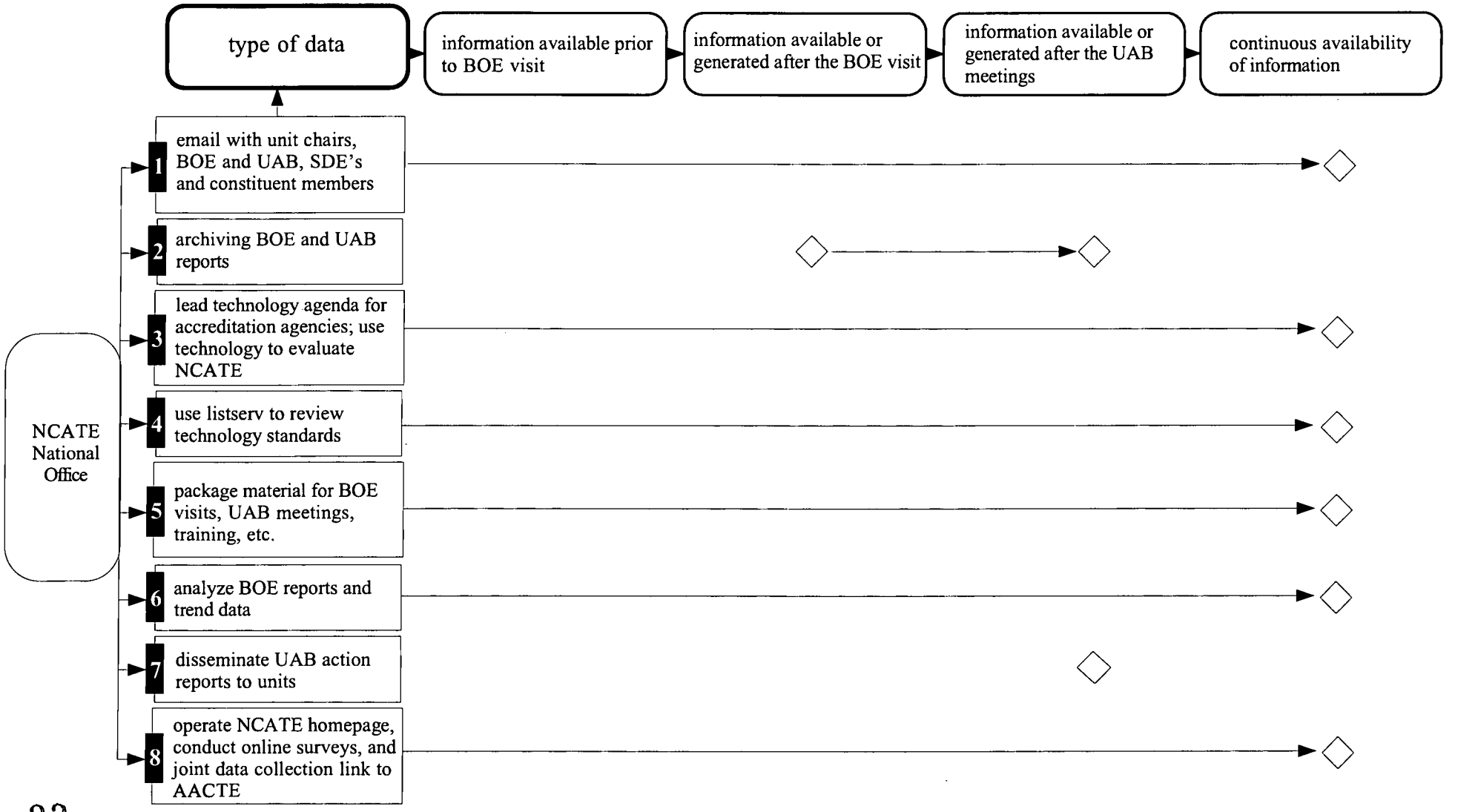
Attachment 7: All Schools, Colleges, and Departments of Education

