TECHNOLOGY IN NURSING EDUCATION

Oregon Education-based Technology Needs Assessment: Expanding Nursing Education Capacity

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✤ Contents

Acknowledgements:

� **Executive Summary**

Oregon, a rural and frontier state[1], needs to produce at least twice its current annual level of Registered Nurse (RN) graduates to solve its acute and growing nursing shortage. Combining technological applications in support of classroom and clinical education can make the best use of limited faculty, financial, and clinical placement resources. The Oregon Center for Nursing coordinated a comprehensive needs assessment of present technology resources and needs in all of Oregon and Southwest Washington's nursing education programs during October 2003. Through site visits, face-to-face interviews, phone interviews, and re-verification of data, it was documented that nursing education programs throughout Oregon and Southwest Washington were utilizing various technology media to provide both theory and clinical education components. One hundred percent of the nursing education programs in Oregon and Southwest Washington (n=23) were assessed. All 23 programs offered web-enhancement of traditional face-to-face courses; nine programs offered on-line courses; seven programs utilize videoconferencing in nursing education; three programs utilize high-fidelity clinical simulation and virtual reality in clinical education. Gaps and needs in technology were identified. Recommendations for utilization of technology in nursing education as a method to expand capacity were made.

� Introduction

Enrollment in all basic nursing programs needs to expand significantly. The Oregon Nursing Leadership Council (ONLC) Strategic Plan, *Solutions to Oregon's Nursing Shortage*, identified five goals to solving Oregon's nursing shortage. Goal Number One in the ONLC's strategic plan[2] is to double enrollment in Oregon nursing programs by 2004. Major barriers to doubling nursing education enrollment statewide include:

> (1) Insufficient numbers of available faculty.[3]
> (2) Budget limitations.
> (3) Limited access to live-patient clinical placements.
> (4) Inconsistency and unpredictability of student clinical learning experiences in live clinical settings.

Combining technological applications in support of classroom and clinical education can reduce these barriers and increase efficiency, thus expanding educational capacity while conserving scarce financial resources[4,5,6,7,8]. It is understood that any such strategies will be accomplished while upholding Oregon's very high standards for nursing education.

The consequences of insufficient numbers of faculty can be addressed through the sharing of teaching resources across Oregon's public, private and community-college nursing programs. This can be achieved through comprehensive integration of all campuses using distance learning technologies to broadcast nursing education statewide.   Oregon's nursing education community has demonstrated a commitment to solve the shortage together. Distance technology can be used to facilitate statewide teaching and sharing the delivery of nursing learning resources.

Advances in simulation and virtual technology now offer excellent adjuncts to "live" clinical education, reducing the barriers associated with limited experiences, limited clinical sites, and limited clinical faculty resources。 Technology provides efficient, safe, and effective alternatives to expand clinical teaching opportunities[9]. Access to central and regional clinical labs and simulation resources can provide even greater mobility for students across educational systems.

By making appropriate use of these technologies, and through cooperation across programs, doubling RN production to meet Oregon's health care needs is achievable. In pursuit of these strategies, a first step was the comprehensive assessment of present technology-based resources and needs in each of Oregon and Southwest Washington's nursing education programs. The Oregon Center for Nursing coordinated and conducted this assessment in collaboration with the Oregon Nursing Leadership

Council (ONLC) Education Committee, and the Oregon Consortium for Nursing Education (OCNE).

✴ Needs Assessment Questions

1) What technology-based simulation and virtual resources are available at each of Oregon's nursing education campuses?
2) What distance education resources are available and compatible across each of Oregon's nursing education campuses?
3) What do Oregon nurse educators identify as barriers and opportunities to increasing utilization of simulation and distance education technologies in Oregon's nursing education system?

✴ Needs Assessment Procedure

Following an extensive review of the literature and relevant research, a draft set of specific needs assessment questions, data elements, and interview questions were proposed to key stakeholders. The assessment coordinator contacted nursing education leaders in the ONLC Education Committee, the OCNE, and education and technology administration stakeholders in the state. Survey questions and the actual data collection instrument were refined and pilot-tested with three nursing education programs.

Once the pilot phase was completed and final revisions made, primary stakeholders were contacted for final review of the assessment scope, items, and methodology. A project glossary was developed to provide common terminology definitions across nursing and information technology informants (see page 13). The assessment coordinator then contacted all Oregon and Southwest Washington nursing education programs, conducted the interviews either over the phone or in person, and sought data re-verification via electronic communication to assure consistency and completeness.

Concordia University, although not currently providing nursing education, plans to initiate a school of nursing and therefore, was interviewed for this needs assessment. Information obtained from Concordia was not reported in the "Findings" section of this report; however, the information is essential to the future of nursing education in Oregon and was included in the data collection tables for future reference.

