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ePortfolio Using the Power of Nonlinear Space to Create and Interlink a Repertoire of Skills Essential for Teaching

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Abstract

The ePortfolio is a web-based innovation that allows teacher education students to demonstrate their competency and share their work on websites. While the original impetus for this work was in professional placement. A platform where students could represent their strengths to potential employers was developed. It has since become the means by which to address state and national mandates for standards performance assessment. The three-part developmental structure of the ePortfolio, in fact, offers a mechanism for demonstrating to faculty, assessors, and to students themselves a mastery of complex learning systems and strategies. The framework for professional development begins with an individual student website maintained for the collection of materials from courses and field experiences with elements of their learning linked to approved performance standards. The second stage is selecting key documents and evidence of best teaching practices to create an electronic portfolio to present a comprehensive picture of academic preparation, performance, pedagogy, and practice to faculty and assessors. The third and final stage is an evolving repository and self-selected professional items for career use as the student transfers from the campus setting to the world of work.

Keywords:

ePortfolio, Digital BackPack, Cyber ToolBox, Assessment, Repertoire

Introduction

In the last two decades, the call for standards -based performance assessment for students in teacher education programs has become a national phenomenon, offering promising new directions for reform in teacher preparation while at the same time creating a

host of conceptual and logistical challenges for the programs that prepare teachers. The National Council for Accreditation of Teacher Education (NCATE) has endorsed the need for such assessments, though it has recognized the difficulty of full implementation, and so has allowed a phase-in period for institutions undergoing review. In the meantime, individual states have adopted a variety of approaches and timetables as part of their review processes, so that the national picture on this issue is complicated, if not unclear.

Teacher education programs find themselves at a critical juncture: not only must they reimagine their own basic architecture of courses and competencies, they must also find the means to demonstrate the competencies of their students in ways that are both compelling and economically feasible.

This paper demonstrate an approach to these challenges that has been developed in our home institution for several years. The ePortfolio project is a web-based innovation that allows our teacher education students to demonstrate their competency and share their work on websites that we provide. While the original impetus for this work was in professional placement—we wanted a platform where students could represent their strengths to potential employers—it has since become the means by which we can address state and national mandates for standards performance assessment.

The three-part developmental structure of the project, in fact, offers a mechanism for demonstrating to faculty, assessors, and to students themselves a mastery of complex learning systems and strategies. Part Two of this paper discusses current employer interest and perceptions regarding ePortfolios in the teacher selection process.

Project Components

Contemporary state and national mandates require colleges and universities to implement substantially different methods of assessing performance to meet new proficiency standards for teacher licensure. The Iowa ePortfolio Model provides the architecture within which students can develop their skills, reflect on their practice, and showcase their strengths to a range of relevant audiences including accreditation teams at both state and national levels.

Digital BackPack™

The framework for professional development begins with the Digital BackPack™—an individual student website maintained for the collection of materials from courses and field experiences with elements of their learning linked to approved performance standards. By streamlining and uploading, supervisors can immediately access recordings from virtually any location (Byrne & Hartley, 2010). Digital technology has become the new communications technology.

Electronic Portfolio

The second stage is selecting key documents and evidence of best teaching practices to create an electronic portfolio—a digital tool using Web technologies to present a comprehensive picture of academic preparation, performance, pedagogy, and practice to faculty, assessors, and ultimately to employers in the global marketplace. It is evident in the growing body of research that increasingly demonstrates that ePortfolios are not only theoretically interesting, but also significant for the students and educators who use them (Penny Light et al., 2012,). Authors Penny Light, Chen, and Ittelson offer a strong

pedagogical argument for the use of technology in the form of ePortfolios by prioritizing the concept of folio thinking and the significance of documenting learning for specific stakeholders.

Cyber ToolBox™

The third and final stage is the Cyber ToolBox™—an evolving repository from BackPack, ePortfolio, and self-selected professional items for career use as the student transfers from the campus setting to the world of work. Digital equipment is physically easy to use and transport. Further, the universal design principle of traceable information involves the distribution of content to students regardless of any sensory impediments they may have (Hennessey & Koch, 2007; McGuire et al., 2003).

The ePortfolio model provides for: 1) Performance assessment tracking system, 2) Employment marketing tool and 3) Professional ToolBox for early career success. The focus of the portfolio framework is on the content of each of the three components: Digital BackPack™, ePortfolio, and Cyber ToolBox™. Sequential by design, seamless in appearance, each component builds upon and complements the other two. The website and the various technological applications are essential background tools that remain secondary to the content. Backpacks allow students to archive materials much like a museum — collecting, analyzing, and displaying relevant works.

-Critiques of books & articles
-Observations of classrooms
-Interactions with students
-Statements of philosophy
-Classroom management strategies and beliefs
-Field-based journals
-Unit and lesson plans
-Evaluations of proposed educational reform
-Autobiographical reflections
-Digital representations of teaching