Attachment 8: Non-School of Education Stakeholders and General Public

Attachment 9: State Departments of Education

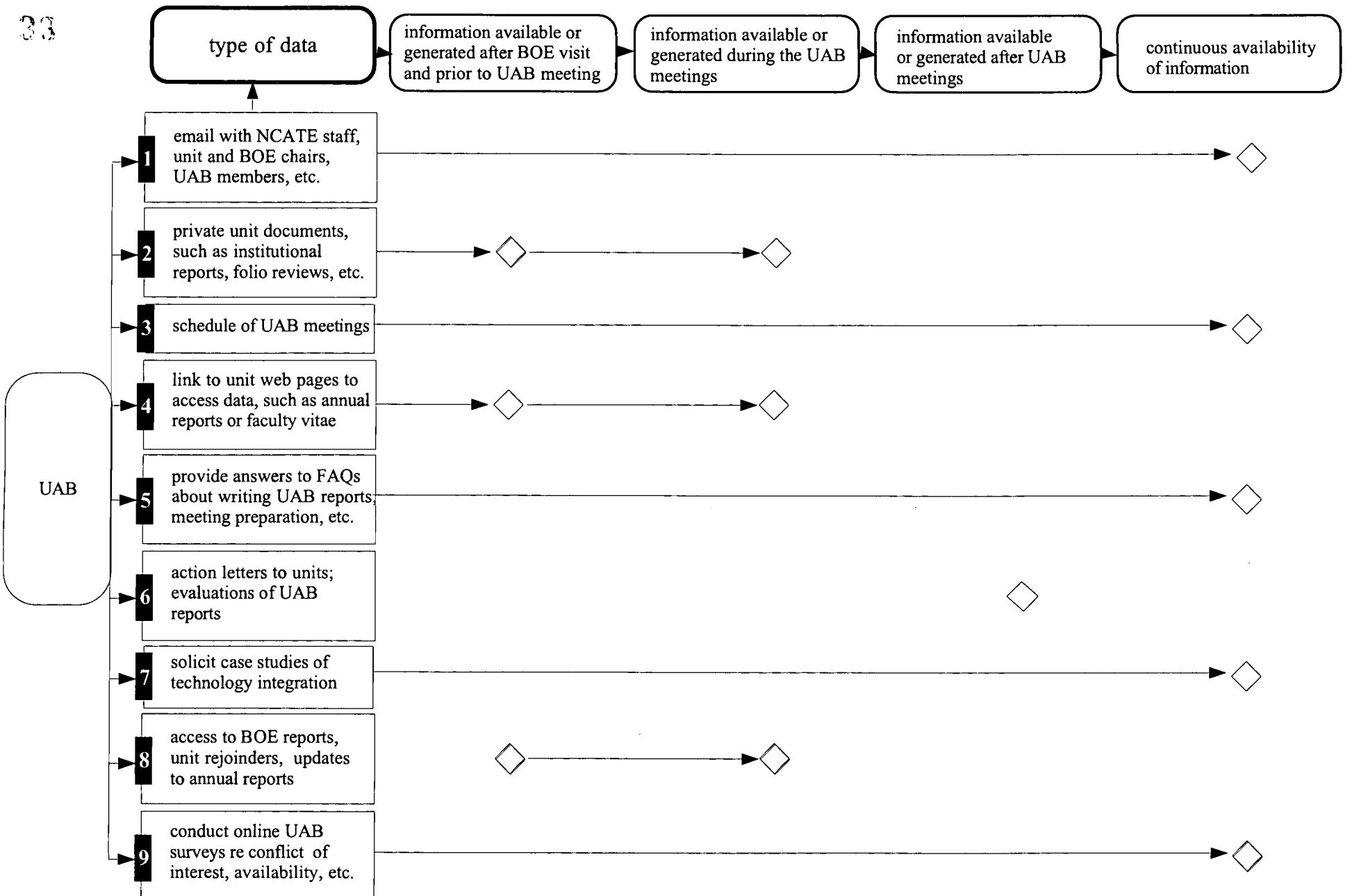
Attachment 1

Possible accreditation data related to internal NCATE staff functions that could be available electronically