� Instrumentation

The instruments used in this assessment included an interview guide (Appendix A) developed by Lorretta Krautscheid, RN, MS, Oregon Center for Nursing Project Director, and a technology continuum instrument (Appendix B) developed by Katherine A. O'Meara, PhD, RN, Oregon Health and Science University (OHSU) Assistant Professor and Director, School of Nursing Systems Engineering. The interview guide assessed each program's use of distance learning technology (categorized as synchronous and asynchronous), clinical education technology, facilitators and barriers to technology use, on-campus technology support, faculty development plans, program needs, and vision for the use of technology in nursing education throughout Oregon and Southwest Washington.

The technology continuum instrument assessed each nursing program's current use of technology in nursing education. The technology continuum instrument was then used to estimate the relative readiness of both faculty and students in the use of increasingly complex technologies in the design and delivery of nursing education. During the pilot testing, it was validated that although access to distance learning technologies were available to nursing programs, the use of technology was dependent upon the readiness of the faculty and students.

✖ Findings

Distance Learning Technology: Synchronous

Technology-related terminology used in this document are defined and explained in the glossary (page 13). The reader is encouraged to refer to the glossary while reviewing the following sections.

Distance learning technology via videoconferencing and/or video-streaming is available throughout Oregon and Southwest Washington. Of the 23 nursing programs assessed, two programs are utilizing video-streaming to provide nursing education. Twenty-two programs have videoconferencing capability on campus (Clackamas Community College and Clatsop Community College do not). Seven of the 21 programs with videoconferencing capability are currently using this technology to provide undergraduate and graduate nursing theory courses (Lane Community College, Linfield, OHSU Ashland, OHSU Klamath Falls, OHSU LaGrande, OHSU

Portland, and WSU Vancouver). Other campuses indicated that they have used videoconferencing in the past, but reported this technology to be an ineffective instructional modality, noting the following barriers: instability of the "connection", scheduling difficulties, connection fees, lack of on-site technology and instructional design support, and faculty discomfort with classroom management at a distance.

The seven campuses utilizing videoconferencing reported similar barriers. However, they indicated that the successes and benefits outweighed the barriers. According to Jeanne Bowden-Wismer, EdD, RN, Director of the OHSU School of Nursing in LaGrande, Oregon, "videoconferencing provides access to nursing education for place-bound students" and improves retention of rural nurses in their rural hometowns. Campuses that have successfully utilized videoconferencing in nursing education exhibited the following characteristics: on-site technology support, Internet Protocol (IP) connection, videoconferencing studios/classrooms, instructional design support, and ongoing faculty development with an emphasis on creating a distance technology learning environment.

Throughout Oregon and Southwest Washington, the issue of connectivity and compatibility presented barriers to connecting all nursing programs. Three common types of videoconferencing systems reside throughout higher education systems in Oregon: Tandberg™, Poly Com™, and V-Tel™. Fifteen of the 21 campuses with videoconferencing capability connected with an Internet Protocol; six campuses had an ISDN line with a 384 K bandwidth; 10 campuses had a T1 line; and two campuses had ITFS or microwave capability (Table 1). The inconsistencies in connectivity and system compatibility that exist among campuses present challenges for moving toward expanded uniform statewide nursing education.

Distance Learning Technology: Asynchronous

Distance learning technologies via web-enhanced hybridized courses and on-line courses are available throughout Oregon and Southwest Washington. Of the 23 nursing programs assessed, all were enhancing traditional face-to-face theory courses through the internet; i.e. some portion of the course was delivered asynchronously through a campus intranet system or a commercial web-delivered course management product. Three nursing programs (Clatsop, Linn-Benton, and OHSU LaGrande) provided basic RN courses on-line supported by clinical faculty to oversee clinical apprenticing in the students' remote locations. In addition to the three aforementioned programs, an additional six nursing programs provided on-line nursing education theory courses for curricula that do not require a clinical component: for example, RN to Bachelor of Science (BS) programs, specific graduate degree programs, and basic nursing courses such as introduction to nursing, leadership, and research courses.

Both web-enhanced and on-line courses were widely used throughout Oregon and Southwest Washington, in part due to ease of connectivity through the internet. When compared with videoconferencing, campus informants reported ease of use, access, and convenience with on-line courses. Karen Burke, RN, MS, Audrey Knippa, RN, MS, MPH (Clatsop Community College, Astoria, Oregon), and Diane Bauer, RN, MS, (Linn-Benton Community College, Albany, Oregon) reported the ability to increase access and capacity to nursing education through outreach to nursing students in Tillamook, Newport and Lincoln City utilizing on-line courses. The students in these programs are supported in their remote locations by clinical faculty.

In order to implement these innovative outreach programs at Clatsop Community College and Linn-Benton Community College, collaborative teams comprised of key leaders from administration, nursing, and information technology were developed. The teams coordinated a plan to meet faculty instructional design needs, implement a student help-desk to assess computer literacy and assist with on-line learning, and provide faculty release time as well as financial incentives for on-line course development.