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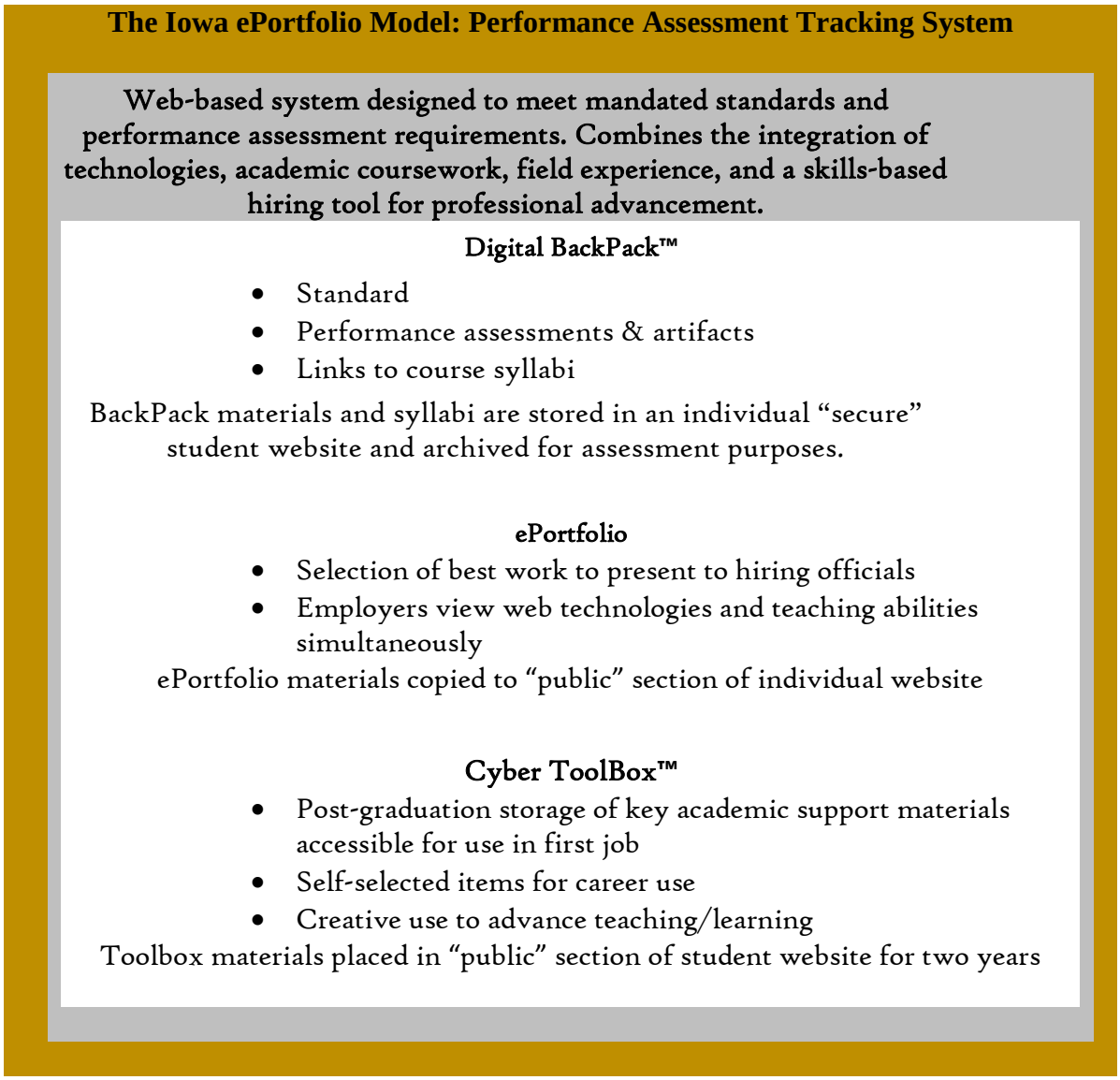
-Critical reflections and observations of their own teaching

FIGURE I: THE IOWA MODEL



Stages of ePortfolio Development

In the first stage, students develop a Digital BackPack™, which is an individually designed and maintained website for the planful collection of materials from classes and field experiences. These materials include artifacts of students' work, including statements

of teaching philosophy, sample lesson plans, observations of other teachers, examples of assignments, assessment plans, photographs and video images of teaching, as well as their own students' work which our students have themselves reflected upon and assessed.

Each of the artifacts on a student web page has been deliberately designed to address standards that have been adopted by our state (see Appendix B) and each website organizes those artifacts both by course and by standard. Thus a particular lesson plan, for instance, can be found under the course where it was assigned and evaluated and, at the same time, under the standard which it addresses.

As students move through their program, they add performances and artifacts to their BackPack in each course, and by the end of student teaching, they have electronically collected multiple instances of their work, all tied directly to individual standards. (Figures 2 and 3 illustrate student and faculty timelines for the ePortfolio process.)

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FIGURE 2: STUDENT ePORTFOLIO TIMELINE