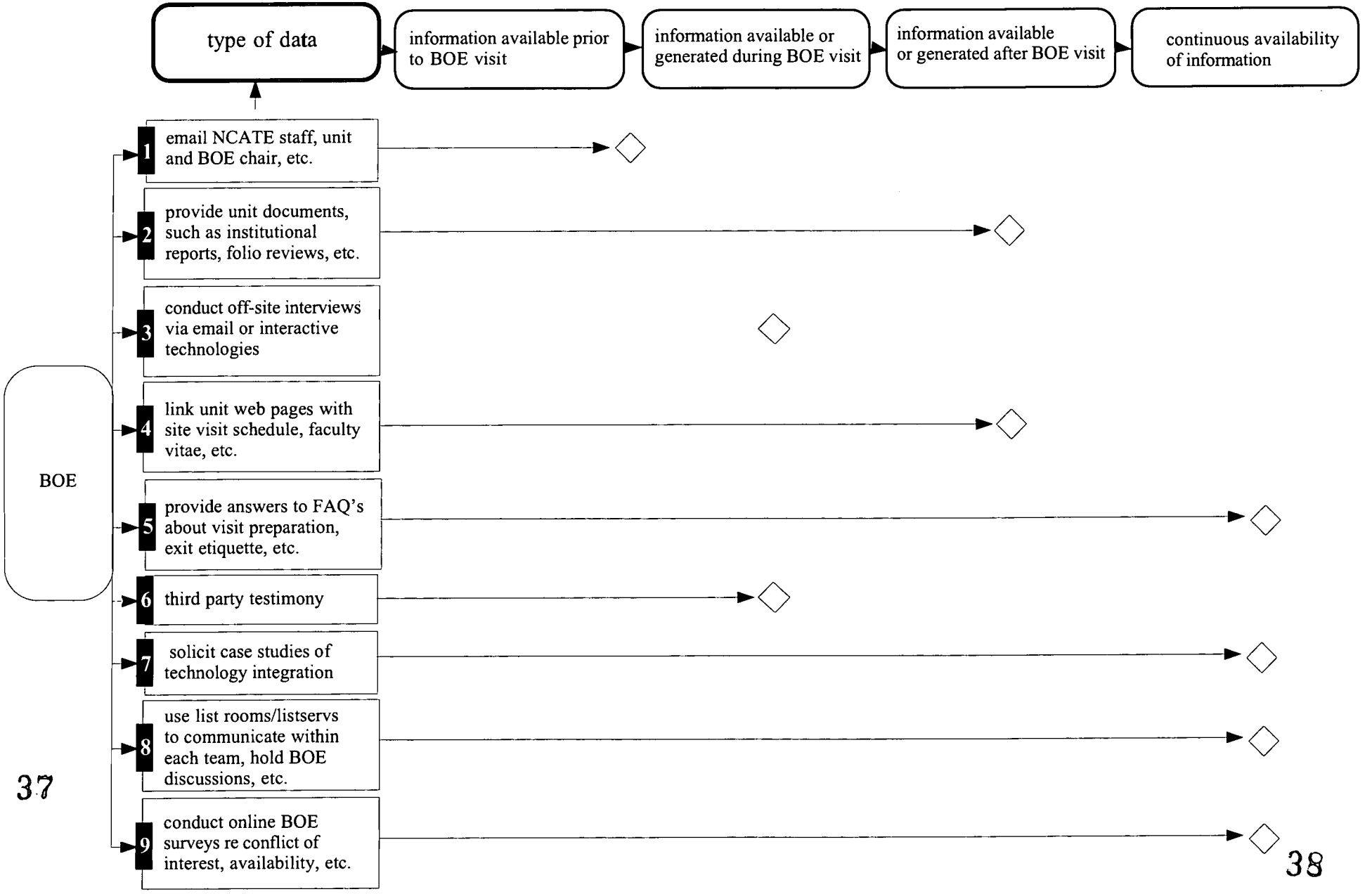
Attachment 2

Possible accreditation data related to Unit Accreditation Board (UAB) that could be available electronically



