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ABSTRACT

The intelligent electronic portfolio goes beyond assessment of teachers to a method of strengthening their professional development in the classroom. Adopted for teachers in a 3-year doctoral program, the intelligent electronic portfolio is a collection of artifacts, indicating competencies and skills, a place to showcase accomplishments and achievements, and a living, working portfolio which makes learning visible. The core system chosen is the laptop portable computer. The elements of a portfolio (reading, thinking, interacting, demonstrating, and writing) are enhanced by the use of technology: (1) "reading" professional literature and organizing data requires network access (electronic mail, newsgroups, and World Wide Web access); (2) "thinking" about artifacts collected is easier for the teacher through the use of "Web Helper Applications"; (3) "interacting" with others in one's discipline is made possible through the use of distance learning media; (4) "writing" requires the use of office software, especially word processing and desktop publishing; and (5) "demonstrating" is possible with the help of a graphics presentation package. The CD-ROM is the ultimate product of the intelligent portfolio. Six figures display information on the intelligent portfolio. (Contains 29 references.) (SPM)

INTELLIGENT PORTFOLIOS FOR PROFESSIONAL DEVELOPMENT

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Running Head: Intelligent Portfolios

ABSTRACT

A professional portfolio process which facilitates the use of thinking strategies and encourages learning communities will have a significant impact on teachers as learners. Long term strategies for professional development in teacher education have been shown to be ineffective. Inservice programs rarely interest teachers, even if well-intentioned and valuable. A portfolio which goes beyond collecting, beyond displaying , and beyond assessment will initiate changes in what accomplished teachers should know and be able to do. The Intelligent electronic portfolio is 1) a collection of artifacts indicating competencies and skills, 2) a place to showcase accomplishments and achievements, and 3) a living, working portfolio which makes learning visible. As an assessment tool, the Intelligent portfolio offers others a way to see teachers more accurately and it insure that we see ourselves as we really are.

Running Head: Intelligent Portfolios

INTRODUCTION

People play tennis or bridge for a lifetime with little improvement to their approach or method. Some educators, too, practice their classroom teaching without much attention to the need for continuous improvement in their methods or personal knowledge base. Some time ago, the National Board for Professional Teaching Standards published its "Vision of Excellence," a list of what teachers should know and be able to do in the classroom (NBPTS, 1994). Many practicing teachers satisfy the first three requirements on the list, but as teacher-educators, we recognize the inadequate preparation of teachers to meet the demands of the remaining two (See Figure 1).

Recent publications such as Mind Matters, Teaching for Thinking (Kirby & Kuykendall, 1991), Teaching for Thoughtfulness (Barell, 1995), The Thinking Classroom (Tishman, Perkins, & Jay, 1995), and Thinking and Learning Together (Fisher, 1995) suggest that thinking in classrooms may not be the norm. An article appearing in Education Week suggests that teaching intellectual skills is difficult at best unless you first possess those skills yourself. Referring to teachers, Paul writes, "Their schooling did not develop their intellectual capacities to a high level" (1996, p.30). This popular view is one held by many nationwide.

In his new publication, Outsmarting IQ, The Emerging Science of Learnable Intelligence, Perkins (1995) writes, "Hardly

anything in conventional educational practice promotes, in a direct and straight forward way, thoughtfulness and the use of strategies to guide thinking" (p.117). The Intelligent Portfolio for professional development initiates the use of thinking strategies which will facilitate thoughtfulness in classrooms.

The last element on the NBPTS list, "Teachers are members of learning communities," is a second area of recognized weakness for teachers. The school environment is not always conducive to teacher-as-learners. In fact, schools are often the worst places for teachers to learn. Schools provide scarce resources on current research and best practices; few periodicals and still fewer books on methodology or subject matter knowledge are on-hand; and, rarely does the school administration encourage teachers to attend professional conferences. Teachers do not have time to share their thoughts and ideas with one another during the typical school day; time to read, write, and reflect are not built into a teacher's schedule. A widely held belief seems to be that teachers will embrace lifelong learning without being lifelong learners themselves.

