

## DOCUMENT RESUME

ED 432 219

IR 019 589

AUTHOR Hagen, Sara L.  
TITLE Technology Diffusion and Innovations in Music Education in a Notebook Computer Environment.  
PUB DATE 1999-03-00  
NOTE 7p.; In: SITE 99: Society for Information Technology & Teacher Education International Conference (10th, San Antonio, TX, February 28-March 4, 1999); see IR 019 584.  
PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)  
EDRS PRICE MF01/PC01 Plus Postage.  
DESCRIPTORS Access to Information; \*Computer Uses in Education; Educational Technology; Evaluation Criteria; Faculty Development; Grants; Higher Education; Instructional Innovation; \*Music Education; Optical Data Disks; \*Portfolio Assessment; Portfolios (Background Materials); Student Evaluation; Training; World Wide Web  
IDENTIFIERS \*Access to Technology; \*Electronic Portfolios; Laptop Computers; Notebook Computers; Technology Integration; Valley City State University ND

## ABSTRACT

Valley City State University (North Dakota) was the second university in the nation to adopt a notebook computer environment, supplying every faculty, staff member, administrator, and student with a laptop computer and 24-hour access to the World Wide Web. This paper outlines the innovations made in the music department to accommodate the infusion of technology over a period of several years. The first section describes the university decisions, grants received, and implications of both in terms of faculty training and the integration of technology into the curriculum. The second section outlines the CD-ROM electronic portfolio Title III grant and its effect on student assessment in the classrooms across campus. The music department developed several projects utilizing technology and the CD-ROM assessment project to participate in the innovations campus-wide, focusing on the following abilities and skills: (1) communication/aesthetic responsiveness (writing, math, speaking, listening); (2) problem solving (creative thinking, reasoning, decision-making); (3) effective citizenship/global perspective (teaching others, exhibiting leadership, working with diversity); (4) collaboration/wellness (responsibility, sociability, self-management); and (5) technology (selects/applies technology, acquires/organizes information). Electronic portfolio assessments and technology in music theory composition, music history, piano classes/applied lessons, and music methods projects are summarized in the third section. The final section describes future needs and concerns.  
(Author/AEF)

\*\*\*\*\*  
\* Reproductions supplied by EDRS are the best that can be made \*  
\* from the original document. \*  
\*\*\*\*\*

# Technology Diffusion and Innovations in Music Education in a Notebook Computer Environment

U.S. DEPARTMENT OF EDUCATION  
Office of Educational Research and Improvement  
EDUCATIONAL RESOURCES INFORMATION  
CENTER (ERIC)

☒ This document has been reproduced as  
received from the person or organization  
originating it.

☐ Minor changes have been made to  
improve reproduction quality.

• Points of view or opinions stated in this  
document do not necessarily represent  
official OERI position or policy.

"PERMISSION TO REPRODUCE THIS  
MATERIAL HAS BEEN GRANTED BY

G.H. Marks

Sara L. Hagen  
Department of Music  
Valley City State University  
United States

[Sara\\_Hagen@mail.vcsu.nodak.edu](mailto:Sara_Hagen@mail.vcsu.nodak.edu)

TO THE EDUCATIONAL RESOURCES  
INFORMATION CENTER (ERIC)."

**Abstract:** Valley City State University was the second university in the nation to adopt a notebook computer environment, supplying every faculty, staff, administrator, and student with a laptop computer and 24-hour access to the World Wide Web. This paper outlines the innovations made in the music department to accommodate the infusion of technology over a period of several years. The first section describes the university decisions, grants received, and implications of both in terms of faculty training and the integration of technology into the curriculum. The second section outlines the CD ROM electronic portfolio Title III grant and its effect on student assessment in the classrooms across campus. The music department developed several projects utilizing technology and the CD ROM assessment project to participate in the innovations campus-wide. The final section describes future needs and concerns.

## Introduction

Valley City State University in Valley City, North Dakota is on the fast track to the future. In the words of its President, Dr. Ellen Chaffee, in her State of the University Address in August of 1995, it's "a bullet train" to the 21<sup>st</sup> century. In actuality, the process had begun approximately five years earlier, when in 1990, VCSU began moving in a new direction. Like turning the Titanic, turning a university system needed to be well in advance and wide enough to make a difference in heading, if even slightly, to set a new course. Those early decisions led to the university receiving a \$1.4 million dollar federal grant, facilitating a total notebook computer environment at VCSU, the second in the nation to do so. (University of Minnesota Crookston, was the first. Also, Waldorf College in Iowa implemented the same initiative in the same year as VCSU.) The new bearing continued to support and promote the training of pre-service teachers, business graduates, and pre-professional students while at the same time weaving educational technology into the everyday lives of the university community. Several significant contributions to the state and national educational technology arena were made by VCSU in the past eight years. They are: (1) the success of the Center for Innovation in Instruction, a K-12 computer training facility located on the campus; (2) the acquisition of several large grants; (3) the successful integration of the notebook computer initiative; and (4) national recognition in such magazines and journals as the August 1998 issue of *U.S. News and World Report* as being one of the top regional liberal arts colleges in the Midwest.

