



Program Review Self-Study Template

Academic unit: Communication Sciences and Disorders (CSD)

College: College of Health Professions

Date of last review 10/28-2010 to KBOR

Date of last accreditation report (if relevant) Annual report: August 1, 2013

List all degrees described in this report (add lines as necessary)

Degree: BA-CSD _____ CIP* code: 51.0201

Degree: MA-Speech-language pathology (SLP) _____ CIP code:

Degree: Doctor of Audiology (AuD) _____ CIP code: _____

Degree: PhD _____ CIP code: _____

*To look up, go to: Classification of Instructional Programs Website, <http://nces.ed.gov/ipeds/cipcode/Default.aspx?v=55>

Faculty of the academic unit (add lines as necessary)

Name	Signature
Kathy L Coufal _____	_____
Anthony DiLollo _____	_____
Barbara Hodson _____	_____
Raymond Hull _____	_____
Antje Mefferd _____	_____
Douglas Parham _____	_____
Julie Scherz _____	_____
Patricia Self _____	_____
Kathy Strattman _____	_____
Xiao-Ming Sun _____	_____
Lynette Goldberg (through 12-2013) _____	_____

Submitted by: Kathy L Coufal, PhD, Professor and Dept Chair _____
(name and title)

Date 4-2014 _____

<p>In yellow highlighted areas, data will be provided</p>

1. Departmental purpose and relationship to the University mission (refer to instructions in the WSU Program Review document for more information on completing this section).

a. University Mission:

The mission of Wichita State University is to be an essential educational, cultural, and economic driver for Kansas and the greater public good.

b. Program Mission (if more than one program, list each mission):

Mission of CSD: To prepare qualified speech-language pathologists and audiologists as scholars/practitioners who are professionally competent to practice in educational and medical settings on behalf of children and adults who have disorders of communication.

The baccalaureate program is a pre-professional program. The entry-level professional degree is the Master's (MA) in Speech-language pathology or the Clinical Doctorate in Audiology (AuD). There is one mission statement that encompasses all programs in CSD.

c. The role of the program (s) and relationship to the University mission: Explain in 1-2 concise paragraphs.

A degree in CSD supports the College and University missions by:

- Providing students the opportunity to engage in a high quality program of study, designed to prepare them for life-long learning while developing their critical thinking skills, interpersonal communications, and overall abilities to be successful professionals.
- Preparing students for professional practice in educational and medical settings which serve individuals with communication impairments, regardless of age, gender, linguistic, and cultural backgrounds.
- Prepare scholar-practitioners who pursue knowledge and skills through their program of study, undergraduate through graduate, leading toward a degree that prepares them for their future goals.
- Provide students with opportunities to develop their research skills for both applied and basic research, which includes evidence-based practice as central to good clinical practice.

d. Has the mission of the Program (s) changed since last review? Yes No

i. If yes, describe in 1-2 concise paragraphs. If no, is there a need to change?

e. Provide an overall description of your program (s) including a list of the measurable goals and objectives of the program (s) (programmatic). Have they changed since the last review?

Yes No

If yes, describe the changes in a concise manner.

Bachelor's of Arts in Communication Sciences and Disorders

The undergraduate program provides an essential conduit for students seeking to enter graduate school in pursuit of either a Master's degree in SLP or the Clinical doctorate in Audiology (AuD). The baccalaureate degree has had minor changes, consistent with national accreditation expectations for entry into graduate programs. This includes moving the Physics of Sound course, previously taught in CSD, to the Physics department. Further, students now have the opportunity to have observation experiences in the CSD Speech, Language, Hearing Clinic during their senior year. Students now enroll in an

online course that is interdisciplinary, which changed CSD 605: Neuroscience of Speech and Language-Basic Processes, to a co-listed course with Physical Therapy and Physician Assistant students, with the primary instructor a member of the Physical Therapy department. Further, the Honor's track has been substantially expanded and a more systematic process of meeting with students in the Honor's program established and implemented.

The BA in CSD provides the basic foundations for advancement to the graduate level. This includes insuring students fulfill requirements in the following areas: basic sciences (biological and physical science); math; statistics; English; human communication development and swallowing; neurological, psychological, and cognitive foundations in human development; acoustical, linguistic, and cultural bases of human communication. The **goal** of the program is to prepare students with all the necessary foundations for entry into a graduate program in CSD. Therefore, the program is designed to offer a broad, comprehensive, pre-professional preparation for specialized training at the graduate level.

The number of students enrolling in CSD courses as pre-majors and majors has increased each year.

Academic year	Number admitted to the major	Number of Pre-majors	Total number of UG students in CSD
2012	44	58	102
2013	36	70	106
2014	49	66	115

The number of students in the CSD honors track has grown and the WSU honors program has declined over the past three years. This presents an area for departmental focus to work closely with the newly created Honor's College, to promote student engagement in honors programs.

Academic year	Number in CSD honors track	Number in WSU honors program	Total number of UG students in honors
2012	3	32	35
2013	1	24	25
2014	6	20	26

The number of students graduating with a BA in CSD has remained stable, however the average cumulative GPA of the graduating classes has declined slightly.

Academic year	Number of graduates	Average cumulative GPA of graduates
2012	35	3.68
2013	25	3.41
2014	35	3.50

Totals/Averages	95	3.52
-----------------	----	------

The number of students graduating with a BA in CSD who were in the WSU honors programs and therefore graduating with University honors (cum laude, etc.) and the students' cumulative GPA are depicted in the table below. There is a clear pattern that suggests further emphasis and support is warranted to promote students' participation in honors programs.

Academic year	Number of graduates	Number of graduates receiving honors (cum laude, etc)	Average cumulative GPA of graduates
2012	35	32	3.68
2013	25	24	3.41
2014	35	20	3.50

The number of students graduating with a BA in CSD who applied for admission to graduate study at WSU and the number admitted to CSD graduate programs are depicted in the table below. Of those applying for graduate admission, from those graduating from the WSU/CSD undergraduate program, ranges from 43% to 81%.

Academic year	Number of graduates	Number of graduates applying for admission to WSU-CSD graduate programs	Number of WSU graduates admitted to WSU-CSD graduate programs
2012	35	30	13
2013	25	21	17
2014	35	28	15 (4 on wait list)

In addition to the BA in CSD, the department offers a concentration in Deafness and Hard of Hearing (DHH), sign language courses in both American Sign Language (ASL) and Signed Exact English (SEE), and multiple sections of co-op education.

Introduction to MA and AuD

Master of Arts in Communication Sciences and Disorders (Speech-Language Pathology) and

Clinical Doctorate in Audiology (AuD)

The Wichita State University (WSU) Department of Communication Sciences and Disorders (herein referred to as the department or CSD) is one of four programs of this type in Kansas. The programs at Kansas State University and Fort Hays State University prepare undergraduates and Master's degree level students but do not include the Doctor of Audiology or the PhD programs. Like the University of Kansas, WSU graduates students with the Bachelor of Arts, Master's, Doctor of Audiology (AuD), and PhD degrees with a major in CSD.

The Master's and AuD programs are accredited by the Council on Academic Accreditation (CAA) of the American Speech-Language-Hearing Association (ASHA). Because the profession requires a graduate degree as the entry level to clinical practice, certification and licensure are granted only to those holding the MA or AuD in CSD. Consistent with this professional standard, the accreditation of academic programs is based on standards established for graduate education, in

accordance with the CAA and consistent with the Council for Clinical Certification (CFCC) of the ASHA. As the certifying body, the CFCC awards individuals the national Certificate of Clinical Competence, which is the standard for licensure in most states, including Kansas. As such, the CFCC and the CAA establish academic standards that are in concert with the professional competencies expected of licensed clinicians.

This report is supplemented by data from the department self study and accreditation report submitted to the CAA as part of the reaccreditation process. Undergraduate education is essential to the program as it provides the foundation for the graduate program and is therefore central to the department. Accreditation by the CAA, however, does not include substantive evaluative information regarding the undergraduate program. Further, the PhD is not part of the ASHA-CAA accreditation process.

Master of Arts in Communication Sciences and Disorders (Speech-Language Pathology)

Communication sciences and disorders includes two professions - speech-language pathology and audiology - which have developed out of a concern for people with communication disorders. Speech-language pathologists provide services to evaluate, diagnose, and treat communication disorders in individuals of all ages, from infants to the elderly. A variety of professional work settings include schools, hospitals, rehabilitation centers, and private practice. At WSU, the CSD Department provides an academic and clinical education for students who wish to become professionally qualified to work with children and adults who have impairments of communication. As clinical scientists, students are expected to integrate their classroom knowledge into their clinical work when assessing and/or treating clients and to use clinical strategies that support current theories/beliefs and research findings.

The **goal** of Wichita State's master's program in speech-language pathology is to prepare graduates for high-demand careers improving the lives of patients with communication and swallowing disorders. The program requires a minimum of 68 credit hours and continuous enrollment in clinical practicum. Students have hands-on experience with clients at the WSU Evelyn Hendren Cassat Speech-Language-Hearing Clinic before completing two off-campus practicum experiences in medical and educational settings.

To successfully complete the program, students must fulfill the following minima **objectives**:

- Maintain a minimum 3.0 GPA
- Complete a mentored research project and oral presentation during their second year
- Achieve a passing score on the Praxis exam as determined by the State of Kansas
- Have sufficient clinical clock hours to satisfy American Speech-Language-Hearing Association (ASHA) requirements for the Certificate of Clinical Competence (CCC-SLP)
- Demonstrate competence in clinical knowledge and skills

Outcome measures of student learning: Students must meet the minimum objectives stated and the program successfully maintains accreditation standards, which examine student outcomes as central to the CAA requirements. As reflected in the tables below, the retention and completion rates (99% over 3 years) for the MA are exceptional; the pass rate (99% over 3 years) for the national exam (PRAXIS) is substantially above the national average (80% rolling average over 3 years); and the employment rate is 100%. Each of these are indicators of the excellent student outcomes for the MA program.