Linda Darling-Hammond, past president of the American Educational Research Association, was quoted as saying, "most schools and teachers cannot produce the kind of learning demanded by new reforms. Not because they do not want to, but because they do not know how," (Viadero, 1996, p.9). Staff development and

teacher in-service have failed to keep practitioners current.

Through a process which promotes thoughtfulness and encourages a community of discourse on a technological landscape, the Intelligent Portfolio can have a significant impact on the professional development of teachers. A portfolio which goes beyond collecting, beyond displaying, and beyond assessment can strengthen the professional development of teachers in the classroom.

IN THE BEGINNING

Ten years ago little had been published on portfolios. Researchers in writing assessment at the university level were looking for better ways to assess (Camp, 1985; Burnman, 1986; Elbow, 1987). Yet even at the primary level, there were questions about the negative effects of assessment on young writers (Graves, 1983; Hansen, Newkirk, & Graves, 1985). Secondary teachers began to explore the notion of "writing to learn" (Bechtel, 1985; Atwell, 1987; Fulwiler, 1987). With the movement toward whole language and alternative assessments, portfolios gained momentum.

In the early 90's portfolio assessments gained favor at the university level for promotion and tenure (Edgerton, Hitchings, Quinlan, 1991; Seldin, 1991, Bird, 1991). When the National Board for Professional Teaching Standards began to examine "what

teachers should know and be able to do," portfolio assessment seemed to offer a logical choice for gathering data (Teacher Assessment Project, 1988; Wolf, 1991; Denus & St. Hilaire, 1992; Barton & Collins, 1993; Petrosky, 1995).

Current publications on portfolios have become nearly as numerous as its varying definitions. However, when the focus of portfolios shifts to the professional development of teachers, the research base quickly diminishes (Fusco, 1994; Zubizarreta, 1994; Guillame & Yopp, 1995; Wolf, Whinery, & Hagerty, 1995; Glatthorn, 1996). Furthermore, the lack of a research base on the value of portfolios with respect to the objective assessment of teacher development, is particularly surprising.

A portfolio can be as simple as a folder of sparsely collected documents or as complex as a CDROM holding the accumulated artifacts of an individual over an extended period of time. Generally speaking, portfolios come in all shapes and sizes with a variety of purposes. Most of them have been shown to be of value to teachers and learners. However, a portfolio for teachers as learners required an extension in current thinking. A portfolio capable of tracking transformations in thinking and assimilations in one's knowledge base was needed.

THE SMART PORTFOLIO

As a tool in the professional development of teachers, the

portfolio requires three characteristics to make it "smart." First, we wanted a portfolio which would demonstrate professional growth and development. Keeping track of reading, writing, thinking, speaking, listening, and viewing are necessary for teachers as learners, and constructing and collecting artifacts from observing, interpreting, applying, investigating, and questioning enhances learning and improves teaching.

Secondly, we wanted a portfolio which would encourage and develop "intellectual discipline." This required an academic, thinking journal able to demonstrate an engaged, on-going reflective process from passively collecting information to actively integrating new knowledge with prior knowledge. The journal is a place to figure out what it is we are thinking, refine it, test it, and refine it again. It is the place where our thinking becomes visible. Through the processes of assessing, interacting, reflecting, and sharing our learning is scaffolded to a higher level. Working through these processes gives us new understandings and perspectives. The portfolio becomes a knowledge base where new information is assimilated as our understandings change and we grow.

Finally, we wanted a portfolio which would facilitate thinking and thoughtfulness, especially in a community of learners. Sharing and getting feedback through group interaction are essential to a teacher's growth and development. Discussions and questions about

readings and current research, analysis and transfer of new ideas and innovations, arguing and defending our ideas and musings are enabling and empowering skills. Practicing reflective thinking strategies, as simple as "thinking about your own thinking" encourages active learning, initiates a self-assessing attitude, and makes good thinkers better thinkers. Practicing thinking and new ways of knowing in a direct and focused way enable teachers to increase their knowledge base and strengthen their habits of mind as they work through the portfolio processes. "Tossing ideas around, defending what we think, hearing how we sound, checking out our logic, and getting friendly, helpful feedback" (Wilcox, 1996a, p.364) give teachers the confidence to take risks, extend their own thinking, and question their own practice.