Audrey Knippa, RN, MS, MPH, Director Clatsop Community College Nursing Program and Jeanne Bowden-Wismer, EdD, RN, Associate Dean OHSU LaGrande School of Nursing, reported that students who took on-line courses exhibited similar Grade Point Averages (GPA's) and national RN licensure examination (NCLEX) pass rates when compared with students who took traditional face-to-face courses. In addition, students reported high levels of satisfaction with both access to education and convenience, as they are able to attend school around their work and family schedules. Of particular interest is that both Southwest Oregon Community College and OHSU Ashland School of Nursing are collecting data to evaluate the effectiveness of distance learning – findings which will be important to analyze as Oregon plans to expand nursing education through the use of technology.

All 23 programs were asked about barriers to implementation of distance learning. The barriers reported most often (78%) included: 1) the need to determine what course content can effectively be taught utilizing technology (matching the content to the technology versus having the technology and making the content fit); and 2) the need for faculty development. Other barriers included the need for faculty release time (56%), the need for on-site information technology support for faculty and students (30%), ongoing access to instructional design support (30%), and hardware and software updates (26%) [Table 3].

Clinical Learning Technology

All of the 23 nursing programs assessed were utilizing technology to provide clinical learning experiences (Table 2). The availability and use of technology varied from low fidelity, static task trainers and mannequins (n=23), to medium fidelity heart, lung, and bowel sound mannequins and computer interactive simulation scenarios (n=8), to high fidelity real-time interactive human patient simulators (HPS) (n=3).   Sim-Man, by Laerdal, was the HPS system being utilized in all three high fidelity simulation labs in Oregon . OHSU LaGrande School of Nursing has acquired funding to purchase an HPS system and update its lab with an anticipated installation date of April 2004.   In addition, two nursing programs, Treasure Valley Community College and Clark Community College, have submitted grants to fund an HPS at their campuses.

Eighteen of the 23 nursing programs (78%) indicated that an HPS system is essential for preparing students with required technical, interpersonal, psychomotor, and interdisciplinary teamwork skills so students will be prepared to make the best use of limited live-patient clinical experiences.   Eleven of the 23 programs (47%) reported limited access to adequate or appropriate live-patient clinical education situations. An HPS system will allow nursing education programs to increase capacity through efficient use of clinical faculty, increased opportunities for practice and evaluation, and will expose students to situations that do not spontaneously arise in clinical environments. Funding, space limitations, faculty, and long-term sustainability of a simulation system were all reported as barriers to achieving a HPS at each campus.

Michael Seropian, MD, Faculty OHSU Schools of Nursing and Medicine, Director OHSU Simulation and Clinical Learning Center, indicated that one of the greatest benefits of the HPS and simulation lab is the ability to involve multiple disciplines in patient care teaching scenarios. The level of thinking that occurs with an interactive patient and interdisciplinary team approach is similar to real clinical situations; however, development of the necessary clinical scenarios is time intensive. Following this line of discussion, in addition to the need for an HPS lab, nine of the 23 programs (39%) identified a need for the development of comprehensive patient simulation scenarios for clinical evaluation (Table 3).

Readiness of Faculty and Students to Utilize Technology

The technology continuum instrument (Appendix B) was used to assess each nursing program's level of faculty and student readiness to use technology in nursing education. The information is an estimation and is reported as "low", "moderate," and "high" levels of readiness as defined in the faculty and student readiness key designed specifically for this needs assessment by the assessment coordinator (Appendix C). Based on informant interviews, seven of the 23 nursing education programs were

estimated to have "low" faculty readiness to utilize distance learning technology, six of the 23 programs were estimated as having "moderate" faculty readiness, and 10 campuses were estimated as having "high" levels of faculty readiness (Table 4).

Student readiness to utilize technology in nursing education was estimated using six specific indicators derived from the technology continuum instrument. These six measures included student use of email, PowerPoint computer slides, computer adaptive testing, distance delivered courses (such as web-courses or videoconferencing courses), and moderate to high-fidelity clinical simulation. Based on informant interviews, one of the 23 nursing programs was estimated as having "low" student readiness, 18 were estimated as having "moderate" student readiness, and four were estimated as having "high" student readiness to utilize distance learning and clinical simulation technology in nursing education.

These findings parallel the reported barriers to implementing distance learning technology in nursing programs: faculty development, faculty release time, on-site information technology support for faculty and students, statewide videoconferencing connectivity and compatibility, ongoing access to instructional design support, and access to HPS systems.

✖ Implications

Implications for Nursing Education in Oregon

Nursing education programs in Oregon and Southwest Washington have demonstrated an ability to effectively provide theory content through distance learning technology. All 23 nursing programs reported a desire to utilize distance learning technology as a modality to increase capacity to prepare RN's in Oregon. All nursing programs have the ability to deliver theory coursework statewide and nationwide through the use of on-line distance technology via the internet. All but two campuses have the ability to deliver theory coursework statewide through two-way videoconferencing as well (Table 1). Both modes of distance learning present unique challenges which require assessment and planning to resolve.