Student Outcome Data

Master of Arts (MA) Program Completion Rates: 3 year average = 99%

Period	# Completed Within Expected Time Frame	# Completed Later than Expected Time Frame	# Not Completing	Completion (%)
2012/2013	24	0	0	100
2011/2012	24	1	1	96
2010/2011	27	0	0	100

Master of Arts (MA) ETS Data (Praxis): 3 year average = 99%

Period	Number of Students Taking Exam	Number of Students Passed	Pass Rate (%)
--------	--------------------------------	---------------------------	---------------

2012/2013	29	28	96
2011/2012	22	22	100
2010/2011	27	27	100

Master of Arts (MA) Employment Rates: 3 year average = 100%

Period	Number of Graduates	Employment Rate in Profession (%)
2012/2013	24	100
2011/2012	25	100
2010/2011	27	100

All students seeking admittance to the MA program are required to have completed foundational coursework in this field, or its equivalent, prior to starting the graduate program. Coursework in biological sciences, physical sciences, social/behavioral sciences, and mathematics is also required to meet ASHA certification and Kansas licensure requirements.

Prerequisites (38 credit hours)

CSD 210 or PHYS 210 Physics of Sound
 CSD 251 Audiology Development & Disorders
 CSD 301 Basic Anatomy & Physiology of Speech Mechanisms
 CSD 302 Basic Anatomy & Physiology of Hearing Mechanisms
 CSD 304+304L Early Language Development & Lab
 CSD 306+306L Applied Phonetics & Lab
 CSD 416+417 Intro to Language Disorders & Lab
 CSD 425 Introduction to Clinical Processes
 CSD 504 Aural Rehabilitation
 CSD 506 Acoustic and Perceptual Phonetics
 CSD 514+515 Speech-Sound Disorders & Lab
 CSD 519+521 Genetics and Organic Syndromes & Lab
 CSD 605 Neuroscience of Speech and Language: Basic Processes

Curriculum

Core Courses (37 credit hours)

CSD 705 Counseling in Communication Disorders
 CSD 710 Autism Spectrum Disorders
 CSD 800 Research Methods
 CSD 809 Language/Literacy for Young Children: Assessment & Intervention
 CSD 810 Motor Speech Disorders
 CSD 811 Dysphagia
 CSD 812 Aphasia, Right Hemisphere Disorders and Dementia
 CSD 814 Applied Phonology
 CSD 815 Augmentative and Alternative Communication
 CSD 816 Language and Literacy for School-Age and Adolescents
 CSD 817 Voice Disorders
 CSD 818 Fluency Disorders
 CSD 819 Traumatic Brain Injury

Practica (28 credit hours)

CSD 655 Graduate Methods and Practicum in Auditory Assessment-SLP
 CSD 821 Educational Settings Practicum
 CSD 822 General Clinic Practicum
 CSD 823 Medical Settings Practicum

CSD 824 External Placement Practicum (*optional*)
 CSD 830 Kaleidoscope Preschool Practicum (*optional*)

Research Project (3-4 credit hours)

CSD 891 Non-Thesis Research
 CSD 892 Presentation of Research
 CSD 895 Thesis Research
 CSD 899 Thesis

Tool Subjects (3-6 credit hours)

CSD 800 Research Methods
 CESP 704 Introduction to Educational Statistics

A recent change in the MA program is the move from a traditional, didactic course for CSD 800: Research Methods, to a hybrid course that is interdisciplinary in nature. Students in Nursing, Physician Assistant, Public Health, and CSD have been grouped in case-based learning teams, using evidence-based practice research to address case decision-making. This course now includes both an online and a didactic component, and is co-taught by faculty from other departments.

During the 2013-2014 academic year the department faculty have engaged in a self-study of the curriculum and have proposed curricular changes that have been approved for implementation in the 2014-2015 academic year. The changes are intended to promote increased emphasis on critical thinking and problem-based approaches to clinical case study. As such, students will engage with faculty in weekly seminars in which a clinical case is presented, analyzed, and discussed, emphasizing the multiple aspects of the diagnostic and intervention processes. The cases will focus on hypothetical clients who present with communication problems that rely on students' knowledge of particular aspects of the human communication systems. Therefore, cases will relate directly to content of those course in which students are engaged at that time (e.g., patient with swallowing problems is the case, at the same time as students are taking courses in swallowing, neurogenic disorders, traumatic brain injury, and aphasia). In making this change, individual courses have been adjusted to 2 credit hours (previously 3 ch) and content has been shifted for inclusion in the newly developed 4 ch seminar. In this way students will be immersed in discussions that promote integration of knowledge across courses, application of knowledge to clinical case decision-making, and advancement of clinical skill development through examples that engage students and faculty in critical thinking discussions.

The MA program continues to be fully accredited by the CAA and is nationally ranked in the top 15% of graduate programs in SLP, according to the U.S. News and World report rankings. Over the past three years, the number of applicants for graduate admission remains steady (155-187). Despite reductions in numbers of faculty, clinical educators, and financial resources, the program remains strong and the student outcomes reflect a high quality program.

Clinical Doctorate in Audiology (AuD)

The AuD program is a post-baccalaureate, entry-level graduate clinical program that prepares students to practice as audiologists in all clinical settings. The three-year program requires a minimum of 100 credit hours and continuous enrollment in clinical practicum. Students receive a variety of practicum experiences at the WSU Evelyn Hendren Cassat Speech-Language-Hearing Clinic and other external clinical sites during the first two years of the program.

Advancement to candidacy allows students to enroll in the final program requirement -- a full-time, one-year supervised residency experience in a hospital, clinical or other audiology practice environment. To advance to candidacy, students must:

- Maintain a minimum 3.50 GPA and satisfactorily demonstrate knowledge and skills to faculty and clinical supervisors throughout the first two years of the program
- Complete a mentored research project and oral presentation during their second year
- Achieve a passing score on a knowledge and clinical skills comprehensive examination

The **goal** of the program is to prepare students to successfully complete all program requirements, to pass the national examination (PRAXIS), and to obtain the national license to practice (Clinical Certificate of Competence (CCC-A)). To successfully complete the program, students must fulfill the following minima **objectives**: Prior to graduation, students must have achieved sufficient clinical clock hours to satisfy requirements of the American Speech-Language-Hearing Association (ASHA) for the CCC-A and must have demonstrated clinical competency in completing those hours as determined by both the department and the CAA. Students must also have demonstrated knowledge and skills learning outcomes in compliance with ASHA standards of certification defined by the Council for Clinical Certification (CFCC-) Knowledge and Skills Acquisition (KASA).

Outcome measures of student learning: Students must meet the minimum objectives stated and the program successfully maintains accreditation standards, which examine student outcomes as central to the CAA requirements. As reflected in the tables below, the retention and completion rates (100% over 3 years) for the AuD are exceptional; the pass rate (88% over 3 years) for the national exam (PRAXIS) is above the national average (80% rolling average over 3 years); and the employment rate is 100%. Each of these are indicators of excellent student outcomes for the AuD program.

Student Outcome Data

Doctor of Audiology (AuD) Program Completion Rates: 3 year average = 100%

Period	# Completed Within Expected Time Frame	# Completed Later than Expected Time Frame	# Not Completing	Completion (%)
2012/2013	8	0	0	100
2011/2012	8	0	0	100
2010/2011	9	0	0	100

Doctor of Audiology (AuD) ETS Data (Praxis): 3 year average = 88%

Period	Number of Students Taking Exam	Number of Students Passed	Pass Rate (%)
2012/2013	8	6	75
2011/2012	8	8	100
2010/2011	9	8	89

Doctor of Audiology (AuD) Employment Rates: 3 year average = 100%

Period	Number of Graduates	Employment Rate in Profession (%)
2012/2013	8	100
2011/2012	8	100
2010/2011	9	100

Curriculum

Prerequisites (2 courses, may be taken during program)

Sign Language (CSD 270 ASL I or CSD 260 SEE I)

Aural Rehabilitation (CSD 504)

Didactic Courses (58 credit hours)

CSD 705 Counseling in Communication Disorders

CSD 800 Research Methods

CSD 803 Introduction to Psychoacoustics

CSD 804 Clinical Audiology I

CSD 805 Clinical Audiology II

CSD 806 Advanced Anatomy & Physiology of the Auditory System

CSD 807 Acoustics and Instrumentation

CSD 808 Otoacoustic Emissions

CSD 851 Medical Audiology

CSD 854 Hearing Conservation

CSD 855 Pediatric and Educational Audiology

CSD 860 Amplification I

CSD 861 Amplification II

CSD 863 Professional Seminar in Audiology

CSD 866 Auditory Evoked Potentials

CSD 868 Diagnosis & Management of Persons with Balance Disorders

CSD 870 Current Topics in Amplification

CSD 871 Current Topics in Auditory Disorders

PHS 804 Principles of Statistics in Health Sciences

Business Elective (department approved)

Practica (36 credit hours)

CSD 835 Early Practicum Experience in Audiology

CSD 886 Clinical Practicum in Audiology

CSD 997 Audiology Residency

Research Project (6 credit hours)

CSD 891 Non-Thesis Research Project

CSD 892 Presentation of Research

Additional Elective (department approved)

A change has occurred in the program during the past three-year period. Beginning with the cohort of students admitted to the program in the Fall, 2012, the program moved from a 4-year to a 3-year plan. The major change was to require students to enroll in full-time study for four academic semesters and two summers prior to the residency year. This change was made in response to students and faculty assessment that indicated a need for earlier involvement of students in clinical practica and more intense emphasis over a consistent timeframe, without the interruption of summer breaks. With this change, students now begin clinical practica in the first semester of the first academic year and continue every semester until they assume the residency placement. The first cohort of three-year students will begin residency placement in the summer of 2014, with anticipated graduation in spring/summer of 2015. The performance outcomes for these students will be examined relative to the national exam pass rates and employment as they complete the program.