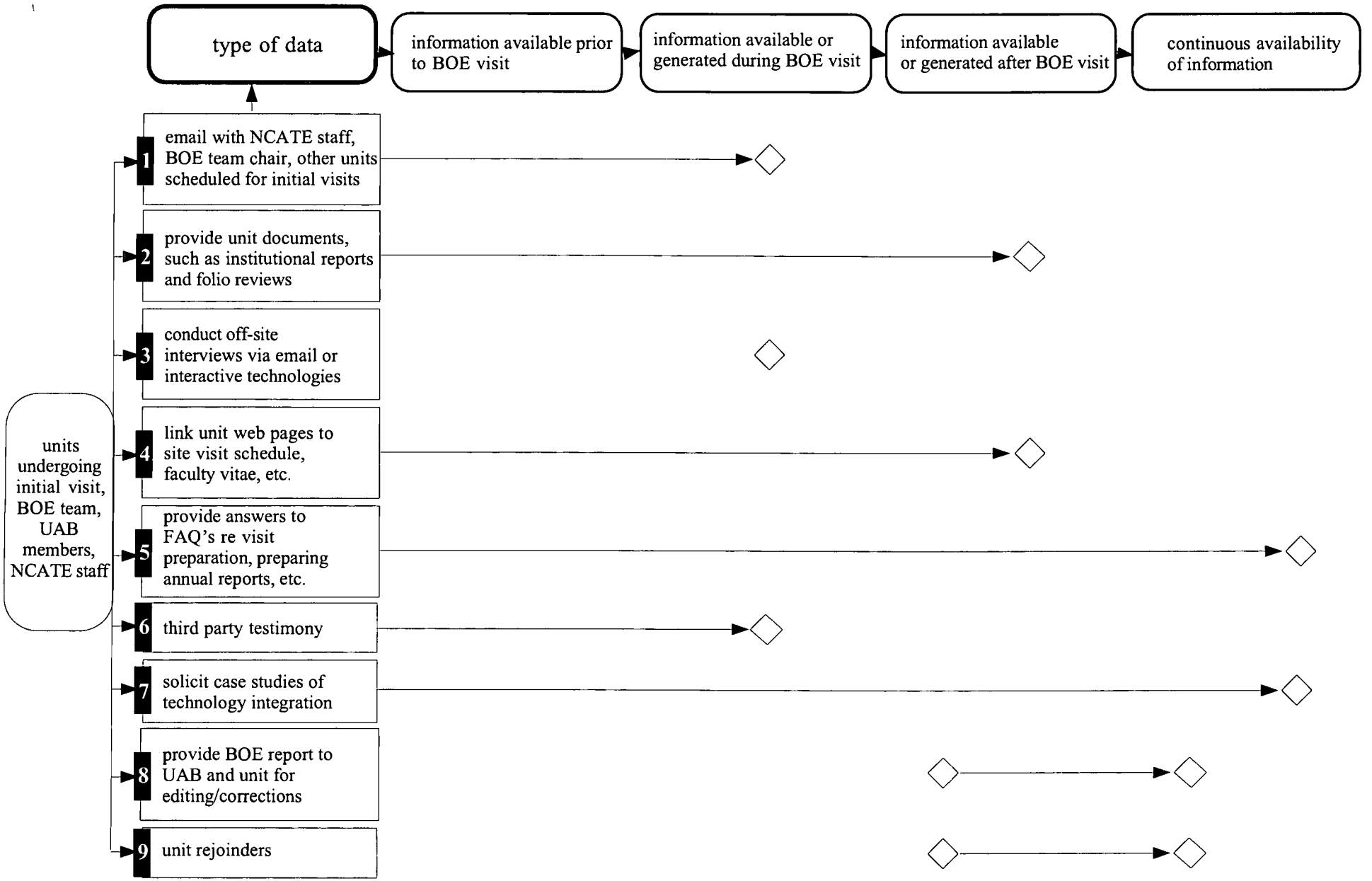
Attachment 3

Possible accreditation data related to Board of Examiner (BOE) visits that could be available electronically