Clearly, an essential initial step is to identify what content is effectively delivered through which means of distance learning technology. Clatsop Community College, OHSU LaGrande, and Linn-Benton Community College have all demonstrated success with RN education courses delivered through distance education technology and supported by clinical faculty at the off-campus locations. Linfield and WSU Vancouver have demonstrated the ability to provide RN to Bachelor's of Science in Nursing (BSN) education through distance technology. In graduate nursing education, OHSU Portland has demonstrated the ability to deliver degree programs combining both on-

line and videoconferencing technology. These programs should be consulted to serve as mentors for expanding nursing education statewide.

With regard to clinical education and simulation, OHSU Portland, Southwestern Oregon Community College, and Umpqua Community College have implemented simulation centers utilizing HPS systems. Within six months, OHSU LaGrande will also have a simulation center. Oregon and Southwest Washington nursing leaders should work collaboratively to secure access to HPS systems for nursing programs statewide and develop a system for sharing simulation scenarios. In addition, as with the use of distance technology for theory content, nurse educators will need to determine the best use of HPS systems to meet clinical education competencies.

In response to the question, "What do you see as the preferred vision for increasing technology-based education across Oregon's nursing education community?", 15 of the 23 programs (65%) reported a desire to work with the OCNE to make the best use of limited resources. Emerging themes in this area include:

1. Compatibility among various programs so we can share information, curriculum, and faculty.
2. Competency-based statewide curriculum with compatible articulation and consistency in evaluating competencies.
3. Creating and sharing clinical simulation lab resources.
4. Meeting Oregon's health care workforce needs.
5. Utilization of experts to teach courses statewide.
6. Decreased competition for scarce resources.

The remaining eight programs (35%) that did not state a specific desire to work with the OCNE indicated concerns in regard to three specific areas: 1) a statewide competency-based curriculum, 2) the use of HPS in clinical education, and 3) the effectiveness of distance learning technology in nursing education.   Emerging needs reported by these eight programs included:

1. Develop competencies and curriculum first .
2. Collect more data to determine the effective use of technology (distance learning and simulation).
3. Consider the needs of students who learn best through traditional face-to-face courses.
4. Assure there are adequate information technology resources (information technology support, equipment, motivated and techno-savvy faculty, and instructional designer) on campus prior to having the capability to utilize distance learning modalities.

Implications for Nursing Research

Evidence substantiating the effectiveness of distance learning technology in nursing education is lacking. Studies conducted in the 1990's [10],[11] need to be replicated reflective of changes in computer literacy levels of current nursing students, the computer literacy levels of current nurse educators, and advances in videoconferencing and on-line course products. At the writing of this report, two nursing education programs in Oregon are in the process of collecting data, comparing test scores, cumulative GPA's, and NCLEX pass rates of distance learning students with those of traditional face-to-face students. The results of these studies must be considered as Oregon and Southwest Washington move forward with plans to increase technology as a method to expanding nursing education capacity.

Evidence supporting the effectiveness of simulation in clinical education is also lacking. Each of the installed HPS systems in Oregon are SimMan®, a product of Laerdal Medical Corporation®, and each simulation center will participate in research studies in cooperation with Laerdal to measure the effectiveness of this form of technology in clinical education. Anecdotal reports from all three simulation centers in Oregon reveal that faculty and students are highly satisfied with the level of learning and exposure to clinical situations that HPS systems afford. In addition, the HPS systems offer an opportunity for interdisciplinary collaboration (integrated scenarios may involve health care team members from respiratory therapy, medicine, lab, and nursing), further enhancing the nursing students' clinical learning experience.

✄ Discussion

This needs assessment revealed that distance learning technology for nursing education is available in every public and private nursing program throughout Oregon and Southwest Washington. On-line distance learning via the use of web-delivered course management programs (Blackboard™, Web CT™, and e-college™), provides the highest level of access, convenience, and mobility for students (students may access class wherever there is an internet connection and information technology support on campus). Successful implementation of on-line courses requires an interdisciplinary teamwork approach to develop an effective, on-line learning environment.

Reported issues and needs for placing nursing courses on-line include: matching the expected competencies with the technology, faculty development, faculty release time, ongoing instructional design support, access to clinical faculty or preceptors in the remote locations, student help desk, and updates in equipment and courseware management software programs. Three nursing programs in Oregon have demonstrated success delivering basic RN courses on-line. Doubling nursing education

enrollment statewide is achievable by providing access to students in remote locations through on-line distance learning technology.

Videoconferencing capability for two-way audio and video is also available in Oregon and Southwest Washington, however, on-campus access is not available for two nursing programs. Access is further limited by the varying types of connections (IP, ISDN, T1 line, and ITFS), connection instability, scheduling conflicts, connection fees, and studio classroom size. Nursing programs which utilize videoconferencing have demonstrated successful delivery of courses to students at remote locations and report that despite the barriers and "glitches", this is an effective modality for teaching.