The AuD program continues to be fully accredited by the CAA. Over the past three years, the number of applicants for graduate admission remains steady (25-55). Despite reductions in numbers of faculty, clinical educators, and financial resources, the program remains strong and the student outcomes reflect a high quality program.

PhD in CSD

The PhD program in CSD prepares doctoral students to be scholar-scientists in research and teaching. Individualized doctoral programs of study, mentoring by nationally and internationally recognized faculty, and specialized practica are provided to help doctoral students develop optimal research and teaching skills. The goal of the CSD doctorate is for the student to acquire the knowledge and skills that lead to scholarly research, expertise in teaching, and professional leadership. To earn the PhD, students need to acquire a substantial mastery of scientific knowledge and also demonstrate the ability to use that knowledge independently and creatively.

Qualifying Examination

The Qualifying Examination is viewed as an opportunity to (a) demonstrate mastery of knowledge and integration of information in the student's area of expertise in communication sciences and disorders and related or supplemental areas and (b) provide evidence of readiness to conduct doctoral research. Typically this examination is completed during the term that the student completes the academic and tool requirements. Prior to the examination, the student meets with each member of the Advisory Committee to establish the parameters for each topic area and to discuss the number and scope of questions to be written. The student then sends a summary of each meeting to the respective committee member and also to the student's doctoral advisor.

The written examination consists of two components: (a) two field-based papers and (b) an "in house" closed session (in which the student responds to a minimum of three questions in writing within a consecutive 3-day period; time constraints to be determined by the Advisory Committee in consultation with the student). The student is allowed 4 weeks for each field-based paper. The student writes a minimum of three closed-session answers in a departmentally approved location (supervised by the advisor) within 4 weeks after completion of the field-based papers. The Qualifying Examination is evaluated by the Advisory Committee, with the student's advisor serving as chair. If the consensus is that the written components are satisfactory, the oral portion of the Qualifying Examination is scheduled to take place within 2 weeks. At this time, the student has the opportunity to clarify aspects related to the written answers and to answer questions from committee members. In the event components (written and/or oral) are deemed unsatisfactory, the Advisory Committee establishes guidelines for further examination. Consistent with Graduate School policy, the student passes the Qualifying Examination if the majority (e.g., at least three members of a five-person committee) vote positively.

Advancement to Candidacy

Following successful completion of the Qualifying Examination, the Graduate School is notified, and the doctoral student becomes a Candidate for the PhD. The student must be enrolled continuously (every semester, including the term that the dissertation is completed) for a minimum of 2 credit hours of Dissertation (CSD 999).

The program faculty continue to review students, the program requirements, and the relative success of students from both a formative and summative perspective. The nature of a PhD program is that it is highly individualized. Therefore, the success of the program, in terms of learner outcomes, is largely reflected in students' completion of the program in a timely manner, their accomplishments during their program of study, and their employment upon completion of the PhD. Of those graduating over the past ten years, 100% of them are employed in positions of their choosing.

2. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates, and scholarly/creative activity (refer to instructions in the WSU Program Review document for more information on completing this section).

Complete the table below and utilize data tables 1-7 provided by the Office of Planning Analysis (covering SCH by FY and fall census day, instructional faculty; instructional FTE employed; program majors; and degree production).

Scholarly Productivity	Number Journal Articles		Number Presentations		Number Conference Proceedings		Performances			Number of Exhibits		Creative Work		No. Books	No. Book Chaps.	No. Grants Awarded or Submitted	\$ Grant Value
	Ref	Non-Ref	Ref	Non-Ref	Ref	Non-Ref	*	**	***	Juried	****	Juried	Non-Juried				
Year 1 2011	14	2	38	22	1	0	0	0	0	0	0	0	0	1	0	19	1,771,147
Year 2 2012	15	4	42	24	0	0	0	0	0	0	0	0	0	1	2	12	7,694
Year 3 2013	19	1	31	18	0	0	0	0	0	0	0	0	0	1	1	11	245,000

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection.

- Provide a brief assessment of the quality of the faculty/staff using the data from the table above and tables 1-7 from the Office of Planning Analysis as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship), efforts to recruit/retain faculty, departmental succession plans, course evaluation data, etc.

Provide assessment here:

The Department of Communication Sciences and Disorders (CSD) offers four degree programs, including the Bachelor's degree in CSD, the Master's degree in Speech-language pathology (SLP), the Clinical Doctorate in Audiology (AuD), and the PhD in CSD. Faculty in the department largely teach courses across the four programs, with the exception of one faculty member, Dr. Xiao-Ming Sun, who only teaches courses in the area of audiology. In addition to the twelve tenure eligible faculty, two Clinical educators in the audiology program hold the terminal degree (PhD) and teach courses in the audiology curriculum, though they are not in the tenure leading track. In addition to faculty, the program employs unclassified professionals who provide clinical education for students in the Master's and AuD programs, as part of the required clinical practica for those academic degrees. These professionals may teach didactic classes in addition to their clinical teaching. The FTE of unclassified professionals providing clinical education has varied over the past five years, but has never been fewer than 5 full-time clinical educators and the FTE equivalent of 3-5 additional clinical educators. This level of staffing has supported a consistently growing number of student credit-hours over the past three aggregated time periods (2007-11: 5011 ch; 2008-12: 5303 ch; 2009-13: 5626 ch).

The ratio of student credit hours (SCH) to tenure eligible faculty for the department reflects a particular strength of CSD, with the 65% of the SCH taught by tenure eligible faculty. Of the remaining portion, 13% of the SCH is taught by unclassified professionals in the context of clinical practica. The portion of SCH taught by lecturers (17%) reflects the sign language courses taught within CSD that are not program-specific, some of which are for students seeking to meet foreign language requirements. A very small number of SCH are taught by GTAs (1.4%). These are in conjunction with PhD student preparation for academic teaching and are primarily for undergraduate courses, for which the PhD student has had prior teaching practica and guided experiences. In examining the SCH by FTE for the program, compared to the college and the university, CSD also demonstrates a rigorous profile. The University ratio reflects approximately 24% of the SCH taught by tenure eligible faculty; the college reflects approximately 33% taught by tenure eligible faculty; and CSD reflects 80% taught by tenure eligible faculty (the SCH for non-program sign language courses taught by lecturers is not included in the calculations). The CSD programs demand highly rigorous pre-service education, based on scientific and clinical evidence, for students at every level. For those degree programs that are accredited (MA and AuD), the student performance outcomes are established

according to national accreditation and certification standards. Therefore, CSD faculty are responsible for the majority of the SCH, working in conjunction with the unclassified professionals who serve as clinical educators, to insure students meet the demanding standards for the degree and professional credentialing. The following table reflects the average teaching productivity for courses in CSD, of the tenure-eligible faculty, over the five years, 2009-2013.

Faculty member	Avg FTE assigned teaching	5-year avg student census	5-year avg sch	5-year avg chr per CSD course	5-year avg # CSD courses per year
Coufal	.77	6	8	4.2	2.6
DiLollo, A.	.8	65	176	12	5.6
Goldberg	1	57	167	7.2	3.4
Hodson	.8 (years 09-12) .45 (2013)	71	167	15.4	7.6
Hull	1	76	183	18	6
Mefferd	1 (beginning spring 2010)	74	147	5.2	3.4
Parham	.8	35.2	97	3	3
Scherz	.8	59	198	20	7
Scudder	.2	4.4	5.2	2.4	1.8
Self	.8	140	319	20	10
Strattman	1	33	58	6.4	3.6
Sun	.8	17	46	10	4.4

The faculty roles include a weighted emphasis on research and teaching, appropriate to a doctoral granting program. As reported by Institutional Research, the tenure-eligible faculty (5 year average 2008-2012) constitute 9.5 FTE of the total 17 FTE attributed to the program. Considering the productivity of the faculty, the average number of refereed journal articles published in scientific journals averaged 1.5 (2011) to 2 (2013) per faculty member per year. These publications are in highly competitive professional journals, which reflect substantial contributions to the literature. In addition, faculty averaged 4 competitively selected professional presentations in 2011, 4.4 in 2012, and 3.3 in 2013. Each of these also indicates a high degree of professional quality as the conferences in which the presentations were accepted are national and international competitions with acceptance rates often less than 33% of the submissions. Faculty also contributed at a high rate of participation to non-refereed and non-competitively selected presentations. Faculty sought grant support, with an average of 1.2 to 2 submissions per faculty member over the past three years. Considering the total amount of grant funding over the past three years, this is an average of \$213,036.00 per faculty member.

As reflected in the above summary table, faculty in CSD carry a substantially heavier teaching load than would be typical of a department with a PhD, Clinical Doctoral, Master's and Bachelor's degree programs. For a PhD program, it would typically be anticipated that faculty would have no more than 6 credit hour teaching loads per semester (12 per year) for a 1.0 FTE. As is evident from the summary table, faculty meet or exceed that expectation. A goal for CSD is to increase the number of tenure-eligible faculty to replace the 1.5 faculty who have retired in 2013 or are on partial retirement. Further, 1.0 FTE faculty left WSU in 2014, leaving another faculty opening. Considering succession planning there needs to be three faculty hired over the next two fiscal years to

maintain the current faculty load and should prepare for an additional one to three faculty retirements over the next five-year window.