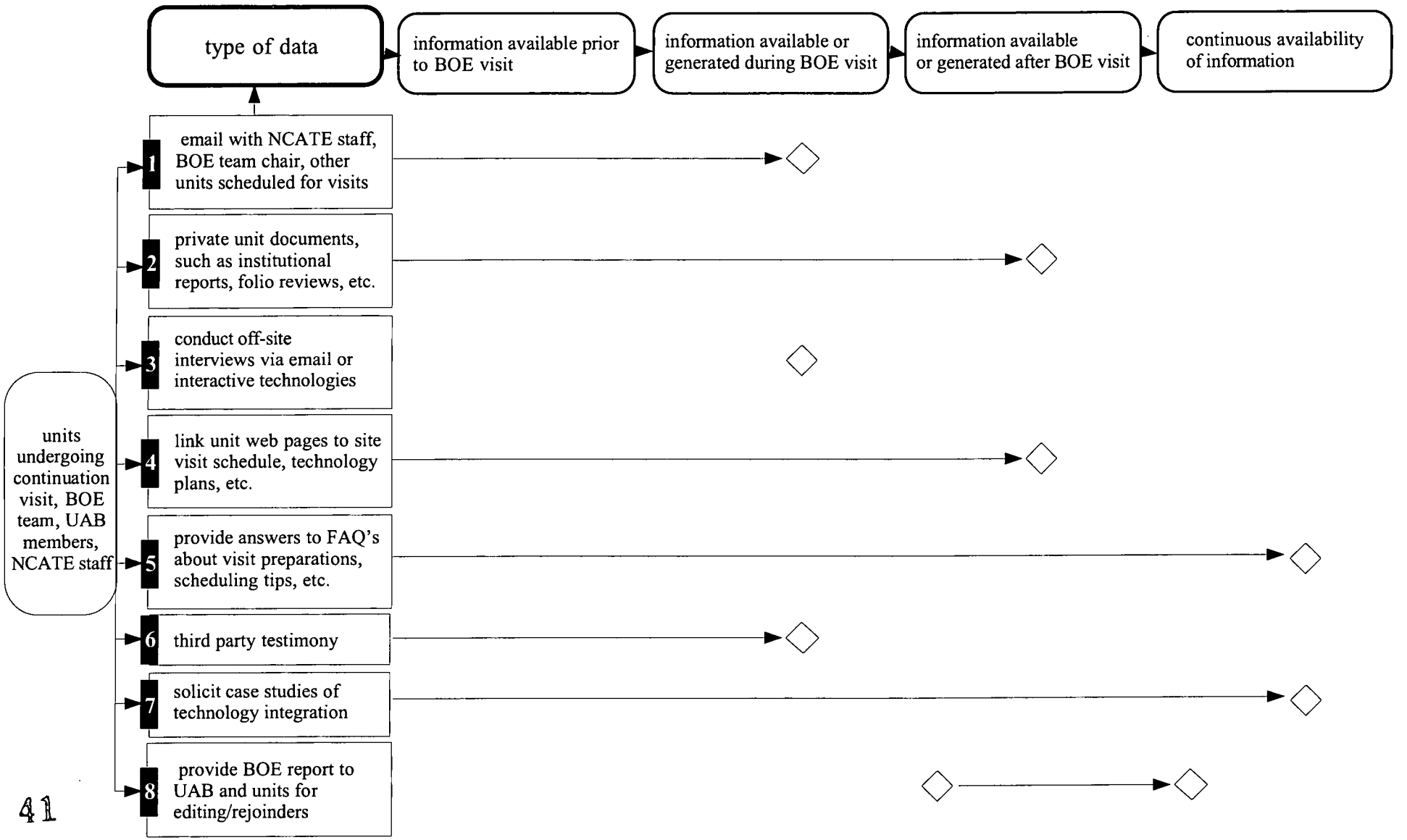
Attachment 4

Possible accreditation data related to Board of Examiner (BOE) visits that could be available electronically to SCDEs experiencing initial BOE visits, as well as specific BOE members and all UAB members



