Oregon Institute of Technology
Medical Imaging Technology Department
Echocardiography Program Assessment
2010-2011

I. Introduction

At this time, OIT's Bachelor of Science in Echocardiography degree is one of only nine in the United States. OIT will provide didactic instruction, clinical observations, leadership and personal training, including advanced skills training. Students are required to complete an 11-month externship at specifically chosen echocardiography laboratories. This externship will provide the hands-on training and patient load requirements necessary to meet the prerequisite requirements for the certifying board agency, the American Registry of Diagnostic Medical Sonographers (ARDMS).

The first OIT cohort for Echocardiography began fall 2008, with 14 students and an additional 17 cohort of students in the Fall of 2009. From the beginning of the program in Fall 2008 to Spring term 2010, retention rate in the Echocardiography program was 93%. At the beginning of Fall term 2009, there were 30 students in the Echocardiography program, 28 of these continued and 20 new students were admitted to the program Fall of 2010, for a total of 48 students in the current Echo program. Of these students, 13 began their off campus externships in June 2010. They will be the first cohort to graduate from the Echocardiography program in June, 2011.

II. Program Purpose, Educational Objectives, and Student Learning Outcomes

The Echocardiography faculty agreed to adopt the student learning outcomes as suggested by a programmatic accrediting body, the Joint Review Committee on Education in Diagnostic Medical Sonography (JRCDMS).

Echocardiography Program Purpose

The OIT Bachelor of Science program in Echocardiography provides students with the knowledge, clinical skills, values and behaviors to become competent echocardiographers.

Echocardiography Program Educational Objectives

1. The program prepares students to utilize diagnostic techniques, sound judgment and good decision making to provide patient services.
2. The program communicates the importance of becoming credentialed in the profession of echocardiography.
3. The program prepares students who think critically, communicate effectively and exemplify professional ethics.
4. The program conveys the importance of becoming life-long learners and responsible citizens.

Expected Program Student Learning Outcomes
Graduates from this program will be able to:

1. The student will demonstrate the ability to communicate effectively in oral, written and visual forms.
2. The student will demonstrate the ability to work effectively in teams.
3. The student will demonstrate an ability to provide basic patient care and comfort.
4. The student will employ professional judgment, discretion, and ethics.
5. The student will demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.
6. The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.
7. The student will demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.
8. The student will demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.
9. The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.

Additional Student Learning Opportunities
Students will be encouraged to attend American Society of Echocardiography (ASE) conferences when held on the west coast or near their externship sites during the student's senior year.

III. Three-Year Cycle for Assessment of Student Learning Outcomes

The faculty also confirmed the assessment cycle planned, as listed in Table 1 below.

Echocardiography Degree Student Learning Outcomes Assessment Schedule	2010-2011	2011-2012	2012-2013
1. The student will demonstrate the ability to communicate effectively in oral, written and visual forms.	X		
2. The student will demonstrate the ability to work effectively in teams.			X
3. The student will demonstrate an ability to provide basic patient care and comfort.		X	
4. The student will employ professional judgment, and discretion including ethics.			X
5. The student will demonstrate knowledge and understanding of human gross anatomy sectional anatomy and normal and abnormal cardiovascular anatomy.	X		
6. The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.		X	
7. The student will demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.		X	
8. The student will demonstrate knowledge and understanding of clinical echocardiography diagnostic procedures and testing	X		
9. The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			X

Table #1 Echocardiography Degree Assessment Cycle

IV. Summary of 2010-11 Assessment Activities

The faculty conducted formal assessment of three student learning outcomes during Fall 2010 to Spring 2011 terms. The Echocardiography program accepted its first cohort of students in Fall 2008, second cohort in Fall 2009 and the third in Fall 2010. Senior level students are completing their externships at this point in time and will provide the first industry based assessments.

Student Learning Outcome #1: The student will demonstrate the ability to communicate effectively in oral, written and visual forms.