For all students in the three graduate degree programs, there is a required research project. Faculty are required to advise students in non-thesis, research presentation, thesis, and dissertation research projects. Every student's non-thesis project is conducted over three semesters and must include presentation at a department forum, a University forum such as GRASP, or at a state or national professional conference. Each faculty member is responsible for 2-6 students' non-thesis projects, in addition to their work with thesis and dissertation research. This presents a substantial teaching responsibility that is not fully reflected in the credit hour formula because student research can be very time consuming, while the student is registered for only 1 credit hour per semester in the non-thesis category. Master's theses and dissertation research is far more demanding and consumes large portions of faculty time and resources. It is essential that additional tenure-eligible faculty be hired in order to support PhD education and research that will maintain this well respected, nationally ranked and accredited program.

3. Academic Program: Analyze the quality of the program as assessed by its curriculum and impact on students for each program (if more than one). Attach updated program assessment plan (s) as an appendix (refer to instructions in the WSU Program Review document for more information).

- a. For undergraduate programs, compare ACT scores of the majors with the University as a whole.

Mean ACT score of Juniors and Seniors Enrolled on Fall Census Day

Statistic:	2006-2010	2007-2011	2008-2012
University level	22.4	22.6	22.7
Program majors	22.1	22.4	22.7
Program majors count	60	64	70
reporting ACT	35	36	40
Percent reporting	58.0%	56.7%	57.8%

note: if ACT missing and SAT available, SAT is used converted to ACT metric; KBOR captures ACT data for enrolled juniors & seniors only; KBOR minima ≥ 20 .

As evident from the table above, undergraduate students in CSD consistently achieve ACT scores at the average level of WSU students overall. Moreover, they score above the KBOR minima of 20.

- b. For graduate programs, compare graduate GPAs of the majors with University graduate GPAs.

Mean Application GPA of Admitted Graduate Student Majors (source= Applications)

Statistic:	2007-2011	2008-2012	2009-2013
University level	3.5	3.5	3.5
Program majors	3.7	3.7	3.7
Program majors count	38	41	40
reporting GR gpa	37	40	38
Percent reporting	97.4%	97.1%	97.0%

note: graduate student application gpa based on last 60 hours of course work earned.

As noted in the table above, students admitted to graduate programs in CSD consistently score above the average GPA for WSU applicants overall.

- c. Identify the principal learning outcomes (i.e., what skills does your Program expect students to graduate with). Provide aggregate data on how students are meeting those outcomes in the table below. Data should relate to the goals and objectives of the program as listed in 1e. Provide an analysis and evaluation of the data by learner outcome with proposed actions based on the results.

In the following table provide program level information. You may add an appendix to provide more explanation/details. Definitions:

Learning Outcomes: Learning outcomes are statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program (e.g., graduates will demonstrate advanced writing ability).

Assessment Tool: One or more tools to identify, collect, and prepare data to evaluate the achievement of learning outcomes (e.g., a writing project evaluated by a rubric).

Criterion/Target: Percentage of program students expected to achieve the desired outcome for demonstrating program effectiveness (e.g., 90% of the students will demonstrate satisfactory performance on a writing project).

Result: Actual achievement on each learning outcome measurement (e.g., 95%).

Analysis: Determines the extent to which learning outcomes are being achieved and leads to decisions and actions to improve the program. The analysis and evaluation should align with specific learning outcome and consider whether the measurement and/or criteria/target remain a valid indicator of the learning outcome as well as whether the learning outcomes need to be revised.

Undergraduate-Bachelor's in CSD

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
Students will demonstrate the necessary foundations for entry into the major in CSD by successfully completing specified CSD courses and general education foundations at the defined level of performance.	Pre-majors must attain an overall GPA of 2.75 and complete the following courses with a grade that generates at least 3.0 credit points per credit hour in each course: CSD 111, 301, 302, 304, 304L, 306, 306L. Further, the applicant must demonstrate knowledge of the principles of: <ul style="list-style-type: none"> ● Biological sciences ● Physical sciences ● Mathematics ● Social/Behavioral sciences (attained through coursework in general education, outside of CSD) 	To be admitted to the major, required courses must be completed with a grade of 3.0 or better; overall GPA of 2.75 or better;	Typically, 96-100% of the applicants for admission to the major meet the requirements and are admitted	Because the undergraduate major accommodates a substantially larger number of students than can be considered for graduate admission (typically the national admission rate is below 25% of the applicant pool), the requirements for admission to the undergraduate major are discussed and analyzed at least annually, with consideration for making the requirements more rigorous in order to better direct students who will potentially not find a graduate program for which they are eligible.
Students will successfully	The applicant must	Students completing	As depicted in 1.e.	The reason for the

<p>complete a broad, comprehensive, pre-professional program that prepares them for specialized training at the graduate level</p>	<p>demonstrate knowledge of basic human communication and swallowing processes, including the following:</p> <ul style="list-style-type: none"> ● Biological ● Neurological ● Psychological ● Developmental/Lifespan ● Linguistic ● Cultural ● Swallowing Processes ● Biological ● Neurological ● Acoustic ● Psychological ● Developmental/Lifespan ● Linguistic ● Cultural 	<p>the undergraduate pre-professional degree program are expected to achieve a grade point of 3.0 or better in each of the following course-content areas:</p> <p>CSD 210 or PHYS 210 Physics of Sound CSD 251 Audiology Development & Disorders CSD 301 Basic Anatomy & Physiology of Speech Mechanisms CSD 302 Basic Anatomy & Physiology of Hearing Mechanisms CSD 304+304L Early Language Development & Lab CSD 306+306L Applied Phonetics & Lab CSD 416+417 Intro to Language Disorders & Lab CSD 425 Introduction to Clinical Processes CSD 504 Aural Rehabilitation CSD 506 Acoustic and Perceptual Phonetics CSD 514+515 Speech- Sound Disorders & Lab CSD 519+521 Genetics and Organic Syndromes & Lab CSD 605 Neuroscience of Speech and Language: Basic Processes</p>	<p>above, students have consistently demonstrated high performance, retention, and graduation rates.</p>	<p>slight decline in the GPA of the graduates (see 1.e. above) is not clear, especially in light of the number who graduated with honors over the same time-period. This bears watching and further consideration.</p>
<p>Students will demonstrate written language skills at the above average level</p>	<p>AACU rubrics</p>	<p>Score above average on the 4-point scale at the time of graduation</p>	<p>Scores averaged 1.8 in the Fall and 2.4 in the spring</p>	<p>The target is generally met but could improve. All students have an essay as part of the application to</p>

				the major that is now being analyzed and compared to an assigned essay at the end of the UG program for tracking performance. Across the curriculum all UG courses in the major now have instituted more written language assignments.
Students will demonstrate critical thinking skills necessary for case-based decision making	<ol style="list-style-type: none"> 1. AACU rubric and 2. Watson-Glaser Critical Thinking Appraisal 	<ol style="list-style-type: none"> 1. Above average performance on the 4-point AACU rubric 2. An overall mean score above average on the 80-point Watson-Glaser (see appendix A for more detail) 	<ol style="list-style-type: none"> 1. AACU average fall scores: 1.87 compared to average spring scores: 1.89 (for students in 2011-2012) 2. Watson-Glaser scores for UGs will be reported in the next report. Only graduate students' scores are available at this time. 	This measure may not be appropriate for measuring change over a relatively short time-frame. The intent is to assess those students who admit to the graduate program from this cohort of students at the completion of the graduate program to determine if it is reflective of change related to clinical decision-making, which would have been a target of the graduate program.

Master's in CSD - SLP

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
Students will successfully achieve the learning outcomes defined by the ASHA as the criteria for certification in SLP (See table below)	Certification application verification (See table below)	100% retention of students admitted to the MA with 100% graduation rate	MA program has a 99% completion rate, a 99% PRAXIS exam pass rate, and a 100% employment rate for the past 3 years.	Continue the program with ongoing evaluation of outcomes
Students will demonstrate written language skills at the	AACU rubrics	Score above average on the 4-point scale at the time of graduation	Scores averaged 2.07 in the Fall (2010) and 2.8 in the spring	The target is met but continued emphasis on

above average level			(2011); Fall (2011) 2.13 and 2.21 in the spring (2012)	professional and scientific writing is central to the MA curriculum
Students will demonstrate critical thinking skills necessary for case-based decision making	Watson-Glaser Critical Thinking Appraisal	An overall mean score above average on the 80-point Watson-Glaser (see appendix A for more detail)	First year MA students and second year MA students were administered the assessment in the Fall, 2013. Both groups scored above the average (overall scores: 57.12 and 57.26 respectively)	It is not possible to determine changes in performance at this time. Students who were in the first year of the MA program will be reassessed at the end of their second year to determine if changes occurred.
Students will demonstrate case-based inquiry and critical thinking related to course-content over a series of four courses that build upon sample cases as additional content areas are introduced	Students' portfolio compiled over the sequences of courses, including the following: CSD 111, 251, 301, 304, 306, 416, 425, 514, 517, 518, 519, 605, 706, and 764 scored on a common rubric and also using student reflections	<ol style="list-style-type: none"> (1) 60 first and/or second-year undergraduate students, enrolled in CSD 111: Disorders of Human Communication in Fall 2012 will be introduced to case-based enquiry focusing on five specific cases (2) These students will develop a notebook/portfolio to document the development of each case as it is explored in subsequent courses (3) Students' written reflections at the completion of each course will document their perceptions of the benefits of this experience, 	Continuous formative assessments each semester in the respective classes	<ul style="list-style-type: none"> • Open-ended responses will be analyzed by faculty/Graduate Assistants using available <i>Leximancer</i> content analysis software • Reflective data will be scored by faculty using systematic AACU Critical Thinking Value and Written Communication Value rubrics • Scaled response tests will be analyzed by faculty using available <i>SPSS</i> software