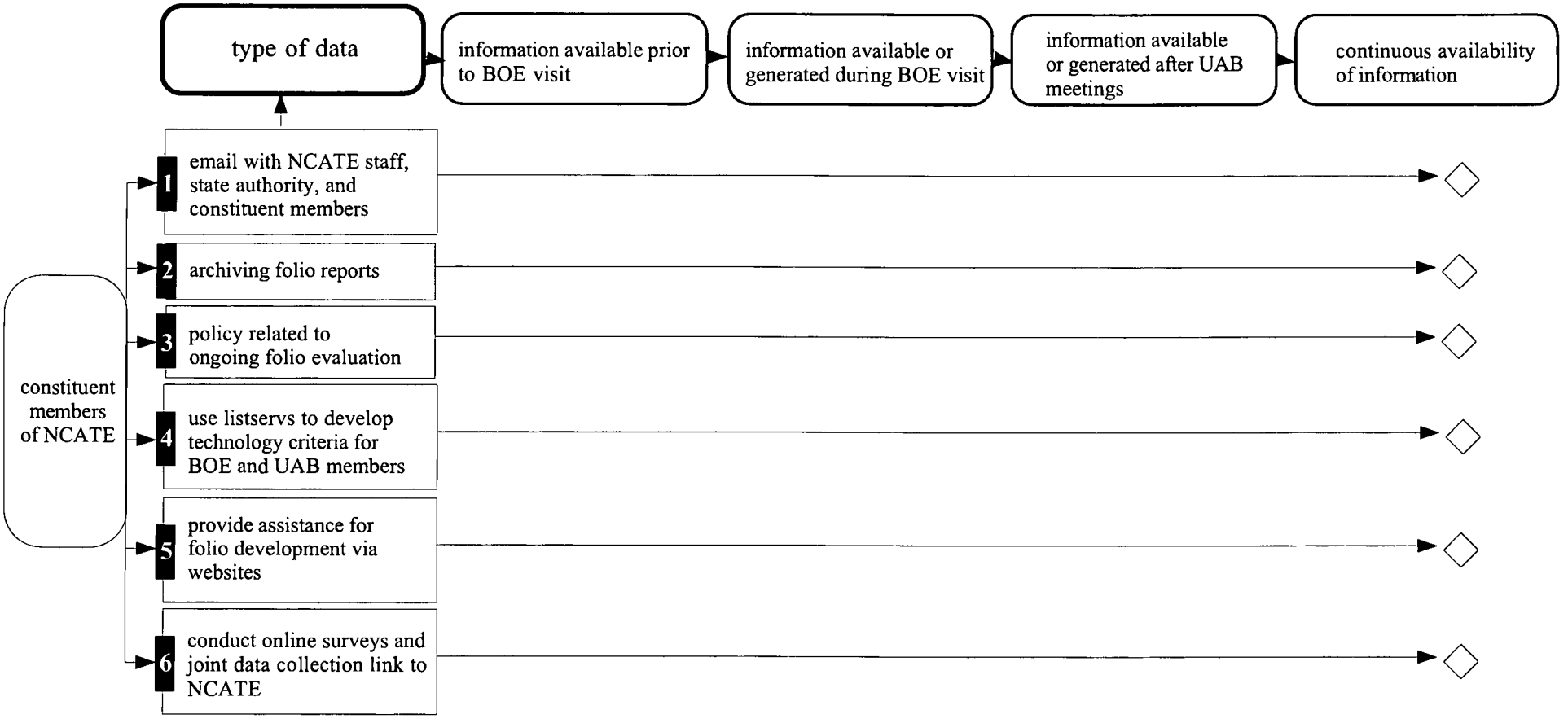
Attachment 5

Possible accreditation data related to Board of Examiner (BOE) visits that could be available electronically to SCDEs experiencing continuation visits as well as specific BOE members and all UAB members