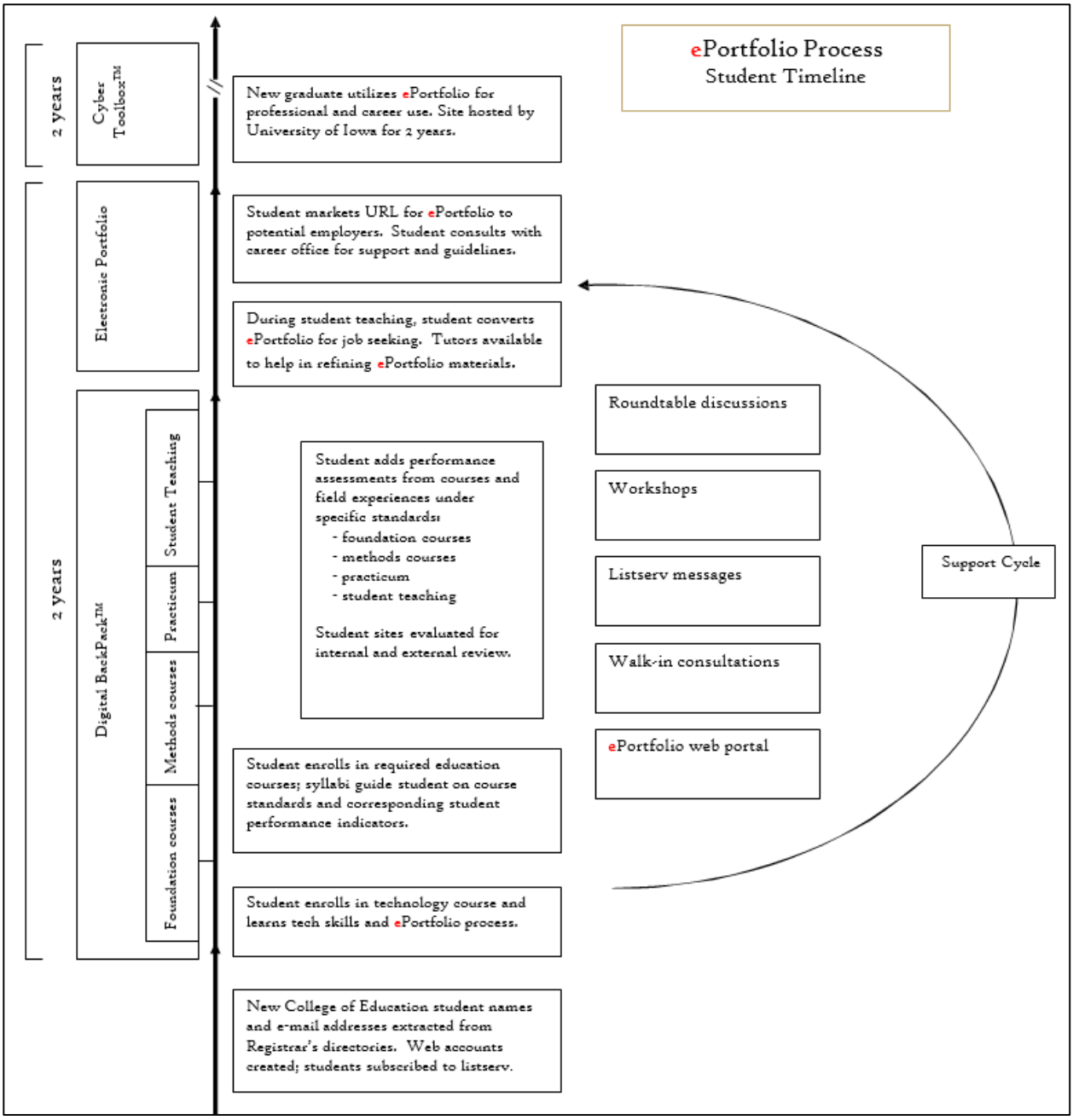

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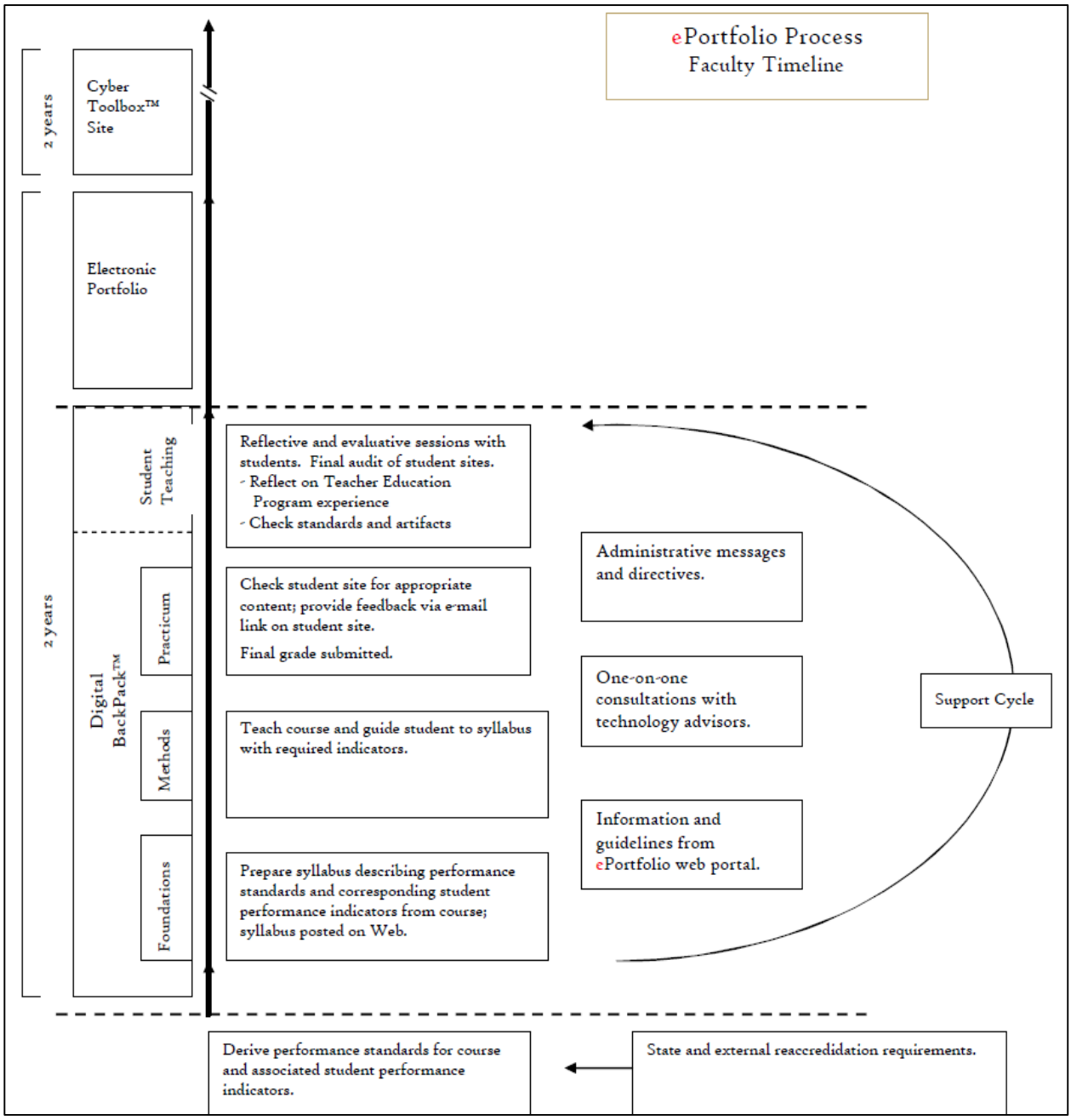
FIGURE 3: FACULTY ePORTFOLIO TIMELINE



Prior to a comprehensive technology-based system, teacher-training institutions had little choice but to gather paper materials in notebooks, report drafts, and file folders for

review and analysis by assessors for state or national accreditation agencies. A primary advantage of an ePortfolio framework—over traditional three- ring binders—is to afford instant and simultaneous availability to multiple viewers. The Iowa Model allows for immediate access to all student work in the Digital BackPack™; assessors can randomly select samples of work in various subject areas or can choose to review all work. From any location, an assessor can enter a URL and a password and have instant access to course syllabi and performance assessments documenting the program's compliance with relevant professional expectations and standards.