Written Communication

The performance criteria for written communicate are:

1. Writing is clear, focused and understandable.
2. Order & structure are clear with satisfying introduction and conclusion.
3. Document is well supported.
4. Voice and wording are appropriate and compelling.
5. Standard writing conventions are used effectively.

Direct Assessment #1

The faculty assessed this outcome in ECHO 321 in fall term using an Institutional Student Learning Outcome writing assignment and grading rubric. The minimum acceptable performance was set by faculty based on the importance of the performance criteria in the profession. The faculty rated the proficiency of students using the performance criteria described in Table 2 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Purpose & Ideas	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	100%
Organization	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	100%
Support	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	80%
Style	Grading Rubric	1-4 scale per rubric proficiency criteria	70% with 3.0 or higher	87%
Conventions	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	60%

Table #2 Assessment Results for SLO #1 written communication in ECHO 321, fall 2010

Strengths: Students performed at minimum acceptable levels for the following performance criteria:

- Writing is clear, focused and understandable.
- Order and structure are clear with satisfying introduction and conclusion.
- Document is well supported.
- Voice and wording are appropriate and compelling.

Weaknesses: Minimum acceptable performance was not obtained for the following performance criteria (with percentages achieved in parentheses):

- Standard writing conventions are used effectively. (60%)

Action: Based on the data, improvement is needed in appropriate conventions in written communication. Actions will be discussed during fall convocation (2011) when the program is fully staffed.

Oral Communication

The performance criteria for oral communicate are:

1. Content is supported, informative and persuasive.
2. Presentation is well organized with smooth transitions.
3. Topic is well understood and conveyed with enthusiasm.
4. Delivery is effective and poised.
5. Well-designed visuals are utilized and integrated in to speech.

Direct Assessment #2

The faculty assessed this outcome in ECHO 321 in fall term using an Institutional Student Learning Outcome oral assignment and grading rubric. The minimum acceptable performance was set by faculty based on the importance of the performance criteria in the profession. The faculty rated the proficiency of students using the performance criteria described in Table 3 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Content	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	100%
Organization	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	87%
Style	Grading Rubric	1-4 scale per rubric proficiency criteria	70% with 3.0 or higher	87%
Delivery	Grading Rubric	1-4 scale per rubric proficiency criteria	70% with 3.0 or higher	67%
Visuals	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	93%

Table #3 Assessment Results for SLO #1 oral communication in ECHO 321, fall 2010

Strengths: Minimum acceptable performance was achieved for the following performance criteria:

- Content is supported, informative & persuasive
- Well-designed visuals are utilized & integrated in to speech.
- Presentation is well organized with smooth transitions.
- Topic is well understood & conveyed with enthusiasm.

Weaknesses: Minimum levels were not reached for the following:

- Delivery is effective & poised.

Action: Actions will be discussed during fall convocation (2011) when the program is fully staffed.

Direct Assessment #3

The faculty also assessed this outcome at Externship sites fall term 2010 using the Student Competency Evaluation provided to those sites. The clinical instructors rated the proficiency of students using the performance criteria described in Table 4 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Maintains clinical records	Student Competency Evaluation #1a	0-100%	90% with a score of 90 or better	97%
Appropriate oral & written summaries to interpreting physician	Student Competency Evaluation #1b	0-100%	90% with a score of 90 or better	98%
Employs medical terminology, abbreviations, symbols & terms appropriately	Student Competency Evaluation #1c	0-100%	90% with a score of 90 or better	98%
Educates patients regarding echo procedure	Student Competency Evaluation #1d	0-100%	90% with a score of 90 or better	96%

Table #4 Student Competency Evaluation Results for SLO #1, fall 2010

Minimum acceptable performance was achieved for all the performance criteria specified.