Valley City State University offers four bachelor's degrees with more than 75 courses of study, over 1,100 students and 125 faculty and staff. VCSU has moved from traditional campus-based instruction to meeting the changing educational and training needs of the state's citizens through technology-intensive learning with notebook computers, multimedia, and CD ROMs; competencies, individual responsibility for learning, and documenting results for learning and teaching strategies; and new relationships with communities, employers, and society.

"You never change anything by fighting it. You change things by making them obsolete."  
-Buckminster Fuller

BEST COPY AVAILABLE

## **Purpose of the Paper**

This paper will address the notebook initiative's roots, diffusion, and eventual adoption and innovations as experienced by the music department faculty. Valley City State University is a member of the National Association of Schools of Music with a small faculty of 4 full-time members and five adjuncts. The age of the current faculty averages about 37 years, with each member having varying degrees of computer experience and levels of comfort. As research suggests, these may be factors in the adoption and integration of computers into a culture or society. Additional factors are time spent with the technology and level of involvement in the decision to adopt technologies. The level of integration into the music curriculum has been on an individual basis; however, the faculty is currently completing the final stage of planning for technology integration throughout the program. In a recent study provided by a staff member at VCSU for her doctoral dissertation, VCSU was compared to two other universities in the state with various time lines and methods of adoption of notebook initiatives. Corwin (1998) found that VCSU faculty were more involved with the initial decision, had a greater sense of responsibility to one another, administration, and students, which could be construed as a sort of "peer pressure," and had a strong organizational culture of innovation. The National Council for Accreditation of Teacher Education (NCATE) team that visited the university in 1996 wrote:

Valley City State University through its collaborative work with the Center for Innovation in Instruction (C.I.I.) ... and through the initiative of its faculty in pursuing grants, has achieved a synergy of vision and mission in action which would not normally be possible for an institution of its size and financial resources. In this case, the whole is greater than the sum of its parts. Noting that institutional culture is notoriously resistant to change, VCSU has achieved virtual transformation of the culture of the entire institution...these multiple efforts have worked in concert, focusing philosophy, and broad range of human and financial resources, to create institution-wide movement toward their long range vision to be a leader in technology in education.

## **A Brief History of Technology Diffusion and Adoption**

Recent studies on campus indicate that sixty-three percent of the faculty have integrated computer use in their teaching in some form (Holleque, 1996, 1997). Current course syllabi reflect these changes and innovations throughout the campus. As the history of this initiative will show, this was not always the case. A needs assessment was conducted early in 1990 with the new State Board of Higher Education mission of technology leadership as the driving force. Rather dismal results showed that (1) students, faculty, and staff needed more and upgraded hardware and software, (2) technical support and training had low ratings, and (3) funding was available for upgrades every 10 years if labs and desktop computers remained the mainstay. Work toward the new mission of technology leadership began with a grant for an assessment study that led to the eventual decision to use electronic portfolios and outcome-based abilities as the new technology-driven method of assessment. By 1992 all faculty had desktop computers on their desks and a Bush grant was in place for faculty development and training toward that end. The next big step would be to write grants which would provide additional monies to carry out the CD ROM portfolio plan.

Meanwhile, in the spring of 1995, the technology planning committee boldly chose to adopt the notebook environment with the approval of the faculty, staff, administration and student body. Thus, the initiative for a notebook environment began. Remarkably, VCSU received no additional state funds to make the transition to notebook computers. Expenses for the transition were covered by reallocation measures. For example, the university survived on a \$10,000 budget for all equipment needs for two years. By February of 1996, all full time faculty had IBM Thinkpad computers loaded with Windows 95, Microsoft Office, Novell Groupwise, Anti-Virus software, and Netscape. Students were dispensed the computers in the fall of 1996, along with a technology fee of about \$900 per year. Each multimedia classroom was equipped with a projection TV, scan converter, VCR, O.H. camera, and printer. Some rooms also contained stereo systems and videodisk players. Other classroom renovations included new desks, chairs, electrical outlets, and access

to the computer network. Some chalkboards were replaced with white boards as well (Corwin & Hagen, 1997).