Each semester, websites are archived on the server for historical and review purposes.
Archiving secures materials in their original form.

Assessors can select archived materials from their choice of semesters or academic calendars

Later in the second stage, students work with faculty, technology tutors, and career specialists to revise and edit the materials in the Digital BackPack™ into the ePortfolio—a more polished and cleanly conceived record of work that will be shared with potential employers. Here students think about the artifacts and performances that most clearly represent their best practice, culling those that are redundant or less than complete, and enhancing those that show particular promise. They work with one another in completing this project, and in the end conduct a presentation of their portfolio in seminars and

roundtables, explaining the choices they have made and asking for responses that will enable them to make even further improvements.

Finally, after graduation, the ePortfolio becomes a Cyber ToolBox™ an evolving repository of teaching ideas and materials that students can use for further professional development. Students can maintain their websites for at least two years after completion of the degree program. These can be shared with colleagues, with students, with administrators and potential employers as they move ahead in their profession. And just as important, they can provide the means for serious reflection about their own development as educators. The principles inherent in ePortfolio thinking encourage the development of a habit of mind "that builds connections across experiences and ideas and across learning experiences inside and outside formal schooling" (Cambridge, 2007, p. 5); this connection of experiences allows for a more comprehensive integration of learned ideas and affords students an opportunity not only to create a living scrapbook.

In this easily accessible, easily negotiated system, students can see their own instructional patterns and emerging beliefs, as well as tangible evidence of progress toward established standards. It is both a developmental record of their professional life and a metacognitive opportunity for them to re-think the direction and emphases of that professional life. And since the whole portfolio can be accessed easily with a URL, it is a means for sharing that life, or parts of it, with colleagues across the hall or across the globe.

Outcomes

Innovations in Assessment Skill

Increased opportunities for assessment contribute to more reliable data on student proficiencies. Equally important is the power of multimedia to convey the complexities of

academic preparation and the ability to document developing pedagogical skills and requisite professional and personal attributes.

Broadening Student Learning

As the student develops the framework, the act of composition creates a different kind of thinking. The composition of hyperspace is analogous to a museum where artifacts can be prominently displayed or discreetly cataloged for future use. Building upon the success of this model, the project today (2002) achieves a seamless integration of high-end multimedia tools creating a metacognitive environment allowing students to use the power of nonlinear space to create and interlink a repertoire of skills essential for teaching in the 21st century. The process of metacognition is increased as students continually reflect on the interconnectivity of coursework, assessment and pedagogy. Students begin to see—and comprehend—their instructional patterns, emerging beliefs, and tangible evidence of progress toward established standards. The process permits students to connect learning from different courses, experiences, and disciplines—a process that would be difficult, if not impossible using traditional assessments. Pierson (2001) suggests that true technology integration lies at the intersection of content knowledge, pedagogical knowledge, and technological knowledge. Schools are recognizing the benefits of these new technology trends and hope to provide teachers and students with new tools to better serve students. Research has sought to optimize the benefits of ePortfolios to fit the needs of a digital workforce and to address the increasing gaps between student performance and expectations. Shapley et al., (2010) posits that schools have seen technology as a useful way to access information from around the world, and they want to teach students to be users and producers of information on a global scale.

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Curricular Review and Dialog

Encompassing curricula in early childhood, elementary, and secondary education, The University of Iowa's College of Education assessment process is rapidly and consciously embracing the power of technology afforded by the ePortfolio framework. From the beginning of the project faculty were brought together to review curriculum and program goals and to comply with standards mandated by the State of Iowa Department of Education. Today, faculty use the framework to help students' document indicators through advanced web and multimedia technologies. The project has fostered and enhanced dialogue among faculty members, administrators, and students at all stages of the teacher preparation program.

Employer Interest

Dating back to 1996, hiring officials were consulted about the usefulness of web-based teaching evidence. Through surveys and one-on-one interviews, hiring officials representing districts from small-Iowa towns to urban Houston, shared critical reflections about the purpose and use of employment ePortfolios. From the elementary principal to the district superintendent, employers acknowledge that portfolios function as important indicators in the selection process.

ePortfolios provide an excellent prescreening tool overcoming storage dilemmas and obstacles of space and time.

ePortfolios suggest that advanced technology skills will be part of the new teacher's repertoire and provide an inventory of aptitudes and capabilities that demonstrate mastery of professional skills.

Technology Integration

The integration of technology begins as a student enters a teacher education program although the student completes a major and earns an undergraduate degree from the College of Liberal Arts and Sciences. Starting with the required technology course in the College of Education, then bolstered by occasional tech boot camps and roundtables, students gain practical experience using digital tools, discuss content and design issues relating to portfolio production including copyright laws and personal safety issues, select and upload instructionally sound material, participate in sessions that culminate in peer and professional review, and learn to readily integrate and model technology.

Each semester, more than 500 students are placed in methods classes, practical, and internships in local, regional, and international settings. From any location, electronic portfolios allow for efficient management and distribution of required materials and effective interaction with university faculty and field evaluators. Furthermore, the ePortfolio avoids the problems and delays of circulating traditional paper materials. Students regularly upload to their site assignments, observations, and relevant artifacts. Unanticipated, but indeed welcomed, was the technology literacy attained by cooperating teachers and supervisors who accessed student websites to review assignments.