		<p>along with improvements in critical thinking and written communication. The application of AACU rubrics will complement existing baseline data on critical thinking and written communication skills from a previous assessment grant.</p> <p>(4) Students' knowledge of each case will increase at the end of each course in which the case is explored, as measured through pre- and post-course objective tests</p> <p>(5) Students' general understanding of the professions of audiology and speech-language pathology will increase, as measured through a pre- (in CSD 111, Year 1) and post- (in CSD 425, Year 3) program</p>		
--	--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--

		<p>questionnaire</p> <p>(6) Students' understanding of the tenets of interprofessional practice will increase, as measured through a pre- (in CSD 111, Year 1) and post- (in CSD 425, Year 3) program questionnaire</p> <p>(7) 90% of the students who were enrolled in CSD 111 in Fall 2012 will complete their program of study in Spring 2015</p> <p>(8) Evidence of student learning through active case-based enquiry will be discussed within the Department with recommendations as to how this learning approach can be continued to improve student learning</p> <p>(9) Students will be invited to serve as co-presenters and co-authors in the dissemination of the findings</p>		
--	--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--

		related to student engagement in case-based learning and student retention.		
Students will demonstrate applied research competencies and evidence-based decision-making	Successful completion of non-thesis or thesis research; application of evidence-based practices in clinical practica	100% successful completion of research, including presentation of research; Successful clinical practica for internal and external practica experiences, demonstrating the clinical competencies as documented in the students' electronic portfolio (see appendix B for sample)	As noted in 1.e., the MA program has a 99% completion rate, a 99% PRAXIS exam pass rate, and a 100% employment rate for the past 3 years.	The rigors of the program are continuously evaluated according to key performance outcomes. The program has made systematic adjustments to the curriculum to promote interprofessional learning opportunities and applied learning experiences

Table of learning outcomes for certification in SLP

**Certification Application
Speech-Language Pathology
Verification by Program Director**

Please respond to each question. The applicant must have met each standard in order to apply for certification.

<input type="checkbox"/> Yes <input type="checkbox"/> No	Has a master's or doctoral degree. A minimum of 75 semester credit hours were completed in a course of study addressing the knowledge and skills pertinent to the field of speech-language pathology
<input type="checkbox"/> Yes <input type="checkbox"/> No	Initiated and completed all graduate course work and graduate clinical practicum in an institution whose program was accredited by the CAA (Std. I)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has completed a program of study (a minimum of 75 semester credit hours overall, including at least 36 at the graduate level) that includes academic course work sufficient in depth and breadth to achieve the specified knowledge outcomes (Std. III)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has demonstrated knowledge of the principles of biological sciences, physical sciences, mathematics, and social/behavioral sciences (Std. III-A)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has demonstrated knowledge of basic human communication and swallowing processes, including their biological, neurological, acoustic, psychological, developmental, linguistic and cultural bases (Std. III-B)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has demonstrated knowledge of the nature of speech, language, hearing, and communication disorders and differences and swallowing disorders, including the etiologies, characteristics, anatomical/physiological, their biological, neurological, acoustic, psychological, developmental, linguistic and cultural correlates in the nine areas noted in the standard (Std. III-C)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Possesses knowledge of the principles and methods of prevention, assessment and intervention for

	people with communication and swallowing disorders (Std. III-D)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has demonstrated knowledge of standards of ethical conduct (Std. III-E)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has knowledge of processes used in research and the integration of research principles into Evidence-based al practice (Std. III-F)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has demonstrated knowledge of contemporary professional issues (Std. III-G)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has demonstrated knowledge about certification, specialty recognition, licensure, and other relevant professional credentials (Std. III-H)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has completed a curriculum of academic and clinical education that follows an appropriate sequence of learning sufficient to achieve the skills outcomes in Std. IV-G (Std. IV-A)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Possesses skill in oral and written and other forms of communication sufficient for entry into professional practice (Std. IV-B)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has completed a minimum of 400 clock hours of supervised clinical experience in the practice of speech-language pathology, including 25 hours in clinical observation and 375 hours in direct client/patient contact (Std. IV-C)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has completed at least 325 clock hours while engaged in graduate study (Std. IV-D)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has been supervised by individuals holding a current ASHA Certificate of Clinical Competence in the appropriate area of practice. The amount of supervision was appropriate to the student's level of knowledge, experience, and competence and was sufficient to ensure the welfare of the client/ patient populations (Std. IV-E)
<input type="checkbox"/> Yes <input type="checkbox"/> No	Has gained knowledge and experience with individuals from culturally/linguistically diverse backgrounds and with client/patient populations across the life span (Std. IV-F)
<input type="checkbox"/> Yes <input type="checkbox"/> No	The applicant has met the education program's requirements for demonstrating satisfactory performance through ongoing formative assessment of knowledge and skills (Std. V-A)

The specific areas that are measured for each student, commensurate with the 18 statements, which can be reviewed at the following website: http://www.asha.org/certification/slp_standards_new.htm

Clinical doctorate in audiology – AuD

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
Students will successfully achieve the learning outcomes defined by the ASHA as the criteria for certification in SLP (See table below)	Certification application verification (See table below)	100% retention of students admitted to the MA with 100% graduation rate	The three year average graduation rate =100%; the PRAXIS rate = 88%; and the employment rate= 100%	The impact of the move to a three-year, full-time curriculum plan is being carefully monitored to determine if there is any impact of student performance outcomes
Students will demonstrate written language skills at	AACU rubrics	Score above average on the 4-point scale	Scores averaged 1.86 in the Fall (2010) and	The target is was not met and

the above average level		at the time of graduation	1.95 in the spring (2011); Fall (2011) 1.62 and 1.90 in the spring (2012)	continued emphasis on professional and scientific writing is emphasized across the curriculum
Students will demonstrate critical thinking skills necessary for case-based decision making	Watson-Glaser Critical Thinking Appraisal	An overall mean score above average on the 80-point Watson-Glaser (see appendix A for more detail)	First year AuD students and second year AuD students were administered the assessment in the Fall, 2013. Both groups scored above the average (overall scores: 58.43 and 52.00 respectively)	It is not possible to determine changes in performance at this time. Students who were in the first year of the AuD program will be reassessed at the end of their second year to determine if changes occurred.
Students will demonstrate clinical competencies at the end of the first year	Comprehensive exam administered jointly by all members of the audiology faculty through clinical application of specific test protocols	Students must achieve a passing score on all items before advancing to external clinical practica	This will be administered for the first time in the fall of 2014 with the new class of admitted AuD students	
Students will demonstrate case-based inquiry and critical thinking related to course-content applied to sample cases	Students' performance on a comprehensive exam administered as the required exam prior to entering candidacy	Students must achieve a passing score on before advancing to candidacy and the third-year external residency	This will be administered for the first time in the spring of 2014 with the class of students admitted to the AuD program in Fall 2012	
Students will demonstrate applied research competencies and evidence-based decision-making	Successful completion of non-thesis or thesis research; application of evidence-based practices in clinical practica	100% successful completion of research, including presentation of research; Successful clinical practica for internal and external practica experiences, demonstrating the clinical competencies as documented in the students' electronic portfolio (see appendix B for sample)	As noted in 1.e., the AuD program has a 100% completion rate, an 88% PRAXIS exam pass rate, and a 100% employment rate for the past 3 years.	The rigors of the program are continuously evaluated according to key performance outcomes. The program has made systematic adjustments to the curriculum to promote interprofessional learning opportunities and applied learning experiences

Table of learning outcomes for certification in Audiology

**Standards for Clinical Certification in Audiology
Verification by Program Director**

Please respond to each question. The applicant must have met each standard in order to be awarded certification.*

- Yes No Completed a course of study that addresses the knowledge and skills necessary to independently practice in the profession of audiology. (Std. I)
- Yes No Been granted a doctoral degree from a program accredited by the Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA). (Std. II)
- Yes No Completed a course of study that includes academic course work and a minimum of 1,820 hours of supervised clinical practicum sufficient in depth and breadth to achieve the knowledge and skills outcomes stipulated in Standard IV. Supervision was provided by individuals who held the ASHA Certificate of Clinical Competence (CCC) in Audiology. (Std. III)
- Yes No Knowledge delineated in Foundations of Practice (Std. IV. A1-A21)
- Yes No Knowledge and skills delineated in Foundations of Practice (Std. IV. A22-29)
- Yes No Knowledge and skills delineated in Prevention and Identification (Std. IV. B1-B6)
- Yes No Knowledge delineated in Assessment (Std. IV. C1)
- Yes No Knowledge and skills delineated in Assessment (Std. IV. C2-C11)
- Yes No Knowledge and skills delineated in Intervention (Treatment) (Std. IV. D1-D7)
- Yes No Knowledge and skills delineated in Advocacy/Consultation (Std. IV. E1-E3)
- Yes No Knowledge and skills delineated in Education/Research/Administration (Std. IV. F1-F6)
- Yes No Met the education program's requirements for demonstrating satisfactory performance through ongoing formative assessment of knowledge and skills. (Std. V-A)

A detailed list of the competencies within each of the above referenced standards can be accessed at:
<http://www.asha.org/Certification/2012-Audiology-Certification-Standards/>

PhD in CSD

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
The goal of the PhD is for the student to acquire the knowledge and skills that lead to scholarly research, expertise in teaching, and professional leadership. To earn the PhD, students need to acquire a substantial mastery of scientific knowledge and also demonstrate the ability to use that knowledge independently and creatively.	Completion of plan of study courses Written qualifying exam Oral qualifying exam Research proposal (prospectus) Dissertation research completion Oral defense of dissertation Classroom teaching	Successful completion of all courses outlined on the plan of study; Successful advancement to candidacy as determined by written and oral qualifying exams; Successful proposal, conduct, and completion of original research/dissertation; Successful teaching practica	Over the past six years there have been 9 PhD students enrolled annually. The average graduation rate over that same period has been 2 per each three-year rolling average interval. All graduates have successfully gained employment in their desired positions.	The program continues to produce highly qualified scholars who are prepared to contribute to the research foundations and to teach in higher education.