Reported needs for broadcasting nursing courses via videoconferencing include: having an IP connection at each campus, access to two-way audio/videoconferencing equipment, on-campus information technology support, studio classrooms dedicated for nursing education use, faculty development, instructional design, and the finances to support these endeavors. Doubling nursing education enrollment statewide may be achievable once each nursing program campus has the capability to connect via videoconferencing with other nursing programs.

Human patient simulation (HPS) is available in Oregon at three locations: Portland, Roseburg, and Coos Bay. One more HPS lab is scheduled to be implemented in LaGrande in spring 2004. In addition to these four locations, 14 other nursing programs reported a desire to integrate HPS into their nursing curriculum. Each nursing student throughout Oregon should have reasonable access to clinical lab simulation to promote the goal of doubling nursing education enrollment statewide.

The challenge to Oregon's nursing community is to discover the best way to meet these needs with the available resources while maintaining Oregon's high standards for nursing education. Oregon's nursing leaders have demonstrated the vision, commitment and capability to achieve this goal. Through statewide collaboration in nursing education, the involvement of the health care and government partners, Oregon can solve the acute and growing nursing shortage.

✖ Glossary

Asynchronous learning: Learning in which interaction between instructors and students occurs intermittently with a time delay. Examples are self-paced courses taken via the internet or CD-ROM, online discussion groups, and e-mail.

Distance Learning/Education: Educational situation in which the instructor and students are separated by time, location, or both. Education or training courses are delivered to remote locations via synchronous or asynchronous means of instruction.

Hybridized course: A version of an on-line course, similar to a web-enhanced course.

IP (Internet Protocol): Using the Internet Protocol, delivery of a learning event over a network from a single source to multiple participants.

ISDN (Integrated Services Digital Network): A telecommunications standard enabling communications channels to carry voice, video, and data simultaneously.

ITFS (Instructional Television Fixed Service): Microwave-based, high frequency television used in educational program delivery.

On-line course: The state in which a computer is connected to another computer or server via a network to deliver course content. Replaces the traditional face-to-face course.

Synchronous learning: A real-time, instructor-led online learning event in which all participants are logged on at the same time and communicate directly with each other. In this virtual classroom setting, the instructor maintains control of the class, with the ability to "call on" participants. Interaction may occur via audio or videoconferencing.

T1 (DS-1): High speed digital data channel that is a high-volume carrier of voice And/or data. Often used for compressed video teleconferencing. T-1 has 24 voice channels.

Videoconferencing: Using video and audio signals to link participants at different and remote locations.

Video-streaming: Audio or video files played as they are being downloaded over the internet instead of users having to wait for the entire file to download first. Requires a media player program.

Web-enhanced course: Enhancement of a traditional face-to-face course by placing some component of the course in an internet accessible location, such as a web-course product, campus intranet location, or group posting location.

Appendix A.
Technology Assessment Interview Guide

Education-based Technology Needs Assessment: Expanding Nursing Education Capacity

School:

Faculty Contact: **Tech or IT contact:**

                                                                        Telecommunications contact:

Technology/System Type	☐ **Synchronous** (list)	☐ **Asynchronous** (list)	☐ **Simulation** (list)
	◘ **Videoconferencing** __ **Poly-Com™** __ **Ed-Net™** __ **V-tel** __ **Tandberg** ◘ **Video-Streaming** __ **Real Presenter** __ **Real Networks** __ **Apple Quick Time** __ **Windows Media**	◘ **HTML sites** ◘ **Web page products (WebBoard™)** ◘ **University-designed template** ◘ **Web course products** __ **Web CT™** __ **eCollege™** __ **Blackboard™** __	◘ **Patient Simulation** __ **SimMan™** __ **HPS™ (Meti)** ◘ **Other (list)**
Installation Implementation date			
Connectivity/Compatibility	◘ **ISDN: band width** ◘ **IP** ◘ **I-Net** ◘ **Bridges:**	◘ **ISP** ◘ **WAP (wireless application)**	
Geographic area(s) served (partnerships)			
System capability • **Student capacity** • **Space requirements** • **Faculty capacity** • **Access**(students/faculty)			

Technology	☐ **Synchronous** (list)	☐ **Asynchronous** (list)	☐ **Simulation** (list)
System management model • **IT support** • **Software updates** • **Use allocation** • **Competition for use**			
Peripheral Equipment			
System successes			
System problems or concerns			
Faculty			
Number/percent trained to use system			
Faculty development plan			
Instructional design support			
Nurse expert in informatics	☐ No ☐ Yes → Name:		
Students			
Learning outcomes data (contact)			
Satisfaction data (contact)			

Organization			
3-5 year strategic plan for technology			

Oregon Education-based Technology Assessment: Expanding Nursing Education Capacity

Assessment Questions:

1. What is the vision at your school for increasing/expanding technical support for nursing education?

2. What do you see as the largest challenges in moving toward greater reliance on technology in the education of nursing students?