Resources Easily Accessible

The College of Education maintains a website portal containing official University of Iowa and College of Education logos, banners, graphic images of the state

standards, and a skeleton template for an ePortolfio. These resources make each student's website easy to build and easy to maintain. Uploading procedures and managing webspace soon become a conventional and customary practice for teacher education students. Because the process is prescribed, students can concentrate on academic skills and proficiencies as an educator rather than mastery of web design applications. The framework is consistent and professional but allows for individual expression in appearance and content in specific assignments and projects illustrating compliance of standards or mastery of particular skills.

Student ePortfolios are rich in individual differences and intellectual complexity.

Security Measures

Website authentication methods are employed to provide a password protected secure area for intellectual property of faculty and students. Further password protection is required because Digital Backpack™ materials may include sensitive items such as media images of children in the classroom, journal entries, official documentation, and personal reflections that may reveal details about students, parents, and other educators. In recognition of individual privacy rights, the University and school district's legal counsel collaborated to devise media release forms distributed to students and faculty for use in field experiences. Other databases contain student demographic data including test scores (ACT, Praxis), courses taken and grades earned as well as information about faculty appointments, interests, publications, and service activities. In order to review these confidential databases, a password or authentication is required for review.

Requisite Resources

Successful implementation of an ePortfolio framework requires time, energy, resources, and the collaboration of college administrators, faculty, and professional staff. College-wide commitment to the project is critical since no one group can be responsible for the totality of this complex system. The administrative details and the systematic and continuous preparation and review result in an imperceptible but invaluable infrastructure for students in the program.

Future developments in technology can only enhance the process. For the present, the Iowa Model depends upon resources and support personnel represented in Figure 4.

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FIGURE 4: TECHNOLOGY BASIC NEEDS FOR ePORTFOLIO FRAMEWORK

1. Web Server

a. Windows 2000 server
   -Dual Xeon Processors
   -G RAM
   - 100 G Storage
b. Security methods for intrusion and viruses
   - URL Scan
   - Integrated operating system security
c. 2,900 current student accounts
d. Web server administrator (part-time)

2. Student Websites

a. Sites accessed and managed with FTP
b. 10 megabytes of space, increased if requested and approved
c. Secured folder in each account; password required to view materials in secured folder

3. Software for Web Production in Laboratories

a. Macromedia Dreamweaver*
b. Microsoft SharePoint*
c. Microsoft Office*
d. SeaMonkey Windows, Macintosh & Linux
e. FTP* (Windows) Fetch* (Macintosh)
f. ThinClient* both Windows and Macintosh

4. Multimedia Tools and Utilities in Laboratories

a. Scanners
b. PhotoShop*
c. Digital cameras and digital video cameras **
d. iMovie*

5. Support and Instructional Functions

a. Technology in the Classroom course
b. Support hours in computer lab
c. Evening workshops and roundtables
d. ePortfolio portal website

* Site licensed by institution, no charge for students.
** Checked out to College of Education students.

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Employer perception of ePortfolios in the selection process

Survey Profile and Methodology

In a 2002 survey, employers were asked to share their perceptions of portfolio content relative to prospective candidates' preparation, experience, and potential for success. School districts in urban, suburban, small city, and rural settings participated in the survey. School districts represented enrollments of 625 students to 52,000 students with yearly per-pupil expenditures ranging from less than $5,000 per student to nearly $10,000 per student.

Survey responses were tabulated and statistical mean scores were calculated based on scorer rankings from over 200 practicing administrators. Respondents included central office administrators (human resource specialists, curriculum directors, and superintendents); elementary, middle school, junior high, and high school principals from districts in California, Illinois, Iowa, Missouri, Texas, and Virginia. The return was generous with a 61% response rate.

Employer's Rank Portfolio Material

The eleven items in Figure 5 represent standards adopted by state and national educational associations and state departments of education. Employers were asked to rank items in regard to their importance in the job seeker's portfolio and in relation to the job seeker's potential for success. Selecting appropriate and consequential content for a portfolio is central to a job seeker's success. Survey responses reinforce that each portfolio item or artifact be carefully selected and targeted for the intended audience.

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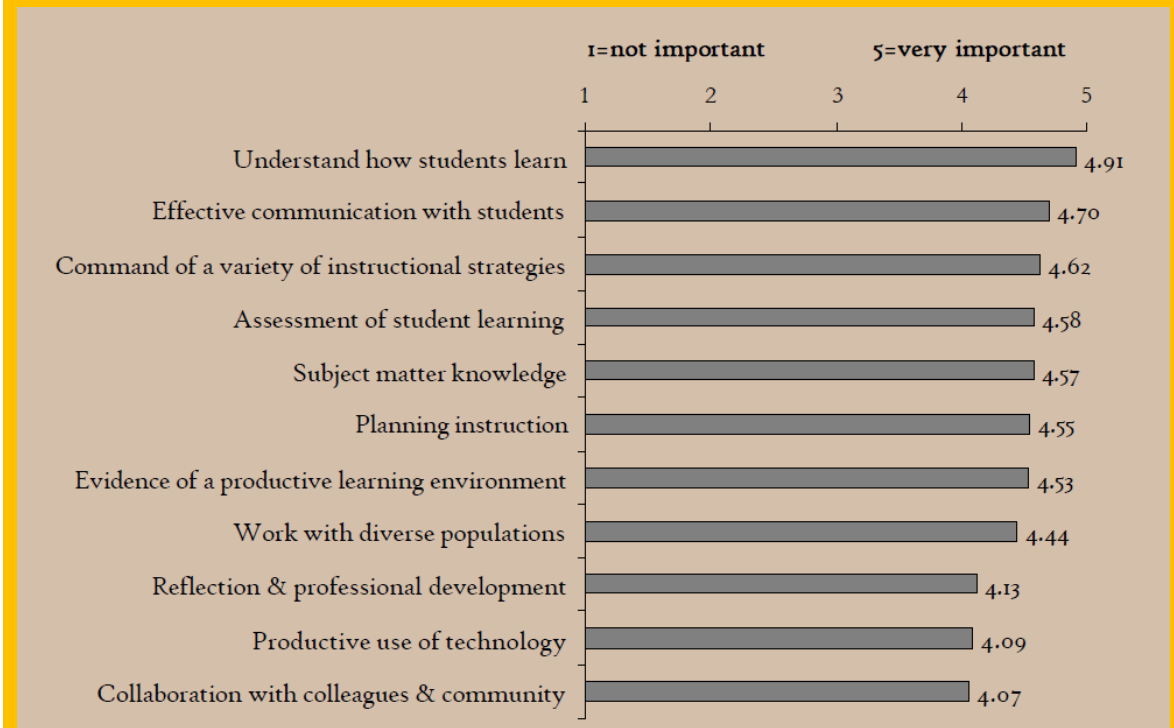
FIGURE 5: HIRING OFFICIALS RANK PORTFOLIO CONTENT