In sum, the SMART portfolio is a collection of artifacts, showing long term or short term progress, competencies, and literacy skills. The SMART portfolio is also a showcase portfolio for accountability, showing accomplishments, honors, and achievements. Finally, the SMART portfolio is a working portfolio which changes and grows, showing patterns and connections in our "ways of knowing." Teachers who keep SMART portfolios are open-minded, totally engaged in teaching and learning, and personally responsible for their own professional development.

This SMART portfolio has five essential elements: reading, thinking, interacting, demonstrating, and writing (Wilcox,

1996b). Early in the process of building a portfolio, artifacts can usually be divided into these general sections and physically placed in the sections as they are constructed (See Figure 2). Booknotes, lesson plans, outlines of projects, etc. are teacher artifacts which indicate the quality thinking and effectiveness of instruction.

A holistic view of the SMART portfolio process confirms that the synergism of the whole is greater than the sum of its parts. The processes of recording, collecting, and selecting are passive next to the processes of assessing, interacting, reflecting, and sharing. Those interested in literacy call the process "integrating the language arts" (See Figure 3). We call it SMART. When this integration occurs in a highly technological environment, our SMART portfolio becomes very INTELLIGENT (See Figure 4).

BECOMING AN INTELLIGENT PORTFOLIO

The Intelligent Portfolio moves beyond the SMART portfolio's call for the integration of reading, writing, thinking, interacting, and demonstrating artifacts. Indeed, the Intelligent Portfolio moves the concept of portfolios far to the right -- to the point of animation, speed, and motion -- bringing each element of the portfolio to life (See Figure 5).

Core System. The laptop portable computer serves as the

platform of choice for our Intelligent Portfolio. Configured with a 100 megahertz Pentium processor and 8 megabytes of random access memory (RAM), a 1.2 gigabyte hard drive, an external 100 megabyte Zip drive for mass storage, and a 28,800 bits per second modem for communications, our "core system" provides sufficient computer power to address the inherent demands of gathering the requisite artifacts. To this basic list of technical features will be added other capabilities in the form of software and networking features to deal more effectively with the Reading-Thinking-Interacting-Writing-Demonstrating elements of our portfolio.

Reading. The first element in the Intelligent Portfolio's life cycle is the professional review of the literature, including locating resources, transferring materials, and organizing data for later recall and use. To effect this feature of our Intelligent Portfolio, network access is required. Collegial communication is effected via electronic mail. Online searches of automated card catalogs, electronic books and digital library files are now possible with the advent of network access. Virtual sojourns to tens of thousands of World Wide Web sites is reality. Thinking journals are forwarded to teachers and classroom peers. Newsgroups inform, guide, and share the contents of some 6,000 current topics. Electronic literature reviews demand that teachers learn new online search

construction. The Intelligent Portfolio demands a broader view of a typical computer account, including multiple *email addresses, electronic mailing lists*, subscriptions to established as well as specially created *newsgroups*, and the latest World Wide Web *(WWW) browser software*. These capabilities will be immediately added to the core system supporting our Intelligent Portfolio.

Thinking. By reflecting on the artifacts accumulated in the reading portion of the portfolio, professional educators can gain a better definition of their own metacognitive skills. Problem solving, formulating personal theories of teaching and learning, and developing lesson objectives based on sound pedagogical principles can be enhanced with the use of the Intelligent Portfolio and its suite of technological tools. *Web Helper Applications* enhance the exploration of the Internet and formulate robust skills supporting "thinking about thinking." *Image, sound, and video clip players* can assist in downloading on-target files that add to a teacher's cache of classroom resource materials. Maps, charts and graphs, instructional materials prepared by other professional educators, lesson plans, news videos, even personalized audio greetings from key public officials are readily acquired for capture in the expansive storage of the Intelligent Portfolio. Expert *authoring tools* provide graphics presentation capabilities which infuse course

presentations with the images and sounds of the Internet in a multi-sensory package making textbook-only assignments appear as antiquated as word-of-mouth must have to the post-Gutenberg classroom. A *database software package* solves the problem of managing the myriad of phone numbers, personal and professional contacts, bibliographic references, and potential WWW sites. An *electronic spreadsheet* tabularizes numeric information allowing the portfolio to electronically project "what if" scenarios to available research information. Finally, thinking can be enhanced with a professional *project management software package* providing scheduling of course work, literature reviews, journal and peer assessments, and other vital milestones of a long-term, portfolio-based personal development program.