Indirect Assessment #1

The students self-assessed this outcome in ECHO 321 in fall term using a written survey of the following written and oral performance criteria. The minimum acceptable performance was set by faculty based on the importance of the performance criteria in the profession. They were instructed to assess whether or not they've gained this skill in general, not their actual performance on a specific assignment. The students rated their proficiency using the performance criteria described in Table 5 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Standard writing conventions are used effectively.	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	64%
Presentation is clear, focused & understandable.	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	86%
Topic is well understood & conveyed with enthusiasm.	Grading Rubric	1-4 scale per rubric proficiency criteria	70% with 3.0 or higher	79%
Voice & wording are appropriate & compelling.	Grading Rubric	1-4 scale per rubric proficiency criteria	70% with 3.0 or higher	71%
Document is well supported.	Grading Rubric	1-4 scale per rubric proficiency criteria	80% with 3.0 or higher	64%

Table #5 Student Self-assessment for SLO #1, fall 2010

The minimum acceptable performance was achieved for three of the five criteria. Students rated themselves low in two written criteria, conventions and support. All student self-ratings are lower than the faculty direct assessment of student work. The faculty believes the students demonstrated significant self-criticism in their rankings, not so much based on actual ability as not wanting to appear arrogant by rating themselves too highly. Instruction was given that the ratings were to be for their overall ability, not for a single assignment.

In future assessments, the faculty would like to administer this survey at the extern level and modify questions to parallel those asked of the clinical instructor, to better match communication expectations of the profession.

Student Learning Outcome #5: The student will demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.

The performance criteria for this outcome are:

1. Student is able to associate anatomical landmarks in the region of interest with cardiac anatomy.
2. Student is able to accurately identify cross sectional cardiac anatomy in ultrasound images as well as in radiologic, CT and MRI images for quality assurance.
3. Student recognizes the sonographic appearance of normal and abnormal cardiac anatomy.

Direct Assessment #1

The faculty planned to assess this outcome in ECHO 376 during winter term using exam materials utilized in class. Due to an unforeseen staffing shortage, this assessment was not administered. However, the industry feedback from clinical instructors was collected (direct assessment #2 below). Faculty feel that this data is a valuable assessment of student learning and provides sufficient evidence at this time. An additional faculty member has been hired for the Echo program and full assessment activities will resume in the fall.

Direct Assessment #2

The faculty also assessed this outcome at externship sites winter term 2011 using the Student Competency Evaluation where students are rated on the performance criteria by clinical instructors at their sites. The clinical instructors rated the proficiency of students using the performance criteria described in Table 6 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results -% with Target or higher
Associates anatomical landmarks with cardiac anatomy	Student Competency Evaluation #5a	0 – 100%	90% with a score of 90 or better	100%
Identifies cross sectional anatomy for QA	Student Competency Evaluation #5b	0 – 100%	90% with a score of 90 or better	100%
Recognizes normal and abnormal cardiac anatomy	Student Competency Evaluation #5c	0 – 100%	90% with a score of 90 or better	100%

Table #6 Student Competency Evaluation Results for SLO #5, winter 2011

Students performed extremely well with 100% getting a score of 90% or better. The majority of students received a score of 95% or better.

As a result of the data, the faculty in the Echo Program decided to raise the bar to 90% with 95% or better. It was also suggested that the second performance criteria (Identifies cross sectional anatomy for QA) be modified to something more appropriate for Echocardiography.

Indirect Assessment #1
The faculty assessed this outcome in ECHO 420, from the student 2010-11 exit surveys of 11 students, asking them to rate how well the OIT Echocardiography program and their extern site prepared them for this learning outcome #5. Student rating is described in Table #7 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results -% with Target Av. or higher
Student rating of how OIT prepared them for outcome #5.	Exit Survey	% scale per category used	90% with a score of 3.0 or better	100%
Student rating of how their extern site prepared them for outcome #5.	Exit survey	% scale per category used	90% with a score of 3.0 or better	100%

Table #7 Student Self-assessment for SLO #5, spring 2011

Student Learning Outcome #8: The student will demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.

The performance criteria for this outcome are:

1. Correlates abnormal test results to the patient history, including demographics and physical data to answer the clinical question.
2. Not only considers general pathological assumptions as being the cause of abnormal test results, but also considers other possibilities or differential diagnosis.
3. Is able to evaluate diagnostic implications regarding what abnormal Doppler findings mean and/or could mean.
4. Is able to answer the clinical question.
5. Student ability to write the actual preliminary report accurately or write an accurate mock preliminary report.