3. If you had all the financial and faculty resources you needed, how would technology be used in your programs?

4. What do you see as the preferred vision for increasing technology-based clinical education across Oregon's nursing education community?

5. What specifically do you see at the essential faculty development and support needs (at your school) for moving toward greater reliance on technology-based education?
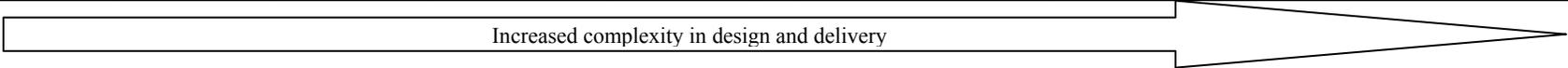
Appendix B.
Technology Continuum Instrument

Technologies in Nursing Education <div align="right">Katherine O'Meara, RN, PhD 2003</div>

Learning Activity	Technology Continuum						
Presentations Media and Hypermedia	Lecture Textbooks Using Videotapes	Blackboard Whiteboard Flipcharts	Overheads Slides Computer slides	Accessing Web-based Text, graphics and file downloads CD ROM content	Producing videotapes closed circuit TV One-way video transmission streaming Audio/video		Conceptual mapping design. Web-based or CD content. Synchronized conferencing
Student Delivered Content	Academic Paper	Class presentation Overheads Slides Computer slides Posters	Teaching Plan Care plan Patient work-up	Consumer Health Web Site Development	Video Production		
Individual Interaction	Programmed texts		CAI Interactive CD	Accessing Static Web-based Content	CD Gaming Interactive video Virtual Reality		Dynamic Database Driven web sites
Discussion	Seminar	Small Group	Panel Discussion	Email Listserv Newsgroup	Asynchronous Discussion Chat		
Performance Evaluation	Testing (Multiple choice, T/F, fill-in)	Essay Test	Personal Journal Written Report Term Paper	Computer Adaptive Test CAT	Demonstration/Observation		
Investigating/ Research	Literature Search	Web Searching Accessing on-line journals	Research Critique Web Site Evaluation	Data Collection Accessing Clinical Data & Public Health Data Sets	Data Set Manipulation Statistical Analysis	Research Design	Data visualization Modeling Prototyping Intervention Research
Practice	Case Critique Role Playing	Skills lab	Patient work-up Community Assessment		Simulation Virtual Reality	Clinical Apprenticing	Clinical Intensive
Collaborations	Meetings Email Telephone	Document Sharing	Text Conferencing	Groupware/Team ware	Videoconferencing		
Mentoring	Face-to-face Office hours	Telephone Voicemail	Email	Text Conferencing	Videoconferencing	Shared Projects	

Increased complexity in design and delivery

Appendix C
Faculty and Student Readiness Key

Goal Statements	Faculty Goal: 100% of faculty will be competent developing and delivering nursing education using distance technology (videoconferencing or Web-enhanced or Web-course management products)	Student Goal: Students will demonstrate the ability to navigate distance education nursing courses via technology as evidenced through the use of the following six measures: email (E), PowerPoint (PP), computer adaptive testing (CAT), Web-courses (WC), videoconferencing courses (VC), and moderate to high fidelity human patient simulation (S).
Readiness Scale		
Low	Zero to 30% of faculty achieve goal	Students demonstrate three or less of the six measures
Moderate	30% to 60% of faculty achieve goal	Students demonstrate three or four of the six measures
High	More than 60% of faculty achieve goal	Students demonstrate five or six of the six measures.

Lorretta Krautscheid, RN, MS. Project Director, Oregon Center for Nursing. December 2003.

Table 1.
Distance Learning Technology Findings: Oct/Nov 2003

Campus	Videotapes	Computer slides	Email	Web enhanced hybrid course	On-line courses	Videoconferencing Connectivity
Blue Mountain				Campus web page		IP / T1 line
Central Oregon				Web CT		IP
Chemeketa CC				Web CT		IP & ITFS
Clackamas CC				Blackboard		None avail.
Clark CC				Web Page	N/A	ISDN 384 K/T1 line
Clatsop CC				Front Page	ADN	None avail
Columbia Gorge				Web CT		IP & T1
Concordia				Web CT		ISDN ¼ T1 & IP
Lane CC				Web CT	N101	IP
Linfield				Web CT	RN – BS	T1 line
Linn-Benton CC				Blackboard	ADN	ITV & ITFS
Mt. Hood CC				Web CT		ISDN T1 line
OHSU – Ashland				E College	MS	IP
OHSU – K Falls				E College	MS	IP
OHSU – LaGrande				ECollege/Blackboard 1st class	RFD/BSN MS	IP
OHSU – Portland				e-college	MS/PhD	IP
Portland CC				Web CT		IP & ISDN T1
Rogue CC				Web Ct		IP
SW Oregon CC				Web Ct		IP & T1 line
Treasure Valley				Blackboard		T1 line
Umpqua				I:drive on campus		IP
Univ. of Portland				Nebula & Blackboard	N/A	ISDN T1 line
Walla Walla – Ptld				Blackboard	N/A	IP
WSU Vancouver				Blackboard	RN – BS	ISDN

(yellow)	In use to provide nursing education.
(blue)	Available on campus/not used in nursing education as of Nov. 2003.