Interacting. Perhaps the strongest use of computer technology will be in the component of interacting -- exploring one's discipline with other experts sharing similar interests. Communication tools will move the portfolio into the "intelligent" range with the introduction of electronic mailing lists, newsgroups, and distance learning opportunities. The Intelligent Portfolio will contain the *electronic addresses* of colleagues who will share ideas, brainstorm new concepts, and assess learning objectives while still in the design phase. *Newsgroups* broaden communication channels by providing a wider target of potential colleagues. For example, a newsgroup

focusing on social studies brings together educators interested in the general aspects of lesson planning, classroom presentations, and assessment. It includes a broader scope of interested parties such as teachers, students, and renown educators from national and international settings. For cohorts separated by distance and opportunity, the use of *Distance Learning* media brings otherwise disparate interest groups together for the first time in a see-you-see-me virtual classroom.

Writing. Publications, formal papers, and classroom materials require two of the most common applications of personal computers: *word processing* and *desktop publishing*. With a growing bag of tools including the *spelling checker, thesaurus, word counter, reading level gauge, hyphenator, and grammar checker*, the Intelligent Portfolio concentrates on the content and presentation of material as well as the quality of its syntax. The incorporation of clip art, tables, and graphics as well as a variety of choices in output add to the professionalism of the final product.

Demonstrating. For the practicing teacher, demonstration could be the most important aspect of the Intelligent Portfolio. With only a few capabilities added to our core system, technology displays the fruits of the Intelligent Portfolio. A *graphics presentation package* such as Microsoft's Power Point provides the

ability to combine materials containing images, sounds, text, and video into a multi-sensory based presentation. Expert slide construction, template backgrounds, and bullet and sub-bullet formatting highlight a comprehensive list of development tools. An easy-to-use viewer delivers classroom slides, transparencies, and hard copy printed handbooks to the student.

In conclusion, integration is the operant descriptor of the Intelligent portfolio. It fosters the uninterrupted use beyond the original limitations of the SMART portfolio. Whereas the SMART portfolio alone is a conglomeration of folders, binders, envelopes, and yellow stickies, the INTELLIGENT portfolio empowers technology to integrate this collection of materials.

The CDROM is the ultimate product of the Intelligent portfolio, allowing it to become a living document. The CDROM -- images, sounds , videos, literature research, text, ideas, spreadsheets, databases, presentations, lesson plans, and assessments are stored together on a single media. Accompanied by a state-of-the-art search engine for quick recall, retrieval, and display of complex search requests, material is captured first to the hard disk, then saved to the Zip drive, and finally pressed permanently to the CDROM.

Try locating material you remember reading during a professional development class taken several years ago. Where did you put it? Was it in the book you read? Or, perhaps a

discussion you had in a learning group? Maybe it was simply an idea that seemed important at that moment, but deferred to a time when it could be considered more thoroughly. Readings, interactions, writings, demonstrations, and thoughts once explored should be captured for exploration at some later date. The Intelligent portfolio better accommodates such a scenario while providing the initial vestiges of an entirely new literacy for the teacher in the classroom.

INTELLIGENT PORTFOLIOS IN ACTION

The concept of the INTELLIGENT portfolio came to life during the development of a doctoral program designed specifically for teachers. The strands (core courses) and the clusters (common concentrations), which emerged were intended to transform teachers into change agents and classroom leaders for their schools. The INTELLIGENT portfolio was adopted as the primary vehicle for comprehensively tracking the construction of artifacts, the assimilation of new knowledge, and the progress of candidates throughout the three years of the proposed program, from the first session on instructional leadership to the final defense of the dissertation.