All administrative and faculty offices, nearly 30 classrooms, the library, and the dorms have direct Internet and LAN access. Universal accessibility has meant a reordering of nearly every course on campus in terms of curricular updates, as well as a restructuring of the assessments that have been a part of traditional learning environments. A portfolio assessment plan was adopted as a tool in the general education courses and major studies that will *require* students to create CD-ROM portfolios prior to graduation beginning with the present 1998-2000 bulletin.

## **The Portfolio Assessment Project**

The CD ROM portfolio assessment project was funded for a five-year period in October of 1995 by a Title III federal grant under the Department of Education. This \$1.7 million dollar grant was awarded to VCSU and its partner school, Mayville State University, which shares several administrative services including the President, Dr. Ellen Chaffee. The grant provided for a five-station multimedia lab to train the students and faculty on the hardware and software and to create the CD-ROMs. A full time director of the grant program was hired to lead the training efforts. One of the most important success factors was the new Help Desk with a director plus twelve students offering online, telephone, and onsite help options. The Help Desk also serves as the total service center for the notebooks including preparation, distribution, inventory, repairs, and loans. Faculty and staff training was accomplished in part with the addition of university courses available for credit. Finally, another Bush faculty development grant worth approximately sixty thousand dollars per year over three years was received. This grant allowed for individual projects as well as departmental or institutional projects, travel to conferences, bringing in consultants, and onsite special training groups to be funded.

The initiative moved forward again in the fall of 1998 to include similar workstations being placed in each division so that students had better access to the equipment as well as providing the opportunity for divisions to add subject-specific software to enhance their portfolio projects. Students and faculty alike have access to the local area network and internet from these sites as well as from the notebooks, offering options for sharing the multimedia projects and for accessing information while preparing them. (The music school workstation has yet to be networked, but is scheduled for early 1999.)

A steady increase in the usage of various software, different computer technologies, and required student use within the courses has occurred. A mentoring approach was used to accomplish that task, beginning with learning teams of representatives from each division being initially trained. Title III monies were available for this team during their own training and for their time in training others. This approach worked very well to disseminate the information and training among faculty. Various monetary and equipment incentives were used along the way via the grants to keep the momentum moving forward. A serendipitous result of the mentoring approach was to create an environment of concern and the nurturing of others in the university community, which helped to propel the momentum. A real sense of teamwork and cooperation was obvious and proved to be a significant factor in the adoption of technology usage.

The full time music faculty have all been mentored and have implemented at least one technology project per course toward student-produced electronic portfolios. Currently the department is working to map these projects across the major and minor degree programs for effectiveness in delivery and thorough coverage of the assessment goals. Following is a description of some of the projects and how they are embedded in the CD ROM assessment tools developed by the university.

## **Electronic Portfolio Assessments and Technology in Music Projects**

The purpose of the first project was to integrate a music theory portfolio project into the university-wide decision to implement assessment portfolios which reflect the results of research done by the Secretary's Commission on Achieving Necessary Skills (SCANS) in 1990. This commission's research produced two major publications: *What Work Requires of Schools* (1991) and *Learning a Living: A Blueprint for High Performance* (1992). These publications define skills critical for success in school and in the workplace. These documents formed the basis of the VCSU Abilities.

Five abilities were chosen for inclusion in the portfolios. Each ability has several SCANS skills contained within it. Following is a list of the abilities with example SCANS skills within each. They are: (1) Communication/Aesthetic Responsiveness (writing, math, speaking, listening); (2) Problem Solving (creative thinking, reasoning, decision-making); (3) Effective Citizenship/Global Perspective (teaching others, exhibiting leadership, working with diversity); (4) Collaboration/Wellness (responsibility, sociability, self-management); and (5) Technology (selects and applies technology, acquires and organizes information). Students must demonstrate their skills within these areas through projects, which individual faculty devise and require as an integral part of their coursework.

## The Music Theory Composition Project

All freshmen majoring in music must take beginning music theory; therefore, this course was chosen for a pilot project focusing on the Problem-solving Ability and the SCANS skill of Decision-making (Hagen, 1997).