Direct Assessment #1
The faculty planned to this outcome in ECHO 334 in Spring Term 2011. Due to an unforeseen staffing shortage, this assessment was not administered. However, the industry feedback from clinical instructors was collected (direct assessment #2 below). Faculty feel that this data is a valuable assessment of student learning and provides sufficient evidence at this time. An additional faculty member has been hired for the Echo program and full assessment activities will resume in the fall.

Direct Assessment #2
The faculty also assessed this outcome at externship sites winter term 2011 using the Student Competency Evaluation where students are rated on the performance criteria by clinical instructors at their sites. The clinical instructors rated the proficiency of students using the performance criteria described in Table 8 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results -% with Target or higher
Correlates test results with clinical information & question	Student Competency Evaluation #8	0 – 100%	90% with a score of 90 or better	100%
Identifies alternate causes of pathology	Student Competency Evaluation #8	0 – 100%	90% with a score of 90 or better	100%
Recognizes abnormal Doppler findings & implications	Student Competency Evaluation #8	0 – 100%	90% with a score of 90 or better	91%
Writes accurate preliminary report	Student Competency Evaluation #8	0 – 100%	90% with a score of 90 or better	92%

Table #8 Student Competency Evaluation Results for SLO #8, spring 2011

Indirect Assessment #1

The faculty assessed this outcome in ECHO 420, from the student 20010-11 exit surveys of 11 students, asking them to rate how well the OIT Echocardiography program and their extern site prepared them for this learning outcome #8. Student rating is described in Table #9 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results -% with Target Av. or higher
Student rating of how OIT prepared them for outcome #8.	Exit Survey	% scale per category used	90% with a score of 3.0 or better	100%
Student rating of how their extern site prepared them for outcome #8.	Exit survey	% scale per category used	90% with a score of 3.0 or better	100%

Table #9 Student Self-assessment for SLO #8, spring 2011

V. Summary of Student Learning

Assessment results will be discussed further during fall convocation (2011) when the program is fully staffed. The following strengths, weaknesses and areas needing improvement require further dialogue to determine if changes need to be made at the programmatic level.

Student Learning Outcome #1: The student will demonstrate the ability to communicate effectively in oral, written and visual forms.

Strengths: Clinical instructors report that students have met their expectations for written and oral communication in the externship setting.

Weaknesses: Student work fell below faculty expectations on usage of standard writing conventions and in their oral delivery skills.

Areas needing improvement: Standard writing conventions and oral delivery skills.

Student Learning Outcome #5: The student will demonstrate knowledge and understanding of human gross anatomy, sectional anatomy and normal, and abnormal, cardiovascular anatomy.

Strengths: Clinical instructors report that students have met their expectations on this outcome. Students also feel competent in this outcome.

Weaknesses: This outcome was not assessed in the classroom setting.

Areas needing improvement: This outcome should be assessed in the classroom prior to the extern experience.

Student Learning Outcome #8: The student will demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.

Strengths: Clinical instructors report that students have met their expectations on this outcome. Students also feel competent in this outcome.

Weaknesses: This outcome was not assessed in the classroom setting.

Areas needing improvement: This outcome should be assessed in the classroom prior to the extern experience.

VI. Changes Resulting from Assessment

Student Learning Outcome #8: The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.

Faculty planned to investigate how to better educate students in cultural diversity awareness. Due to the shortage of program faculty this year, this action item has been postponed until fall 2011.

Appendix A
Student Learning Outcome-Course Matrices

Student Learning Outcome #1: The student will demonstrate the ability to communicate effectively in oral, written and visual forms.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on the performance on the SLO.