It is significant to note that respondents judged all of the items to be important indicating they seek and consider evidence of preparation and experience consistent with state and national educational standards. Responses from administrators at all levels and from large to small districts showed only slight variations. Understanding how students learn, effective communication with students, and command of a variety of instructional strategies received highest rankings.

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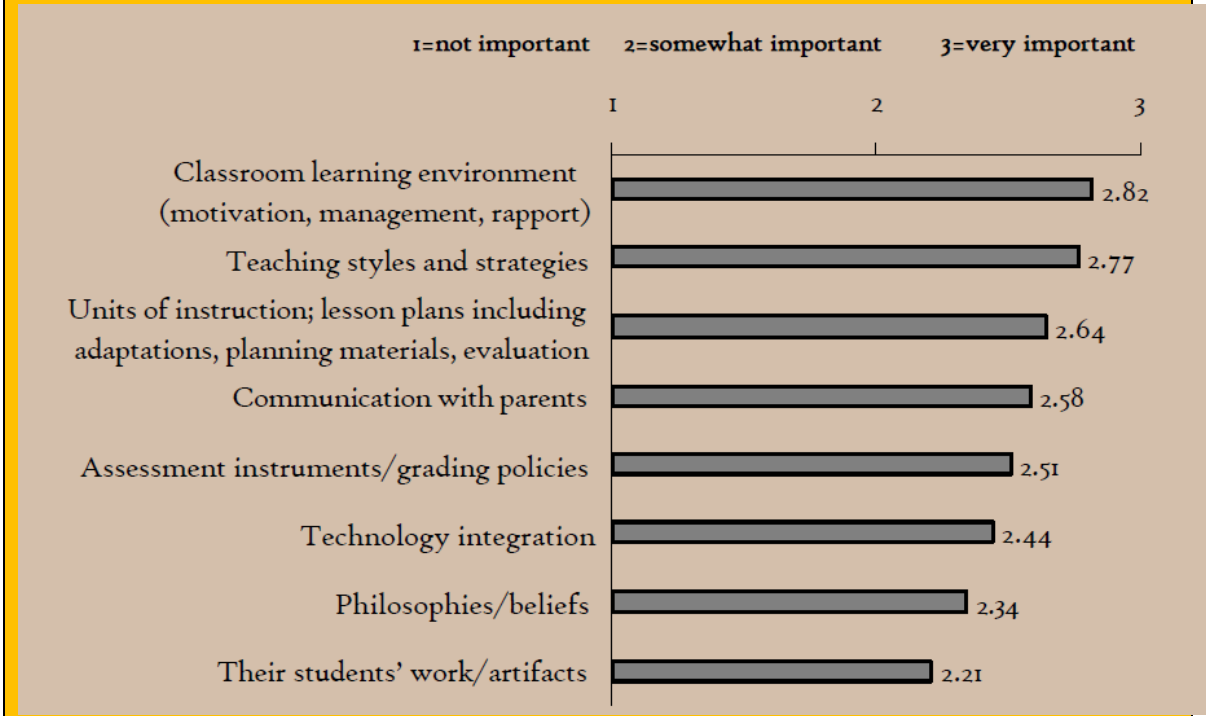
FIGURE 6: EMPLOYERS RANK MEANINGFUL EXAMPLES IN PROSPECTIVE TEACHERS' PORTFOLIOS



Responses from hiring officials show a consensus of opinion about the importance of ePortfolio items that reveal a teacher's knowledge and understanding of pedagogy and sound educational theory and practice. Employers expect to find authentic documentation of student experience, training, and professional consciousness.

The danger of not building a portfolio around established and recognized standards and acceptable content can result in a cyber-scrapbook that detracts from the prospective teacher's image.