First, students were divided into groups of three or four to work cooperatively and provide evaluations. Then, the problem was given in increments based upon the concepts covered in class. The first assignment was to compose a melody of 16 measures that had the characteristics of a "good" melody as discussed in class. The students were then asked to write about how their melody evolved—how they made their choice of where to place the climax, for instance. Their criteria of a good melody served as the basis of their melody evaluations by both themselves and their peer group. Next, they were asked to add sequences and extensions according to the "rules" which they defined through reading in the text and through class discussions. The assessment procedure was consistent throughout the course of the project. Each student, then, composed a melody from which every other assignment was built. Students were able to see how their initial ideas were changed and developed as they learned more about melodic structure.

The next step was to rewrite the melody according to 16<sup>th</sup> century models. This meant a complete revision for many students in order to match the "rules" of that time period for horizontal intervallic structure, melodic direction, etc. Next, they were to add a counterpoint to their melody, being cognizant of the vertical intervallic structure and cadences. Following each revision procedure, the students were asked to write a reflective statement describing any difficulties they encountered, what they needed to change and why, and their impressions of the new arrangement.

After an introduction to figured bass, the students were to construct the inner voicings of their two-voice piece in Bach chorale-style in first species counterpoint. Next, cadences were changed to match the style and the students were invited to add nonharmonic tones to the melody. The students continued to modify their pieces as they learned about seventh chords, phrasing, and periodic structure. The final compositions also included a secondary dominant, a modulation, and a return to the original key. Some handwritten work was scanned as part of the generative process of the project, an essential part of the portfolio assessment.

The pilot project was completed mainly by handwritten exercises. However, some of the work was completed in the Macintosh lab using *Overture*. The current project is constructed in *Music Time*, a program located in an IBM lab in the music school (The notebook computers were used for all other aspects of the project, including e-mail usage among students and the instructor). A graphic was created from the notation and placed in an html document with a link to its matching MIDI file. The student and peer evaluations were not kept as a part of the portfolio; however, the composer's reflective statements were included. If decisions were based upon the evaluations, the reflective statement included that reference. These statements helped to define the level of performance at which the student was operating while making the changes in the pieces.

Each SCANS skill has five levels within it for assessing degrees of proficiency. In Decision-making, level one is "understands decision-making process and recalls basic rules/principles allowing for the identification of goals and constraints." For instance, if the students completely rewrote the assignment several times, that might suggest that they were operating at a level three by analyzing the situation and the information, considering the implications, and compiling multiple viewpoints. If the students were able to define changes *only where they were needed* on the initial rewrite, they were more likely to demonstrate a level four performance. Level four indicators are demonstrated by generating and evaluating alternative solutions and formulating a plan of action as the result of the prediction of the results based upon prior knowledge or experience. Several students were able to reach level four, but only two were considered to have met level five in which they could judge consistency and precedence of their decision or clearly



compare their work to exemplary models. Most students were able to create a satisfactory composition to match the assignment; however, many were unable to clearly verbalize about their work in a consistent manner. Not surprisingly, the two who were able to best verbalize their thinking processes were also older than average students. An example project is located at:

[http://www.vcsu.nodak.edu/offices/FineArts/faculty/Sara\\_Hagen/Jill/index.htm](http://www.vcsu.nodak.edu/offices/FineArts/faculty/Sara_Hagen/Jill/index.htm).

### **Music History Projects**

The music history project was designed as a semester-long cumulative inquiry on a single topic, with each student in the class having a separate topic to research and then present as a final speech. The ability was Communication/Aesthetic Responsiveness with the SCANS skill of speaking. Students prepared a Power Point slideshow to accompany their speeches. An example of a topic: the approach to tonality is constantly changing. What are some of the different views on tonality that we have studied? What is considered consonant, and what is considered dissonant? During different periods that we studied this semester, how much dissonance or chromaticism was acceptable? Which composers were drawn to dissonance? Which composers strove for a more consonant sound?

### **Piano Classes and Applied Lessons Projects**

The theme that generally threaded throughout these areas was the ability of Collaboration and Wellness. Various projects focused on the SCANS skills within this ability such as responsibility, sociability, participates as a team member, and self-management. The traditional assessment tools of performance were intertwined to include the SCANS skills. The performances were videotaped and recorded. The students then were able to take these raw materials to the workstation to use Adobe Premier to mesh video clips with audio, including transitions and voice-overs, and later burn into their CD ROMs. Conducting classes and student teaching videos are handled in much the same way.

### **Music Methods Projects**

Two projects were considered to be especially important by the students themselves in the fall 1998 semester. Both had been implemented the spring 98 semester in Music for Elementary Students for nonmajors. The fall 98 class was a combination of music minors and nonmajors. The first project was also shared in the Music in the Junior and Senior High School music majors as well.