I = Introduced; R = Reinforced; E = Emphasized

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Phys		BUS 317	HlthCare Mgmt	R	ECHO 420	Extern	R E
	ECHO 320	Cardio Methods		ECHO 333	Echo III	R			
	PHY 217	Physics of MI		ECHO 321	TEE & Stress	R			
	WRI 227	Tech Writing	I E	SPE 321	Small Group Comm	I E			
Win	ECHO 231	Echo I	R	BUS 316	TQM	R	ECHO 420	Extern	R E
	BIO 346	Patho I		CHE 210	Clinical Pharm				
	VAS 210	VAS Physics I		ECHO 376	Survey of Vas Tech	R			
	Soc Sci	Elective		ECHO 325	Pediatric Echo	R			
				Hum	Elective				
Spr	ECHO 225	Pt Mgmt	I E	ECHO 385	Lab Mgmt	R E	ECHO 420	Extern	R E
	ECHO 232	Echo II	R	ECHO 365	Abd/Renal				
	ECHO 332	Invasive Cardio		ECHO 388	Extern Orient	R			
	BIO 347	Patho II		Comm	Elective	E			
	VAS 211	VAS Physics II		Hum	Elective				

Table A1. Student Learning Outcome #3-Course Matrix
**Subject to change as courses are designed and developed.

Appendix B
Student Learning Outcome-Course Matrices

Student Learning Outcome #5: The student will demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on the performance on the SLO.

I = Introduced; R = Reinforced; E = Emphasized

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Phys	I E	BUS 317	HlthCare Mgmt		ECHO 420	Extern	E R
	ECHO 320	Cardio Methods	R	ECHO 333	Echo III	E			
	PHY 217	Physics of MI		ECHO 321	TEE & Stress	E			
	WRI 227	Tech Writing		SPE 321	Small Group Comm				
Win	ECHO 231	Echo I	I E	BUS 316	TQM		ECHO 420	Extern	E R
	BIO 346	Patho I	R	CHE 210	Clinical Pharm				
	VAS 210	VAS Physics I		ECHO 376	Survey of Vas Tech	I E			
	Soc Sci	Elective		ECHO 325	Pediatric Echo	I E			
				Hum	Elective				
Spr	ECHO 225	Pt Mgmt		ECHO 385	Lab Mgmt		ECHO 420	Extern	E R
	ECHO 232	Echo II	E R	ECHO 365	Abd/Renal	I E			
	ECHO 332	Invasive Cardio	E R	ECHO 388	Extern Orient				
	BIO 347	Patho II	R	Comm	Elective				
	VAS 211	VAS Physics II		Hum	Elective				

Table A2. Student Learning Outcome #5-Course Matrix
**Subject to change as courses are designed and developed.

Appendix C
Student Learning Outcome-Course Matrices

Student Learning Outcome #8: The student will demonstrate knowledge and understanding of clinical echocardiography diagnostic procedures and testing.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on the performance on the SLO.

I = Introduced; R = Reinforced; E = Emphasized

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Phys		BUS 317	HlthCare Mgmt		ECHO 420	Extern	E
	ECHO 320	Cardio Methods	I E	ECHO 333	Echo III	I E			
	PHY 217	Physics of MI		ECHO 321	TEE & Stress	I E			
	WRI 227	Tech Writing		SPE 321	Small Group Comm				
Win	ECHO 231	Echo I	I E	BUS 316	TQM		ECHO 420	Extern	E
	BIO 346	Patho I		CHE 210	Clinical Pharm				
	VAS 210	VAS Physics I	I E	ECHO 376	Survey of Vas Tech				
	Soc Sci	Elective		ECHO 325	Pediatric Echo	I E			
				Hum	Elective				
Spr	ECHO 225	Pt Mgmt		ECHO 385	Lab Mgmt		ECHO 420	Extern	E
	ECHO 232	Echo II	I E	ECHO 365	Abd/Renal				
	ECHO 332	Invasive Cardio	R	ECHO 388	Extern Orient				
	BIO 347	Patho II		Comm	Elective				
	VAS 211	VAS Physics II	I E	Hum	Elective				

Table A3. Student Learning Outcome #8-Course Matrix
**Subject to change as courses are designed and developed.