Teachers entering the program come with a strong background in their academic discipline. They come committed to students; they are able to manage and monitor student learning. Believing

that such credentials are a "given" for a target population of doctoral students, the program designers agreed on the need to specifically address the two additional areas determined by the National Board for Professional Teaching Standards. (See Figure 1.) The ultimate goal of the doctoral program became the development of teachers who think systematically about their practice, learn from their experiences, and contribute as members of a community of learners.

To accomplish this goal it would be necessary for teachers to change their "ways of knowing" and "habits of mind." Going beyond the traditional definition of learning so that the teacher not only acquires knowledge, but more importantly, engages in independent, self-directed learning, constantly forming and reforming a personal knowledge base. Through continuous assessment, interaction, and reflection in a community of discourse, learning is almost automatically scaffolded to higher levels. Working through the processes of gathering, organizing, and constructing the artifacts that compose the INTELLIGENT portfolio, teachers assume the responsibility for their own professional development.

The INTELLIGENT portfolio was the ideal forum in which to nurture a reflective, self-assessing attitude, to manage a knowledge base, and to organize thinking and learning artifacts. It could do this easily and efficiently, alone or with others,

anytime, anywhere, with the touch of a finger. The final product becomes a person who as a matter of habit and aspiration, engages in almost continuous reflection about one's own thinking and ultimately about one's own practice and experiences. Soon the candidates become experts as they come to understand their own teaching and learning processes.

Once a year the INTELLIGENT portfolio goes through a review process called an "exhibition." The "exhibition" is a formal presentation where the candidate describes the integration process, including assessing (starting with what we know and how we came to know it), interacting (gathering new information and forming new ideas), reflecting (making our own meaning, building our own ideas, generating new knowledge), and sharing (justifying and defending our thinking with confidence). The INTELLIGENT portfolio becomes the visible evidence for assessment and self-assessment. A simple checklist guides candidates to this point of "exhibition."

Throughout the construction of the INTELLIGENT portfolio, the assessment process has been formative, trying things out, sharing ideas, organizing and defending our thinking. The construction site, often messy during preparation and practice runs, now holds the evidence of a year's work in perfect order for quick retrieval. Sharing one's personal portfolio with others during an "exhibition" allows the candidate to present all

kinds of artifacts to a different, more critical audience. The candidate must demonstrate to the satisfaction of the faculty that profound movement has been experienced along the continuum in pursuit of scholarship, commitment to life-long learning, and toward the development of a disciplined mind. This audience, consisting of university faculty members, determines whether the candidate continues.

As the doctoral candidate progresses through succeeding strands and clusters (See Figure 6), through the accumulated bank of knowledge, through reading, writing, interaction, and demonstration, the files and electronic bit patterns are stored in the INTELLIGENT portfolio. Understanding the necessity of available time to share these ideas and to interact with other teachers, opportunities were built into this phase of the doctoral program and incorporated into the INTELLIGENT portfolio from its inception. Circles of learning and communities of discourse are easily accomplished electronically. Until now, valuable documentation of teachable moments were often abandoned as time and energy pushed the currency of the portfolio to the background.

CONCLUSION

Opportunities for professional development encompass the long-term, "living" aspect of the INTELLIGENT portfolio. The

excitement of using dedicated, readily accessible, personal computer resources to collect, organize, retrieve, share, display, and even publish artifacts will foster its proliferation over a teacher's professional life. The INTELLIGENT portfolio allows teachers to be life-long learners, taking them out of isolation and putting them into communities of learners. There can be continuous thinking and reflecting not only about the concrete materials contained in the portfolio, but also on how a person thinks and rethinks, forms and reforms, constructs and reconstructs his own knowledge.

Professional development often fails at this point because of powerful school cultures which promote mindlessness, passivity, and isolation. Are we worried? Not at all. Under each scholar's arm is an INTELLIGENT portfolio, offering sustained support and continual access to the Internet, WWW, and E-mail. These teacher/scholars are technologically very literate, never to be mindless, or passive, or isolated again.