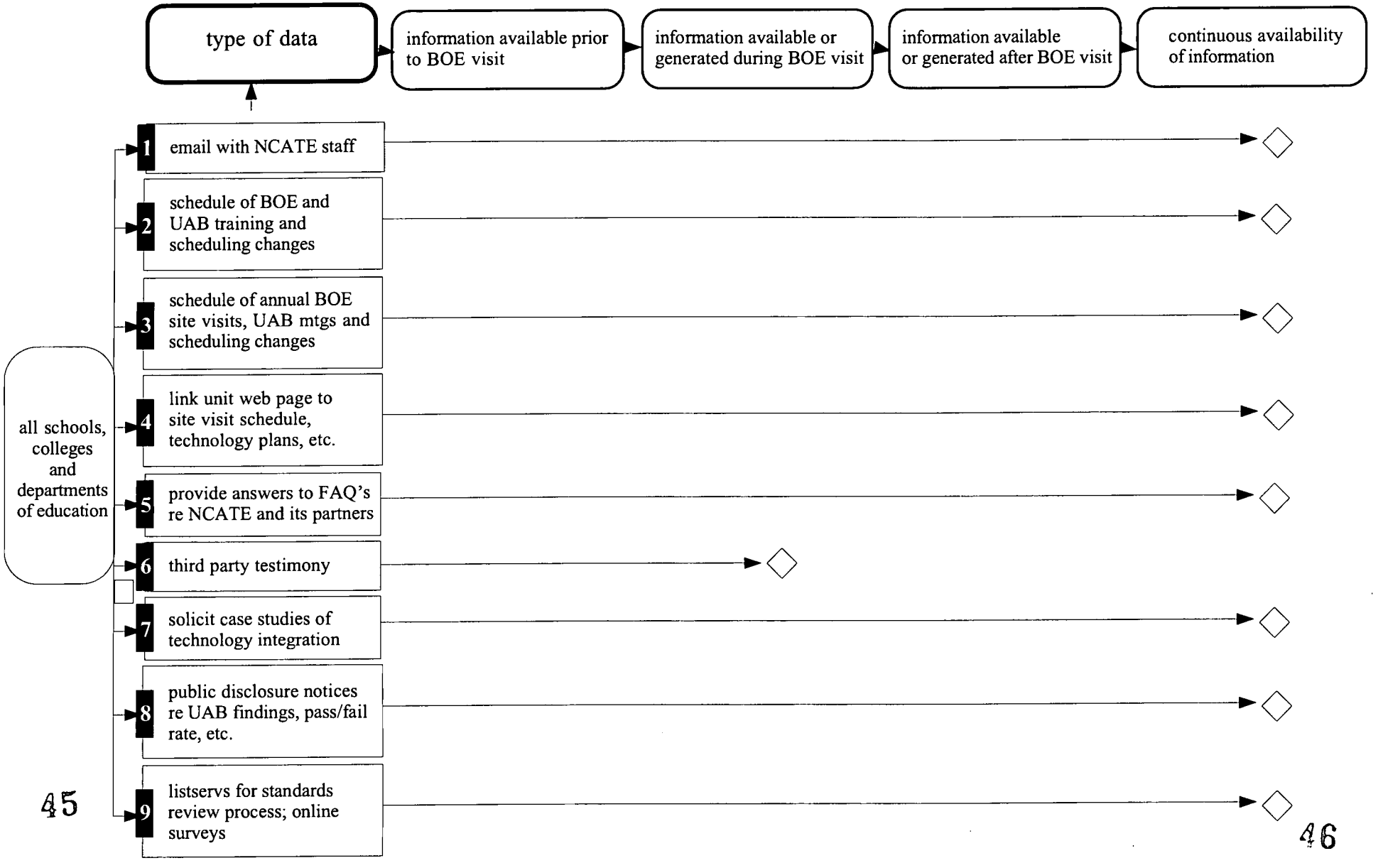
Attachment 6

Possible accreditation data related to constituent member organization functions that could be available electronically



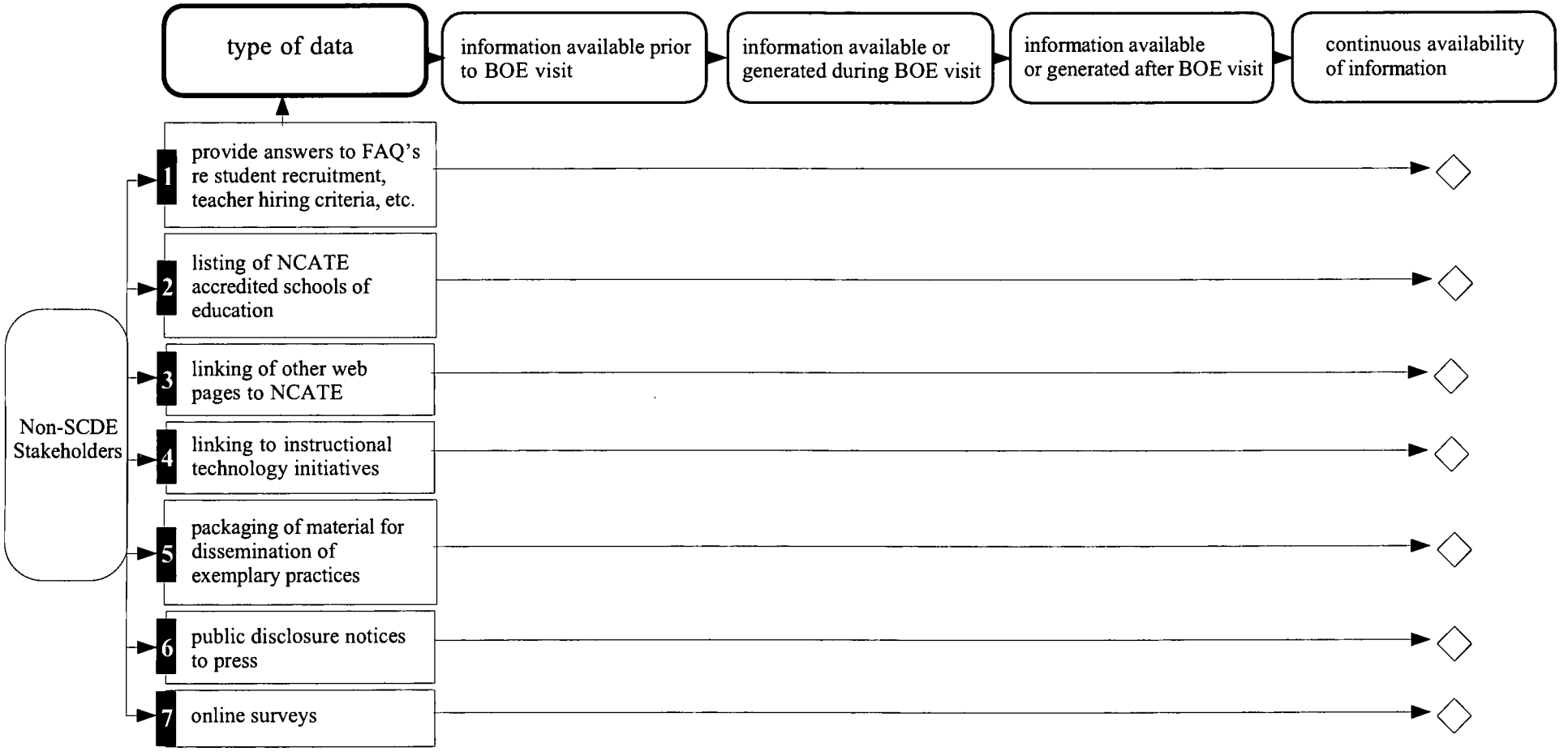
Attachment 7

Possible accreditation data related to Board of Examiner (BOE) visits that could be available electronically to all schools, colleges, and departments of education (SCDEs)