L. Krautscheid, RN, MS. Oregon Center for Nursing. December 2003.

Table 2.
Clinical Education Technology Findings: Oct/Nov 2003

Campus	Technology Continuum							
	Case Critique Role Playing	Skills lab Task trainers Mannequins	Patient workup Community assessment	Computer simulation Interactive CD	Simulation Virtual reality High fidelity	Clinical apprenticing	Clinical internship	
Blue Mountain CC	✓	✓	✓	✓		✓		
Central Oregon CC	✓	✓	✓			✓	✓	
Chemeketa CC	✓	✓	✓			✓		
Clackamas CC	✓	✓	✓			✓	✓	
Clark CC	✓	✓	✓		2005 -install	✓	✓	
Clatsop CC	✓	✓	✓			✓		
Columbia Gorge CC	✓	✓	✓	✓		✓		
Concordia								
Lane CC	✓	✓	✓	✓		✓	✓	
Linfield	✓	✓	✓			✓	✓	
Linn-Benton CC	✓	✓	✓			✓	✓	
Mt. Hood CC	✓	✓	✓	✓		✓	✓	
OHSU – Ashland	✓	✓	✓			✓	✓	
OHSU – K Falls	✓	✓	✓			✓	✓	
OHSU – LaGrande	✓	✓	✓		2004 - install	✓	✓	
OHSU - Portland	✓	✓	✓	✓		✓	✓	
Portland CC	✓	✓	✓			✓	✓	
Rogue CC	✓	✓	✓			✓	✓	
SW Oregon CC	✓	✓	✓	✓	✓	✓		
Treasure Valley CC	✓	✓	✓			✓		
Umpqua	✓	✓	✓	✓		✓	✓	
Univ. of Portland	✓	✓	✓			✓	✓	
Walla Walla - Ptld	✓	✓	✓			✓	✓	
WSU Vancouver	✓	✓	✓			✓	✓	

✓ (yellow)	Utilized in nursing education at this campus

L. Krautscheid, RN, MS. Oregon Center for Nursing. December 2003.

Table 3.
Reported Nursing Program Needs for Expanding Nursing Education Capacity: Oct/Nov 2003

Campus ✓ = reported need	Needs for Expanding Nursing Education Capacity							
	Faculty Development	Faculty release time	Instructional Designer	Updated hardware/software	On-site Tech support: faculty/students	Figure out content 1st then fit tech. to content	Comprehensive scenarios for clinical eval.	High fidelity simulation.
Blue Mountain CC	✓			✓	✓	✓	✓	✓
Central Oregon CC	✓	✓				✓	✓	✓
Chemeketa CC	✓	✓				✓		✓
Clackamas CC	✓		✓			✓		✓
Clark CC		✓	✓		✓			✓
Clatsop CC	✓			✓	✓			
Columbia Gorge CC	✓		✓	✓		✓		
Concordia						(✓)		(✓)
Lane CC	✓	✓			✓	✓		✓
Linfield	✓	✓	✓	✓	✓	✓	✓	✓
Linn-Benton CC	✓			✓		✓		
Mt. Hood CC	✓	✓				✓	✓	✓
OHSU – Ashland	✓	✓					✓	✓
OHSU – K Falls	✓	✓					✓	✓
OHSU – LaGrande	✓	✓				✓		✓
OHSU - Portland	✓		✓			✓	✓	
Portland CC						✓		✓
Rogue CC						✓		✓
SW Oregon CC	✓	✓			✓		✓	
Treasure Valley CC	✓	✓	✓			✓		✓
Umpqua	✓	✓				✓	✓	
Univ. of Portland						✓		
Walla Walla - Ptld	✓			✓				✓
WSU - Vancouver		✓	✓		✓	✓		
Total # (%)	18/23 (78%)	13/23 (56%)	7/23 (30%)	6/23 (26%)	7/23 (30%)	18/23 (78%)	9/23 (39%)	15/23 (65%)

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Table 4.
Estimation of Faculty and Student Technology Readiness by Program: Oct/Nov 2003