The primary limitation on the number of PhD students enrolled and the rate of completion of the program is the limited resources of the department. PhD students require substantial time from faculty, research labs and equipment, and financial support in order to complete the program effectively and in a reasonable

period of time. Each of the PhD students currently or recently enrolled has sought outside employment to supplement the assistantship support available from the department. With more support from the graduate school for doctoral students they could devote more attention to the program of study. Further, as noted earlier in this report, there is an exceptionally demanding teaching load on faculty, a shortage of tenure-eligible faculty, and a need for faculty to supervise a large number of research projects across the department. This limits the resources faculty can marshal and apply toward seeking external funding support from research grants that would not only advance the research agenda but provide additional support for students.

- d. Provide aggregate data on student majors satisfaction (e.g., exit surveys), capstone results, licensing or certification examination results (if applicable), employer surveys or other such data that indicate student satisfaction with the program and whether students are learning the curriculum (for learner outcomes, data should relate to the outcomes of the program as listed in 3c).

Satisfaction with Program among Undergraduate and Graduate Students at End of Program Exit

Academic Year (fall-spring-summer sequence)	Rolling 5 AY average				
	2012	2013	2007-2011	2008-2012	2009-2013
Student level:					
University	79.5%	82.9%	n/a	n/a	n/a
Undergraduate level					
College	82.2%	85.8%	n/a	n/a	n/a
Division					
Undergraduate level					
Program Undergraduate majors:					
Percent satisfied or very satisfied	97.1%	96.6%	n/a	n/a	n/a
mean	4.6	4.6	n/a	n/a	n/a
median	5	5	n/a	n/a	n/a
count	35	29	n/a	n/a	n/a
University	80.0%	82.5%	n/a	n/a	n/a
Graduate level					
College	74.7%	76.4%	n/a	n/a	n/a
Division					
Graduates level					
Program Graduate majors:					
Percent satisfied or very satisfied	86.4%	96.9%	n/a	n/a	n/a
mean	4.3	4.3	n/a	n/a	n/a
median	4	4	n/a	n/a	n/a
count	22	32	n/a	n/a	n/a

Although there is not a 5-year average for the satisfaction ratings from exit interviews, the two years that are available (2012-2013) reflect outstanding ratings from both undergraduates and graduates in CSD. For undergraduates, the percent of CSD majors who responded "satisfied or very satisfied" ranged from 97.1% to 96.6%, which is more than 10 percentage points above the college ratings and at least 15 points above the University ratings. This reflects the quality and value of the CSD major to undergraduate students, even though 96-97% of those students would not have been successfully admitted into the graduate program, which is the desired outcome of the pre-professional undergraduate degree.

Of the graduate program majors, the percent responding "satisfied or very satisfied" ranged from 96.9%-86.4% for CSD graduates. Compared to the college, these ratings were 12 to 20 percentage points higher than for other CHP programs. CSD graduate student ratings were 6 to 12 points higher than those

ratings for the WSU graduate programs. This reflects the positive value students place on the education received and their preparation for entry into professional practice.

Master of Arts (MA) ETS Data (Praxis): 3 year average = 99%				
Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Name of Exam	Program Result	National Comparison±
2012/2013	29	PRAXIS	Passed: 28 96%	Nat'l 3 Yr Avg: 80%
2011/2012	22	PRAXIS	Passed: 22 100%	Nat'l 3 Yr Avg: 80%
2010/2011	27	PRAXIS	Passed: 27 100%	Nat'l 3 Yr Avg: 80%

Doctor of Audiology (AuD) ETS Data (Praxis): 3 year average = 88%				
Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Name of Exam	Program Result	National Comparison±
2012/2013	8	PRAXIS	Passed: 6 75%	Nat'l 3 Yr Avg: 80%
2011/2012	8	PRAXIS	Passed: 8 100%	Nat'l 3 Yr Avg: 80%
2010/2011	9	PRAXIS	Passed: 8 100%	Nat'l 3 Yr Avg: 80%

e. Provide aggregate data on how the goals of the *WSU General Education Program* and *KBOR 2020 Foundation Skills* are assessed in undergraduate programs (optional for graduate programs).

Outcomes:		Results		
<ul style="list-style-type: none"> o Have acquired knowledge in the arts, humanities, and natural and social sciences o Think critically and independently o Write and speak effectively o Employ analytical reasoning and problem solving techniques 		Undergraduates in CSD		
Students will demonstrate written language skills at the above average level	AACU rubrics	Score above average on the 4-point scale at the time of graduation	Scores averaged 1.8 in the Fall and 2.4 in the spring	The target is generally met but could improve. All students have an essay as part of the application to the major that is now being analyzed and compared to an assigned essay at the end of the UG program for tracking performance. Across the curriculum all UG courses in the major now have

				instituted more written language assignments.
Students will demonstrate critical thinking skills necessary for case-based decision making	3. AACU rubric and 4. Watson-Glaser Critical Thinking Appraisal	1. Above average performance on the 4-point AACU rubric 2. An overall mean score above average on the 80-point Watson-Glaser (see appendix A for more detail)	1. AACU average fall scores: 1.87 compared to average spring scores: 1.89 (for students in 2011-2012) 2. Watson-Glaser scores for UGs will be reported in the next report. Only graduate students' scores are available at this time.	This measure may not be appropriate for measuring change over a relatively short time-frame. The intent is to assess those students who admit to the graduate program from this cohort of students at the completion of the graduate program to determine if it is reflective of change related to clinical decision-making, which would have been a target of the graduate program.

Note: Not all programs evaluate every goal/skill. Programs may choose to use assessment rubrics for this purpose. Sample forms available at:

<http://www.aacu.org/value/rubrics/>

- For programs/departments with concurrent enrollment courses (per KBOR policy), provide the assessment of such courses over the last three years (disaggregated by each year) that assures grading standards (e.g., papers, portfolios, quizzes, labs, etc.) course management, instructional delivery, and content meet or exceed those in regular on-campus sections.
Provide information here:
- Indicate whether the program is accredited by a specialty accrediting body including the next review date and concerns from the last review.
Provide information here: Accredited by ASHA Council on Academic Accreditation (CAA); next review 2017; no concerns
- Provide the process the department uses to assure assignment of credit hours (per WSU policy 2.18) to all courses has been reviewed over the last three years.
Provide information here: All undergraduate and graduate courses were reviewed and some changes in credit hour adjustments were made in 2012. These were reviewed and approved by the CSD and CHP Academic Affairs Committees and then approved by the WSU Academic Affairs and Graduate Council, respectively.
- Provide a brief assessment of the overall quality of the academic program using the data from 3a – 3e and other information you may collect, including outstanding student work (e.g., outstanding scholarship, inductions into honor organizations, publications, special awards, academic scholarships, student recruitment and retention).

Provide assessment here:

Department Review/Assessment

The Communication Sciences and Disorders (CSD) department is evaluated annually, with a site visit every 8 years, by the Council on Academic Accreditation (CAA) of the American Speech-Language-Hearing Association (ASHA). In addition, the CSD department functions within the framework of the University, Graduate School, and College of Health Professions (CHP). This department must provide evidence regularly that it is meeting the various mission, goal, and activity statements at each level of assessment, and demonstrate that relevant data have been collected that address community, faculty, staff, student, curricular, clinical, and practicum issues and procedures. To provide data for each level of mandated review, it is necessary that this Department have a functioning Assessment Plan that allows for data collection on a regular basis rather than when a particular review is required.

The Department of Communication Sciences and Disorders regularly engages in self-study in the areas of curriculum review, student success, and strategic planning. In March, 2009, a site visit was held for the review of two of our graduate programs (MA/SLP and AuD) by the Council on Academic Accreditation of the American Speech-Language-Hearing Association (ASHA). Both programs were successfully reaccredited for a period of 8 years. Following the reaccreditation site visit, department faculty and staff continued to work to evaluate curriculum offerings, clinical assessments, and continue strategic planning. This work occurred during whole Department retreats held each semester and the ongoing work of Department committees and working groups. An annual review of these accredited programs is submitted to ASHA's Higher Education Database (HES) on August 1 of each year. The program consistently receives positive evaluation for both the accredited programs (MA and AuD).