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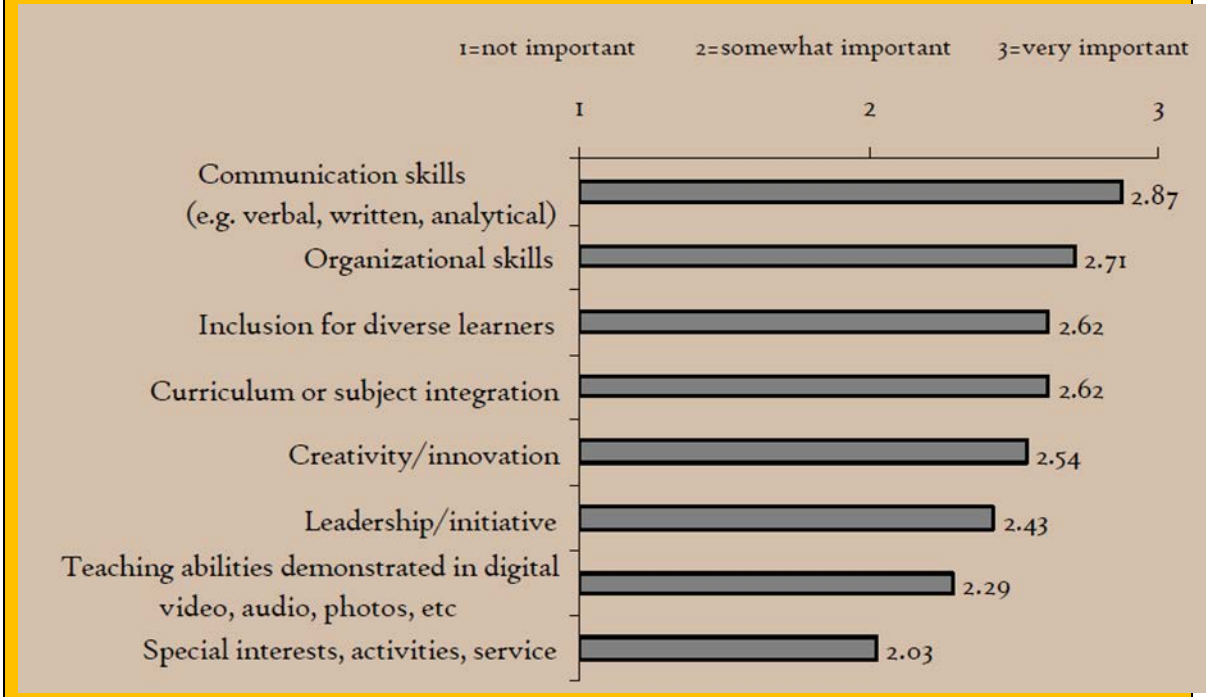
Developing a meaningful portfolio depends upon selection of items and artifacts that demonstrate instructional prowess and their presentation in a coherent and deliberate progression.

FIGURE 7: EMPLOYERS RANK MEANINGFUL EVIDENCE OF SKILLS AND CHARACTERISTICS IN PROSPECTIVE TEACHERS' PORTFOLIOS



Foremost among all levels of hiring officials is evidence of the prospective teacher's ability to engage in effective communication with students, colleagues, parents/guardians, and the community. Evidence of inclusion for diverse populations was ranked progressively higher by administrators representing small to large school districts. All items were ranked as somewhat important and mean responses for more than half of the items were ranked above 2.50 with 3.00 representing the highest level of importance.

Employers in all settings and at all administrative levels placed evidence of the candidate's special interests, activities, and service as somewhat important but ranking below all other items, perhaps because this type of information is routinely included in

the candidate's résumé, cover letter, or the school district's application form.

Employers Ranks Importance and Use of Portfolio

Administrators were asked when they prefer to review ePortfolio content. Is it most common before the interview? During the interview? Or after the interview? Figures 8 illustrates hiring officials' preferences.

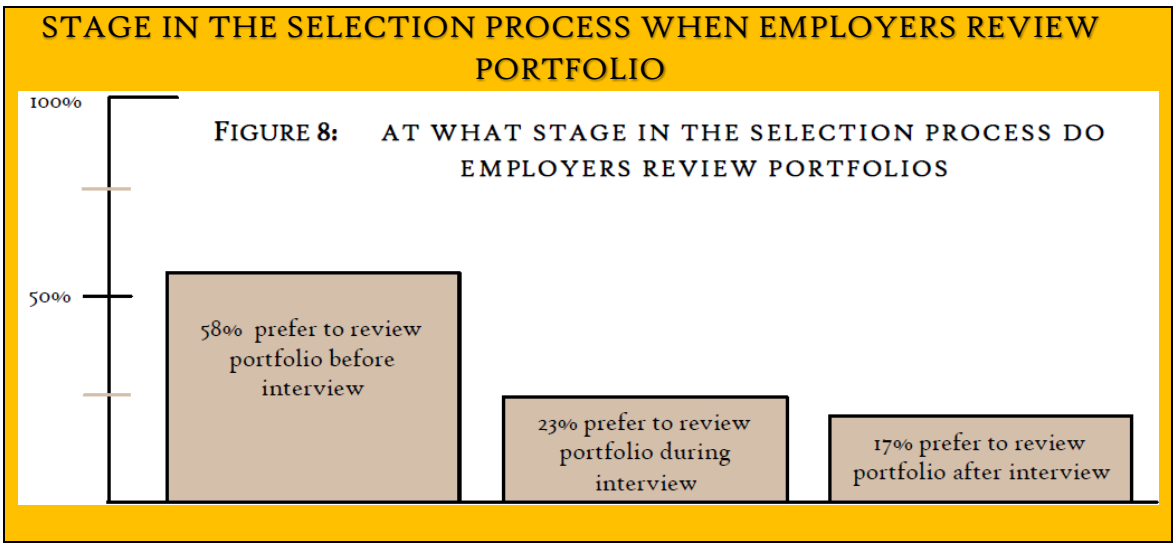


FIGURE 8: AT WHAT STAGE IN THE SELECTION PROCESS DO EMPLOYERS REVIEW PORTFOLIOS

Overall, fifty-eight percent stated they prefer to review portfolios before the interview. Sixty-seven percent of central office administrators, many of whom are responsible for initial screening processes, prefer to review portfolios before meeting a candidate. Greatest preferences for reviewing portfolios prior to the interview were expressed by the districts with the smallest (under 2500 students) and the largest (over 50,000 students) enrollments. A few respondents indicated a preference for reviewing portfolios both before and during the actual interview.

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Because there are no handling costs and no storage issues with web-based ePortfolios, employers worldwide can review key teaching practices and strategies prior to a face-to-face interview by simply clicking a mouse.