The first project was a presentation using Power Point on the topic, "Teaching with the National Standards." This project was designed to meet the ability of Effective Citizenship/Global Perspective and the SCANS skill of teaching others. The students were to research the standards in addition to their learning from class discussion and readings to determine how the standards would personally affect them and their teaching practices. Other arts education classes were invited to the presentations and they were videotaped to air on the local VCSU TV network newscast. The presentations were compiled into html documents and placed on the class syllabus website. An example of one of the papers is located at:  
[http://www.vcsu.nodak.edu/offices/FineArts/faculty/Sara\\_Hagen/standards.html](http://www.vcsu.nodak.edu/offices/FineArts/faculty/Sara_Hagen/standards.html).

A second project in the methods courses for elementary teachers involved research of three musical cultures, each using a different source of information. They were to use the internet, the university library, and an interview with a person from a different heritage from the predominantly Scandinavian or western European background of 98% of the student body. This project met the ability of Effective Citizenship/Global Perspective and the SCANS skill of working with diversity. Students found a variety of sources, but confirmed that they learned the most from the live interview. One of the interviewees actually came to class and taught an ethnic dance from Bulgaria. The presentations were made with a Power Point slide show accompanying them and given to the class. An example of one of the presentations is located at  
[http://www.vcsu.nodak.edu/offices/FineArts/faculty/Sara\\_Hagen/Kristi/multi.ppt](http://www.vcsu.nodak.edu/offices/FineArts/faculty/Sara_Hagen/Kristi/multi.ppt)

## Future Plans for Projects

The current project of mapping all of these individually crafted projects into a unified whole as a department, then as a division, is an important component of the assessment program. Each division and department was charged to do so. When compiled, the divisions will revisit their choices of projects and work to balance the abilities and SCANS skills with a spiral approach to the levels of achievement to help students produce a meaningful assessment upon graduation.

The culture at VCSU is constantly changing and growing. The music faculty have many ideas that are in planning stages at the present time. The faculty is constantly looking for ways to integrate the technology with the assessment tools and course content. Our present needs assessment indicates that digital audio equipment and recording facilities as well as an acoustically-sound environment for performance is essential. In order to produce high-quality CDs, these requirements must be addressed. Each year, the technology committee meets to determine the needs across campus and prioritizes them according to greatest necessity and urgency. Maintenance of the present system requires a major portion of the budget and in these economic times, expansion will be a challenge.

Valley City State University is a place where boundaries are always challenged, barriers often removed, and learning continues to be re-evaluated. The strategic plan emphasizes customized learning defined as "learning that enables each person or organization to have effective, convenient, and efficient access to an educational process that supports independent progress toward their goals." This vision provides strong impetus toward change and adoption of technology into every aspect of the university community—including music. Many music projects utilizing technology are integrated now and have received positive feedback from students involved. As the university moves forward, the hope of the music department is that monies will be available to upgrade equipment and performance facilities, provide software to each laptop as needed, and maintain solid support for building on a traditional program as well as in the technological arena. As a whole, the music faculty feel the need to "get on board" with the vision and mission of the university as good team members. However, there is lingering uneasiness about the future of a traditional music program for the preparation of K-12 teachers in this innovative environment. The unanswered question is when tradition meets technology, is there a clear winner or loser? Can the two be truly compatible or will the one with the most momentum usurp the other?

## References:

- Corwin, T. & Hagen, S. (1997). Creating student CD ROM portfolios. *Proceedings of the Association for the Advancement of Computing in Education Ed-Media & Ed-Telecom*, Calgary, Alberta, CANADA.
- Corwin, T. (1998). *Prediction of and differences in computer use: Universal adoption of notebook computers at three undergraduate institutions*. Unpublished doctoral dissertation, Iowa State University, Ames.
- Hagen, S. (1997). Student CD-ROM portfolios and nontraditional assessment techniques: Using a music theory project for abilities-based assessment. *GAMUT Journal of the Georgia Association of Music Theorists*, 8, 65-68.
- Holleque, K. (1996). *Technology survey results*. Unpublished manuscript, Valley City State University, Valley City.
- Holleque, K. (1997). *Impact of notebook computers on learner centered education*. Unpublished manuscript, Valley City State University, Valley City.
- Valley City State University. (1998). *U.S. department of education application for grants under the strengthening institutions program*. Valley City, ND: Valley City State University.



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



## **NOTICE**

### **REPRODUCTION BASIS**



This document is covered by a signed "Reproduction Release (Blanket) form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.



This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").