The data in the above tables (3a-3e) reflect high performance standards and outcomes for all degree programs in CSD. The program faculty and students excel in academic and clinical performance, regularly receiving recognition and honors for their work. In addition to professional presentations and publications, four members of the department have achieved national recognition as Board Certified Specialists in Child Language (3) and Fluency (1). This represents performance that is at the highest level among all professionals nationally (e.g., fewer than 100 professionals are Board Certified Specialists in Child Language). Five faculty have been awarded the distinction of ASHA Fellow in recognition of their outstanding performance in scholarly, professional, and clinical contributions. The retention and graduation rates exceed the University and national averages. The numbers of students graduating with honors and the number of students in the CSD Honors track are outstanding. Students regularly present their work at conferences that require competitive selection, GRASP, and the Graduate Research Symposium at the Capitol. Recently one of those students received the state award for outstanding research. Significant data is reported regularly to the CAA and through the ASHA-CAA Education surveys that are submitted annually. Consistently, CSD performs above national averages in all categories assessed. The MA program is ranked by U.S. News and World Report within the top 15% of all programs, which reflects peer evaluation of the WSU program. In promotion of undergraduate research, CSD students garnered 1st and 2nd place finishes in Wichita State's 2014 Undergraduate Research and Creative Activity Forum (URCAF).

f. Analyze the student need and employer demand for the program. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

- a. Evaluate tables 11-15 from the Office of Planning Analysis for number of applicants, admits, and enrollments and percent URM students by student level and degrees conferred.

Undergraduates:

According to the institutional data, the average number of students applying to, admitted, and enrolled has been consistent over the past five years.

years	Applicants	Admitted	Census day
2007-2011	29	29	21
2008-2012	32	32	23
2009-2013	38	37	27

Students do not admit to the undergraduate major until the junior year. Looking at data for Juniors and Seniors, the number of students in the Under-represented Minority (URM) groups on Fall Census Day reflects a majority of Caucasian students. The percent URM for CSD averages 9.1.5% over the past five years, while the University average is 13.5% for that same timeframe. However, the percentage in CSD exceeds the national average for programs in CSD, which is less than 6%.

MA:

According to the institutional data, the average number of students applying to, admitted, and enrolled has been consistent over the past five years.

years	Applicants	Admitted	Census day
2007-2011	59	23	23
2008-2012	73	24	24
2009-2013	90	25	24

There has been a steady increase in the number of applicants and a stable number of students admitted and enrolled for the MA.

AuD:

According to the institutional data, the average number of students applying to, admitted, and enrolled has been consistent over the past five years.

years	Applicants	Admitted	Census day
2007-2011	16	7	7
2008-2012	22	8	7
2009-2013	27	8	7

There has been a steady increase in the number of applicants and a stable number of students admitted and enrolled for the AuD

PhD	Applicants	Admitted	Census day
2007-2011	4	2	2
2008-2012	4	2	2
2009-2013	4	2	2
2010-2014	5		

The number of applicants, admissions, and enrollments have remained steady for the PhD.

- b. Utilize the table below to provide data that demonstrates student need and demand for the program.
- Provide a brief assessment of student need and demand using the data from tables 11-15 from the Office of Planning and Analysis and from the table above. Include the most common types of positions, in terms of employment graduates can expect to find.

Provide assessment here:

Undergraduate education is a pre-professional degree program and therefore employment data are not applicable.

The table represents the most recent information from the U.S. Bureau of Labor Statistics for the MA, AuD, and PhD. The demand for graduates continues to be strong and is projected to remain strong over the next two decades. The applicant pool for admission to graduate programs far exceeds the number of available openings in CSD programs across the nation. Equally as demanding is the call for PhD graduates who can fill academic positions in CSD programs throughout the U.S.

Bureau of Labor Statistics 2012¹

Employment of Majors*							Projected growth from BLS** Current year only
	Average Salary	Employment % in state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or professional education	
MA	\$69,870	See below	100%	100%	0		↓
Aud	\$69,720	See below	100%	100%	0		

¹ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2014-15 Edition*, Audiologists, on the Internet at <http://www.bls.gov/ooh/healthcare/audiologists.htm> (visited April 17, 2014).

PhD	\$68,970	See below	100%	100%	0		
-----	----------	-----------	------	------	---	--	--

MA: The health care and social assistance sector is projected to grow at an annual rate of 2.6 percent, adding 5.0 million jobs between 2012 and 2022. This accounts for nearly one-third of the total projected increase in jobs. The growth reflects, in part, the demand for healthcare workers to address the needs of an aging population according to the BLS 2012 Statistics Report.

AuD: Employment of audiologists is projected to grow 34 percent from 2012 to 2022, much faster than the average for all occupations. Hearing loss increases as people age, so the aging population is likely to increase demand for audiologists according to the BLS 2012 Statistics Report.

PhD: Employment of postsecondary teachers is projected to grow 19 percent from 2012 to 2022, faster than the average for all occupations. Growth is expected as enrollments at postsecondary institutions at all levels continue to rise, although at slower rates than they have in the past. Many jobs are expected to be for part-time or adjunct faculty according

Kansas Department of Labor Statistics 2012: Sedgwick County²

Employment of Majors*							
	Average Salary	Employment % in state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or professional education	Projected growth from BLS** Current year only.
MA	\$76,413	See below	100%	100%	0		↓
Aud	\$67,441	See below	100%	100%	0		
PhD	\$52,503	See below		100%	0		

Kansas Department of Labor Statistics 2012: State³

Employment of Majors*							
	Average Salary	Employment % in state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or professional education	Projected growth from BLS** Current year only.
MA	\$63,610	See below	100%	100%	0		↓
Aud	\$62,130	See below	100%	100%	0		
PhD	\$52,530	See below	100%	100%	0		

² Wage Data Source: Labor Market Statistics, Occupational Employment Statistics & Wages Program

³ Wage Data Source: Labor Market Statistics, Occupational Employment Statistics & Wages Program

MA: The median annual wage for speech-language pathologists was \$76,413 in May 2012. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent earned less than \$44,380, and the top 10 percent more than \$107,650.

AuD: The median annual wage for audiologists was \$67,441 in May 2012. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent earned less than \$43,820, and the top 10 percent earned more than \$101,130.

PhD: The median annual wage for postsecondary teachers was \$52,503 in May 2012. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent earned less than \$35,670, and the top 10 percent earned more than \$142,270.

As reported by CareerCast, ranking of the top 10 careers included Tenured University Professor (#2), Audiologist (#5) and Speech-language pathologist (#10). The brief profiles are as follows:

#2 Best Jobs of 2014: 2. University Professor (Tenured)

BLS Median Annual Salary: 68,970
Projected Job Growth by 2022: 19%*
Jobs Rated Score : 73

Achieving tenure is a difficult milestone for those in higher education, but doing so is a rewarding goal. Many of the careers atop the 2014 Jobs Rated report require postsecondary education, and university professors are integral in giving students the necessary foundation to succeed in other careers

#5 Best Jobs of 2014: 5. Audiologist

BLS Median Annual Salary: \$69,720
Projected Job Growth by 2022: 34%
Jobs Rated Score : 110

An audiologist helps patients address hearing and balance problems. With an aging population, audiologists are expected to be in high demand over the coming years. The BLS also reports that as hearing aid technology improves, devices become more attractive to patients, which translates into greater opportunities for audiologists.

#10 Best Jobs of 2014: 10. Speech Pathologist

BLS Median Annual Salary: \$69,870
Projected Job Growth by 2022: 19%
Jobs Rated Score : 138

Speech pathologist ranks in the top 10 of the 2014 Jobs Rated report for its favorable marks across all categories. Speech pathologists can work in educational or medical settings to help patients work through communicative disorders.

<i>Academic Year</i>	<i># of graduates</i>	<i># working in Kansas</i>
2005-06	16	9
2006-07	18	16
2007-08	28	25
2008-09	21	18
2009-10	18	13
2010-11	25	15
2011-12	22	16
2012-13	29	19

AuD

<i>Academic Year</i>	<i># of graduates</i>	<i># working in Kansas</i>
2006-07	1	0
2007-08	5	3
2008-09	6	4
2009-10	2	2
2010-11	9	4
2011-12	8	3
2012-13	8	4

PhD		

<i>Academic Year</i>	<i># of graduates</i>	<i># working in Kansas</i>
2005-06	2	0
2006-07	3	1
2007-08	0	0
2008-09	2	0
2009-10	1	0
2010-11	2	1
2011-12	1	0
2012-13	2	0

Communication Sciences and Disorders:

- **Speech Language Pathologists with MA in SLP** – In the past 7 years we have had 177 graduates and 131 – or 74% are currently working in Kansas.
The median salary for an SLP in Kansas is \$63,610. Thus, for the 131 WSU graduates the total salary dollars would be at least \$8,332,910.00 using the median salary for the state as the lowest estimate.
- **Audiologists graduated:** In the past 7 years we have had 39 graduates and 20 – or 51% are currently working in Kansas
Entry level salaries in Kansas, for an Audiologist, is \$62,130 annually. Thus our 39 WSU graduates working in Kansas would generate at least \$2,423,070.00 using the median salary for the state as the lowest estimate.

g. Analyze the service the Program provides to the discipline, other programs at the University, and beyond. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

Evaluate table 16 from the Office of Planning Analysis for SCH by student department affiliation on fall census day.

- Provide a brief assessment of the service the Program provides. Comment on percentage of SCH taken by majors and non-majors, nature of Program in terms of the service it provides to other University programs, faculty service to the institution, and beyond.