The concept of the INTELLIGENT portfolio is presented here not as a revolutionary change from the basic principles of the portfolio as an authentic assessment tool, but with the added dimension of a portfolio as a tool for lifelong learning. It represents yet another paradigm shift as the portfolio concept evolves.

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A VISION OF EXCELLENCE

National Board for Professional Teaching Standards

I. Teachers are committed to students and their learning

II. Teachers know the subjects they teach and how to teach those subjects to students

III. Teachers are responsible for managing and monitoring student learning

IV. Teachers think systematically about their practice and learn from experience

V. Teachers are members of learning communities

Figure 1

CONTENTS OF PORTFOLIO SECTIONS

The Artifacts

READING
Evidence of new knowledge and perspecitives from Textbooks, articles, papers, etc.

- Booklists
- Outlines
- Booknotes
- Summaries

THINKING
Academic reflections of scholarly activity or records of thinking

- Dialog
- Ideas
- Process Memos
- Mind Wanderings

INTERACTING
Artifacts constructed cooperatively during Group Inquiry

- Solutions
- Brainstorming
- Peer Assessments
- Projects

DEMONSTRATING
Video of Presentation for public assessment and other exhibition materials

- Lesson Plans
- Checklists
- Critiques
- Projects

WRITING
Formal paper demonstrates new knowledge has been evaluated, integrated, documented