Portfolio Impact on Selection Process

Seventy-nine percent of the respondents stated that a job seeker's ePortfolio can be a significant selection tool along with references, credentials, transcripts, résumé and cover letter, and interviews. Only minor variations were expressed by building administrators and central office staff; some regional variation was noted, although administrators from all geographic areas found the portfolio to be an important tool. Central office administrators, primarily in the human resource area, indicated that portfolios are of great consequence in the hiring process; in fact, 79 percent indicated that portfolio is an important selection tool. Portfolio Quality Counts

Overall, school administrators find portfolios of real consequence in the hiring process. A well-prepared portfolio can contribute to a candidate's success; however, respondents caution that a poorly-constructed portfolio can diminish an applicant's chance of employment. Portfolios that do not reflect standards or recognized teaching proficiencies are burdensome and distracting. High school principals revealed the strongest opinions about the quality of portfolios; seventy-one percent of them stated that a poorly constructed portfolio could decrease chances of employment while that same number of administrators stated that a well-constructed portfolio can increase job chances.

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FIGURE 9: EMPLOYER'S PERCEPTION OF THE EFFECT OF PORTFOLIO QUALITY IN THE SELECTION PROCESS

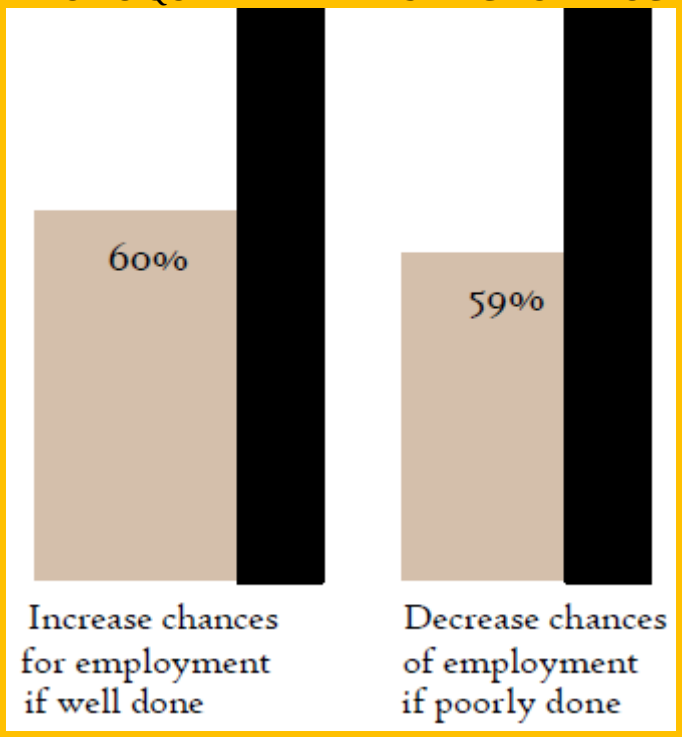

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FIGURE 10: EPORTFOLIO FAST FACTS FROM EMPLOYERS

Employers rank ePortfolio content:

#1. understand how students learn
#2. effective communication with students
#3. command of a variety of instructional strategies
#4. assessment of student learning
#5. subject matter knowledge

Employers rank meaningful examples in teachers' ePortfolios:

#1. classroom learning environment (motivation, management, rapport)
#2. teaching styles and strategies
#3. units of instruction; lesson plans including adaptations, planning materials, evaluation
#4. communication with parents
#5. assessment instruments/grading policies

Employers rank meaningful evidence of skills and characteristics in teachers' ePortfolios:

#1. communication skills (verbal, written, analytical)
#2. organizational skills
#3. inclusion for diverse learners
#3. curriculum or subject integration

Employers rank importance, quality, & use of ePortfolios:

- prefer to review portfolio before interview
- portfolios are a significant selection tool along with references, credentials, résumé, cover letter, transcripts, and interviews
- portfolio quality can increase *or* diminish a candidate's employment chances

© College of Education, The University of Iowa results from 2002 survey, ePortfolios in the Employment Process

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Appendix A

Background: The pilot project started in 1995 when Anthony and Achrazoglou took a traditional paper-based employment portfolio and developed an electronic version using web-based multimedia tools. Factors influencing the development of the ePortfolio Project included a need for a meaningful way to teach instructional technology, a desire for a new electronic tool for job-seeking, and a mechanism for building a flexible toolbox of professional skills that easily transfer from the campus setting to the world of work.

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Appendix B

Graphic images of mandated state standards provided to students for use in building their ePortfolio

Standards

A. Student Learning: Candidates understand how learning occurs - how students construct knowledge and acquire skills - and how to use instructional strategies that promote student learning.

B. Diverse Learners: Candidates understand how students may differ in their approaches to learning and create instructional opportunities that are equitable and adaptable to diverse learners.

C. Planning Instruction: Candidates understand learning theory, curriculum development, and student development and know how to use this knowledge in planning instruction to meet curricular goals.

D. Instructional Strategies: Candidates understand and know how to use a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.

E. Learning Environment: Candidates know how to help students work productively and cooperatively with each other in complex social settings.

F. Communication: Candidates communicate effectively, understand the role of language in learning, and foster active inquiry, collaboration, and interaction in the classroom.

G. Assessment: Candidates understand the uses, advantages, and limitations of different types of formal and informal student assessments.

H. Reflection and Professional Development: Candidates understand the importance of reflection, self-assessment, and learning as ongoing processes and actively seek opportunities for professional growth.

I. Collaboration, Ethics, and Relationships: Candidates understand schools as connected to larger community contexts and foster relationships with parents, school colleagues, and organizations that will support students' learning and development.

J. Technology: Candidates understand and know how to use computer technology in their teaching.

K. Subject Matter Knowledge: Candidates understand the major concepts, assumptions, debates, processes of inquiry, and ways of knowing that are central to the subjects they teach.

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