Campus	**Faculty:** Proportion/number of faculty reported as competent using Videoconferencing (VC)	**Faculty:** Proportion/number of faculty reported as competent developing and delivering Web-enhanced or Web Courses (WC)	**Students:** E=Email PP= Powerpoint CAT = Computer Adaptive Testing WC = Web Course VC = Video Conferencing S = Mod or High Fidelity Simulation	**Faculty** Relative Readiness to utilize Technology in Nursing Education	**Student** Relative Readiness to utilize Technology in Nursing Education
Blue Mountain CC	0/6	6/6	E, PP, CAT, WC	HIGH	MODERATE
Central Oregon CC	0/6	1/6	E, PP	LOW	LOW
Chemeketa CC	4/16	1/16	E, CAT, PP, WC	LOW	MODERATE
Clackamas CC	0/8 (VC not avail)	8/8	E, CAT, WC	HIGH	MODERATE
Clark CC	0/9	3/9	E,PP,CAT,WC,	MODERATE	MODERATE
Clatsop CC	0/4 (VC not avail)	4/4	E, PP, CAT, WC	HIGH	MODERATE
Columbia Gorge CC	0/11	11/11 HYBRID	E,PP,CAT,WC	HIGH	MODERATE
Concordia					
Lane CC	0/18	3/18	E,PP,CAT,WC	LOW	MODERATE
Linfield	0/19	3/19	E,PP,WC, S (MOD FIDELITY)	LOW	MODERATE
Linn-Benton CC	0/10	8/10	E,PP,CAT,WC	HIGH	MODERATE
Mt. Hood CC	0/7	7/7	E,PP,CAT,WC	HIGH	MODERATE
OHSU – Ashland	8/10	8/10	E,PP,CAT,WC,VC	HIGH	HIGH
OHSU – K Falls	3/5	3/5	E,PP,CAT,WC,VC	HIGH	HIGH
OHSU – LaGrande	12/12	2/12	E,PP,CAT,WC,VC	HIGH	HIGH
OHSU - Portland	50 %	50 %	E,PP,CAT,WC,VC,S (HIGH FIDEL)	MODERATE	HIGH
Portland CC	0/16	16/16	E,PP,CAT,WC	MODERATE	MODERATE
Rogue CC	0/7	2/7	E,PP,WC	LOW	MODERATE
SW Oregon CC	0/6	3/6	E,PP,WC, S (HIGH FIDEL)	MODERATE	MODERATE
Treasure Valley CC	0/6	3/6	E,PP,CAT,WC	MODERATE	MODERATE
Umpqua	0/13	7/13	E,PP,CAT,WC,S (HIGH FIDEL)	MODERATE	MODERATE
Univ. of Portland	0/14	3-4/14	E,PP,CAT,WC, S (MOD FIDEL)	LOW	MODERATE
Walla Walla - Ptld	2/9	1/9	E,PP,CAT,WC	LOW	MODERATE
WSU – VANCOUVER	9/9	2/9	E,PP,WC,VC	HIGH	MODERATE

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Ms. Krautscheid earned her Bachelor's of Science at Montana State University in Bozeman, Montana and her Master's of Science at Oregon Health & Science University, in Portland, Oregon. While working for the Oregon Center for Nursing, Ms. Krautscheid continued to provide patient care as a Maternal-Newborn nurse at Tuality Healthcare in Hillsboro, Oregon, and also served as clinical faculty at the University of Portland in Maternal-Newborn Nursing. Prior to the OCN, Ms. Krautscheid held positions as Clinical Education Specialist at Tuality Healthcare, and was the Registered Nurse (RN) for the *Health Network for Rural Schools*, where she assessed, coordinated, and provided health care services for five rural school districts and their communities in Eastern Oregon.

In each of her positions, Ms. Krautscheid has directed various quality improvement projects, including a statewide initiative, called "Simple Answer – Vaccinate Early," to improve immunization rates among children in Montana, for which she received national recognition as a member of the 1995 *USA Today* All American Academic Scholar Team.   In Oregon, Ms. Krautscheid has presented at both local and statewide conferences on maternal-newborn health issues, improving health care access for rural Oregonians, change management, and career health decision making to prevent burnout and promote retention in health care professions.

Deborah Burton, PhD, RN
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Deborah Burton is Executive Director of the Oregon Center for Nursing. The Center was created in January of 2002; its primary mission is to solve the acute shortage of nurses in Oregon. Dr. Burton is also Associate Professor of Nursing at University of Portland where she teaches graduate nursing administration, community health, and most recently, *Nursing 101*.

Prior to the OCN, Dr. Burton was Director of Education at the Portland VA Medical Center. She has held a wide range of clinical, administrative, research and teaching positions in acute care, public health and long term care.   An international consultant on matters of nursing workforce and regulation, she is currently working with the countries of Oman and Ethiopia.

She is presently serving her sixth year on the Oregon State Board of Nursing and served as its president for two years. She has just completed two terms on the Board of Directors of the National Council of State Boards of Nursing.

Dr. Burton holds a BSN from University of Portland and received both her master's and doctoral degree in nursing from the Oregon Health and Sciences University.

She is the recipient of multiple awards, grants and publications to her credit and is widely recognized for her expertise in nursing workforce, standards-related issues.

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∗ Forty-one percent of faculty in baccalaureate and higher degree programs, and 24 percent of associate degree faculty are expected to retire by 2005. NWHF, 2001.

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