- Essays
- Publication
- Goals
- Self Assessments

Figure 2

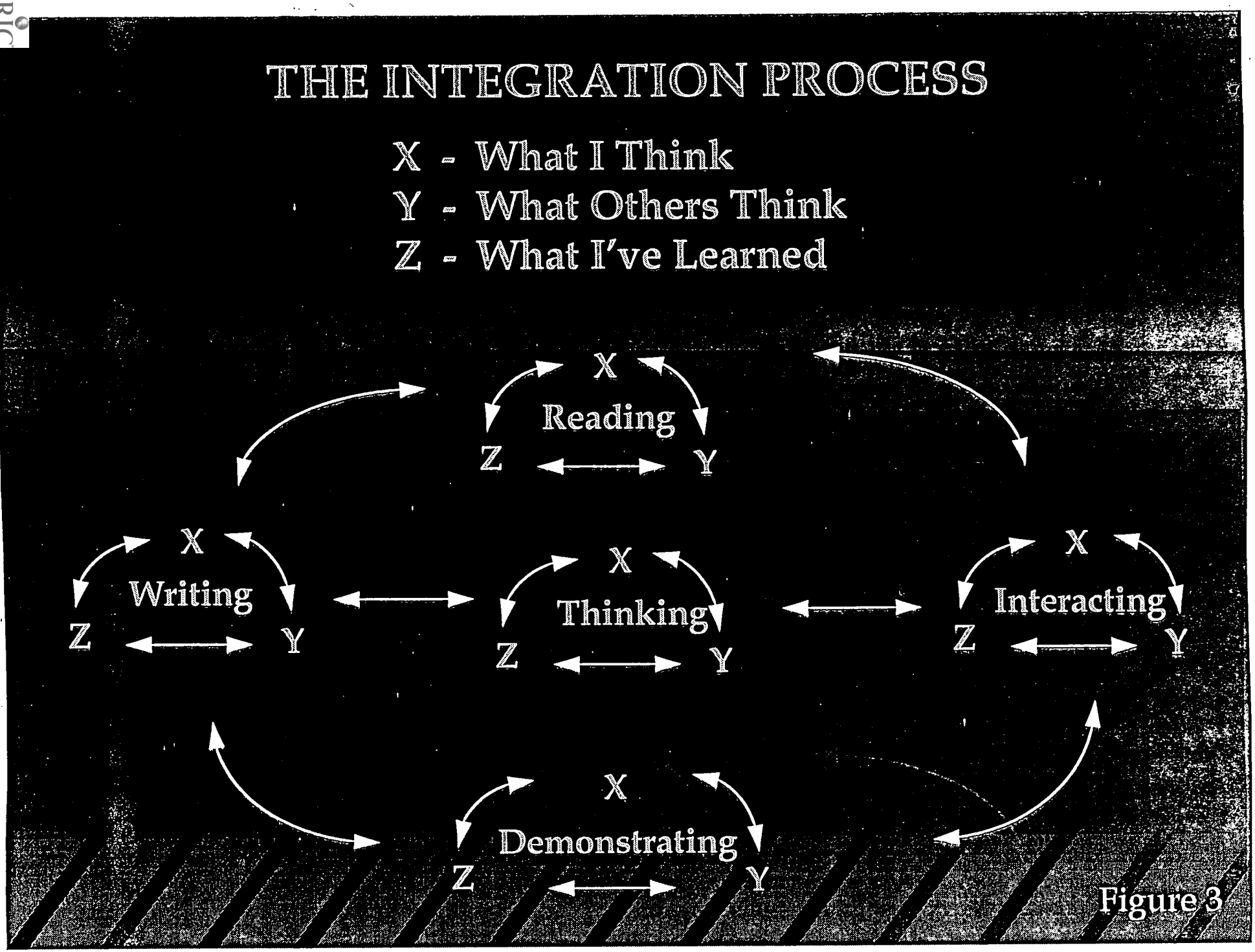


Figure 3

Elements of an INTELLIGENT Portfolio: Technology

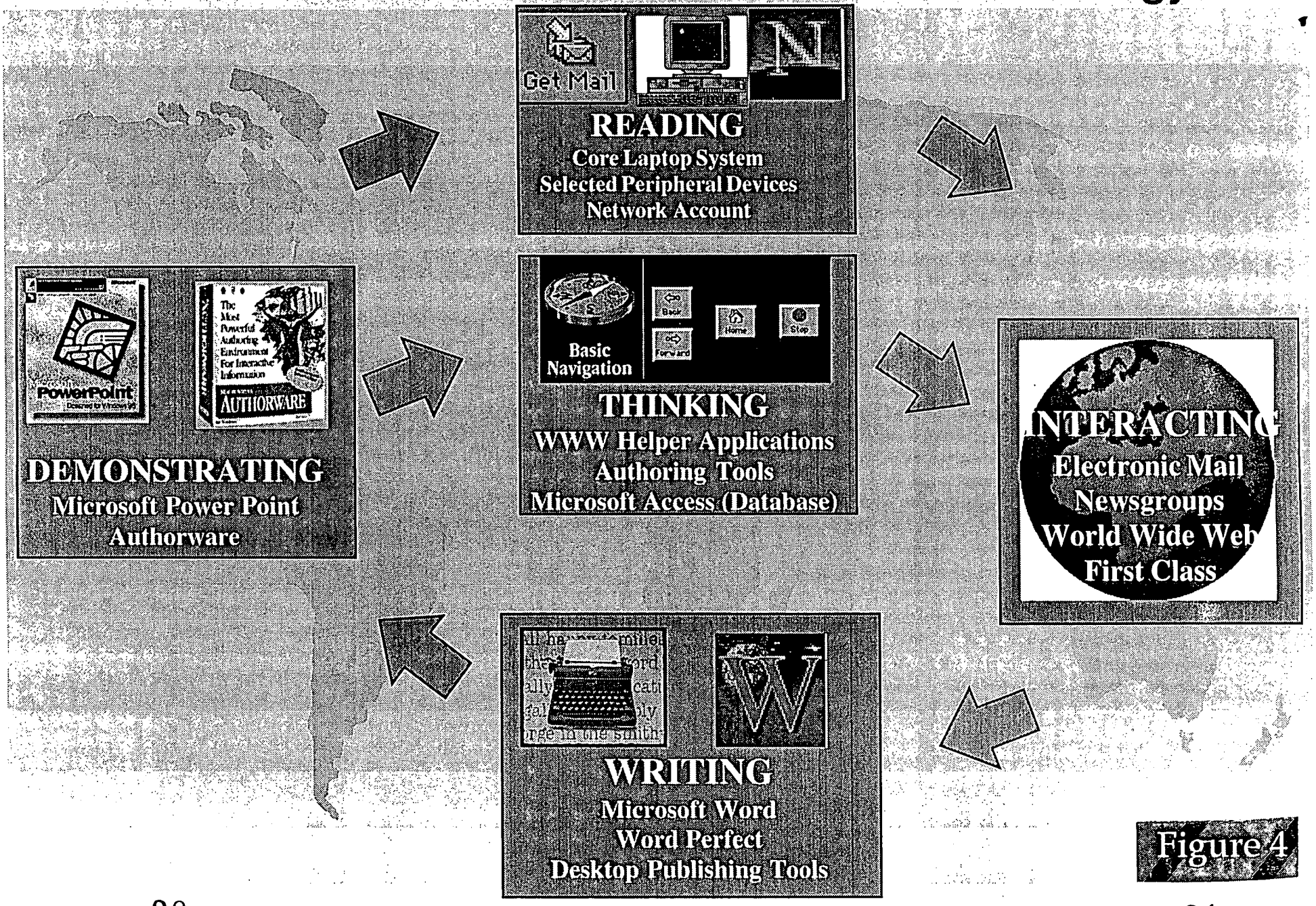
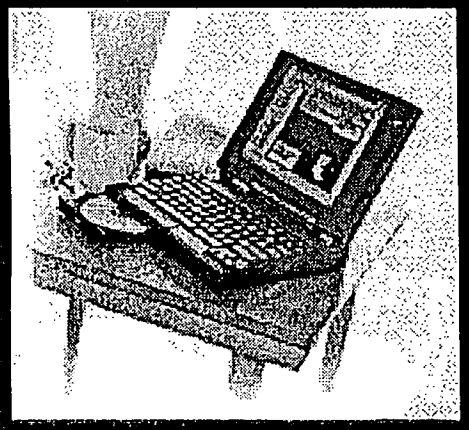
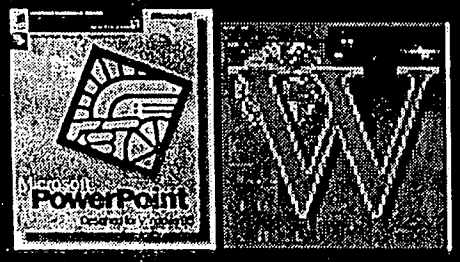