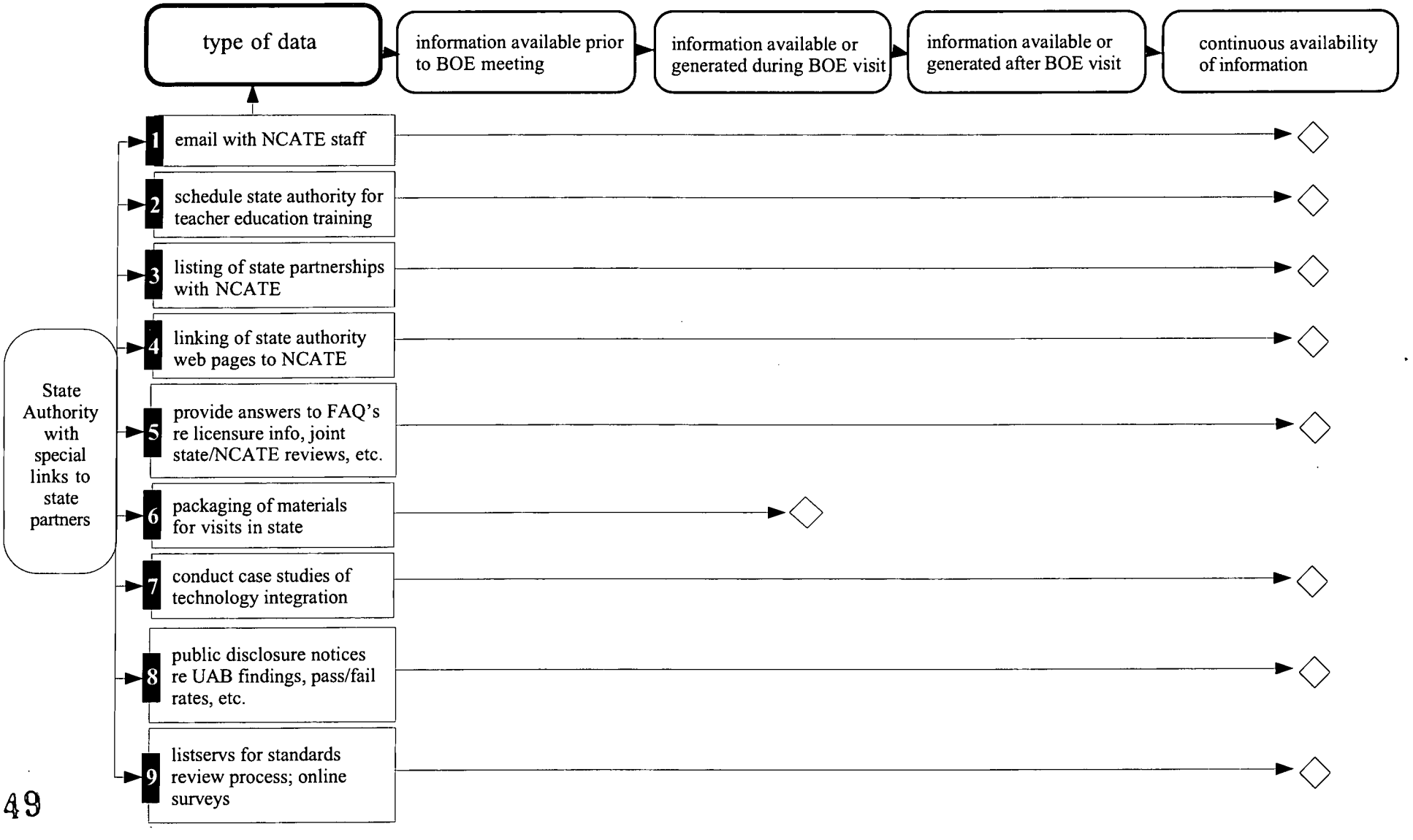
Attachment 8

Possible accreditation data related to other non-SCDE stakeholders (such as university presidents, prospective teachers, school districts, funding agencies, US Department of Education, and the press) that could be available electronically



Attachment 9

Possible accreditation data related to State Authority for Teacher Education that could be available electronically



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