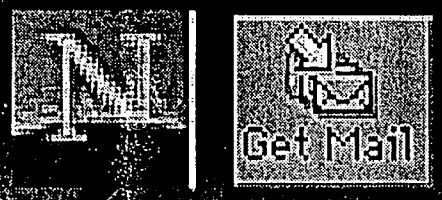
Figure 4

Components of the INTELLIGENT PORTFOLIO



IBM ThinkPad 365ED





- State of the Art Core Computer System
- Network Account
  - Electronic Mail
  - Newsgroups
  - WWW Access
- Web Helper Applications
- Distance Learning
- Office Software
  - Word Processing and Desktop Publishing
  - Electronic Spreadsheet
  - Database Management
- Graphics Presentation Package

Figure 5

Instructional Leadership Portfolio

Semester	Strands	Clusters	Integration	Assessment
Summer 1997	Professional Seminar Leadership			
Fall 1997	Action Research	The Literature	READING	
Spring 1997	Instructional Learning Theories	Organizing Themes	THINKING	
Summer 1998	Instructional Leadership			Portfolio Exhibition
Fall 1998	Instructional Leadership and Ethics	Choosing: Areas of Interest	INTERACTING	
Spring 1999	Program Design	Planning The Study	INTERACTING	
Summer 1999	Best Instructional Practice			Portfolio Exhibition
Fall 1999	Models & Tools for Program Evaluation	Critiquing The Project	WRITING	
Spring 2000	Instructional Leader	Reflecting The Results	DEMONSTRATING	Final Portfolio Exhibition
Summer 2000		Synthesizing The Dissertation	DEMONSTRATING	Defense of the Dissertation

Figure 6

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
Educational Resources Information Center (ERIC)

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