Provide assessment here:

According to the data provided, CSD UG majors, Graduate majors, and non-program majors are distributed equally, as relates to SCH. That is, the average SCH for each of the 5-year rolling averages

reported 33-35% of the SCH generated on the Fall Census Day is attributed equally to the three groups, with little variance for any 5-year period. Given the nature of programs in CSD as pre-professional, this is a substantial contribution to the institution beyond those courses specific to the majors. Additionally, faculty have consistently taught interprofessional courses within the college (e.g., research methods/evidence-based practice), courses specific to other majors (e.g., communication in aging, statistics for the health professions), and engaged with students and faculty from across campus in clinical education (including dental hygiene, physician assistant, physical therapy, engineering, human factors, clinical psychology, music education, educational psychology). Ongoing research and teaching engages students and faculty in interdisciplinary pursuits that are of service across programs and are inherent in the department mission and curricula.

h. Report on the Program's goal (s) from the last review. List the goal (s), data that may have been collected to support the goal, and the outcome. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

Communication Sciences and Disorders

Sample Department Goals

2008 (base-line data for Goals 2, 3, 4, 7 and 13) – December 2011

Recent summary data used to set goals for 2012 and beyond

(For Last 3 FYs)	Goal (s)	Assessment Data Analyzed	Outcome
See table below	Increase research productivity	See table below	See table below
	Increase external support for research	See table below	See table below
	Increase student research	See table below	See table below

	2008	2009	2010	2011
Articles in Refereed Journals	7	5	14	13
Articles in Refereed Periodicals	2	4	1	6
Chapters in Refereed Books	1	2	4	2
Authored and Edited Books	0	1	0	1
Conference Proceedings	2	0	4	5
Total	12	12	23	27

Completed Dissertations	1	2	2	0
5.5 Completed Theses	0	3	2	1
5.1 National & International Refereed Presentations				
Total	37	40	39	45
Number of Faculty-Student Presentations (Increase by 50% by 2012)	15	15	13	21
5.2 & 5.3 External Grants				
5.2 Research				
• Number Continuing	1	1	1	1
• Number Submitted	0	11	?	0
• Number Awarded	0	2	2	0
• Number Pending	n/a	4	1	0
• Number Denied	n/a	5	1	0
(Increase # awarded by 50% over 3 yrs)			Internal = 7	Internal = 3 awarded 6 submitted; 3 denied
5.3 Training				
• Number Continuing	2	2	3	0
• Number Submitted	0	1	?	4
• Number Awarded	0	1	?	0
• Number Pending	n/a	0	?	0
• Number Denied	n/a	0	?	4
(Increase # awarded by 50% over 3 yrs)			Internal = 1	Internal = 8 awarded 8 submitted

CSD goals from 2008-2012 strategic plan

- **Identity:** Refine, unify and promote the identity of the Department.
- **Quality Improvement:** Strive for continuous quality improvement in WSU- CSD programs and thereby contribute to the improved quality of the professions of audiology and speech-language pathology
- **Enrollment Growth:** Increase the size and diversity of CSD enrollment.
- **Growth of Scholarship:** Expand scholarly productivity.
- **Leadership:** Grow a culture of leadership

- **Globalization:** Establish a focus on globalization in CSD.

The specific objectives and measures for these goals have been posted on the CSD website. The table above is an example of the data collected and used in the process of establishing an updated strategic plan for the department. The goals listed above have all been achieved in accordance with the objectives related to each goal. Going forward, the process of establishing new department goals and strategic planning has been ongoing during the 2012-2013 academic year and is coincident with the University strategic planning process. The department goals detailed in the newly defined strategic plan build upon those listed because these continue to be overarching determinants of the department mission. The current strategic goals are below:

WSU / Communication Sciences and Disorders (CSD) Strategic Plan

Vision

To be recognized for leadership, innovation, and excellence in communication sciences and disorders.

Mission

To prepare qualified speech-language pathologists and audiologists as scholars/practitioners who are professionally competent to practice in educational and medical settings on behalf of children and adults who have disorders of communication and related difficulties.

Goals

1. A. Maintain stable and sustainable CSD programs (Undergraduate, MA, AuD, and PhD) so that every student will have applied learning experiences in the classroom and clinic practicum.
 - B. Continue to insure that CSD students (undergraduate honors, MA, AuD, and PhD) will have a quality research experience.
 - Maintain CAA accreditation (MA & AuD).
 - Introduce telepractice by Fall 2014 to provide an applied learning experience.
 - Increase the number of students that seek and/or obtain funding to conduct their research by 20% annually.
 - Increase the number of university and/or community partnerships as venues for research.
2. Increase research productivity in CSD
 - Increase the number of refereed publications by 20% over the next three years through the following:
 - Enhance the research capacity of CSD.
 - Increase number of international scholarly presentations by 20% over the next three years.
 - Increase submissions for research and personnel prep funding by 50% over the next 3 years.
 - Sustain the number of national, state, and local refereed presentations involving student and faculty research.
3. Collaborate with other WSU departments, clinics, and external community agencies for increased applied learning, technology transfer, and/or translational research.
 - Increase the number of partnerships within WSU and with outside agencies for applied learning and/or research opportunities, by 10% per year
 - Advance the proposed UG degree in ASL/English language interpreter education
4. Provide integrated learning opportunities in the CSD curriculum with incentives, rewards, and assessments.
 - Facilitate the IPE learning experiences of all students and increase integrated learning opportunities (such as critical thinking seminars) in CSD curriculum.
5. Act as catalysts for students' participation as leaders within and external to WSU.
 - Support students' leadership roles on campus by nominating/advancing them for programs such as the Honor's program, the new PALs positions, Senior Men/Women, etc.

6. Increase the educational opportunities for high quality students.
 - Establish support for underrepresented student groups by designating 20% of the student program fees to support mentorship programs for potential students from underrepresented groups, student scholarships, and graduate fellowships.
 - Identify early admission program pathways to attract the highest quality undergraduate students.
7. Promote the restructure of the unclassified professional ranking system to develop a system of rank and promotion for those not classified as faculty.
 - Working with cognizant committees and senates within the College and University, promote the reclassification of unclassified professionals to provide appropriate tracks for incentives and rewards.

The department assessment plan and matrix is aligned with this strategic plan.

7. Summary and Recommendations

Set forth a summary of the report including an overview evaluating the strengths and concerns. List recommendations for improvement of each Program (for departments with multiple programs) that have resulted from this report (relate recommendations back to information provided in any of the categories and to the goals and objectives of the program as listed in 1e). Identify three year goal (s) for the Program to be accomplished in time for the next review.

Provide assessment here:

All programs in CSD remain strong as reflected in the enrollments, faculty and student productivity, graduation and employment rates, the applicant pools, accreditation status and national rankings.

The number of students admitted to the program is limited by the number of clinical educators that are employed. This is a reflection of the dependence on revenue to support clinical education. Without a stable and sustainable base budget for clinical education, the programs are at capacity and cannot expand enrollment or new programs.

The salaries for faculty and clinical educators remain below market value and will impact recruitment of new faculty to fill existing vacancies.

Current faculty time and base budget funds are diverted to support clinical education which reduces faculty ability to engage in extensive research and therefore impacts external funding opportunities.

As reflected in the strategic goals for the department, the priorities are to attract a diverse and highly qualified pool of students to all programs; to expand research and external funding; to promote globalization; to engage in technology applications to extend the impact of CSD through telepractice; to add a new undergraduate program in sign language interpreting; advance interprofessional education and practice.

Recommendations:

Secure full base budget (GU) funding to cover the costs of existing clinical educators salaries and benefits.

Fill the existing faculty openings with senior research faculty.

Engage in telepractice to expand services, clinical education, and technology applications.

Continue to promote interprofessional education and practice through service learning, globalized curricula, and faculty/student international studies.

Appendix A: Watson-Glaser critical thinking assessment

Appendix B: Competencies

The Watson-Glaser Critical Thinking Appraisal

Reflections on initial data
Colloquium
August 30, 2013

What is Critical Thinking?

- *“Critical thinking comprises the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts.”*
- *“Critical thinking is the ability to see the world as it is – not the way others present it to us, or even perhaps the way we would like it to be.”*

What is Critical Thinking?

- *Critical thinking is a composite of attitudes, knowledge and skills*
 - *Attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is purported to be true*
 - *Knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined*
 - *Skills in employing and applying the above attitudes and knowledge*

About the Watson-Glaser

- First version published in 1925 as a test of “fair-mindedness”
- Revised extensively in 1941 and then a number of minor revisions followed over the years
- In 1994, a short form was published, increasing its popularity for use in the business world as a predictor of job success. The W-G is still used widely for that purpose

About the Watson-Glaser

- Measures select skills and abilities involved in critical thinking:
 - Recognize assumptions
 - Evaluate arguments
 - Draw conclusions

Why did we ask YOU to complete the Watson-Glaser?

- The effective and evidence-based practice of audiology and speech-language pathology needs us to be able to:
 - Define a problem
 - Select pertinent information for the solution of a problem
 - Recognize stated and unstated assumptions
 - Formulate and select relevant and promising hypotheses, and
 - Draw valid conclusions and judge the validity of inferences
- The initial data from the 5 subtests of the W-G test provide the baseline for us to examine our critical thinking skills for effective clinical practice and clinical research

Comparison Groups

Audiology students

- First year (n = 7)
- Second year (n = 7)

Speech-language pathology students

- First year (n = 25)
- Second year (n = 23)

PhD students

- Only 1 in this data set thus not included in analyses

Questions of interest:

- Are there differences between students' critical thinking skills in terms of their program (AuD vs. SLP) and year of study (1st vs. 2nd)?
- Does speaking English as a second language make a difference?

Subtest 1. Inference (Points possible = 16)

The ability to discriminate among degrees of truth or falsity of inferences drawn from

Program	Year	Mean	SD	Range
SLP	1 (N = 25)	10.00	2.58	2-13
	2 (N = 23)	9.61	2.50	4-14
AuD	1 (N = 7)	10.57	2.99	6-13
	2 (N = 7)	7.71	3.04	3-12

Source	df	Mean Square	F	Sig.
Program	1	4.74	0.68	0.41
Year	1	28.58	4.08	0.05*
Program	1	16.47	2.35	0.13
X Year				

*Significant difference by year with 1st Year students scoring higher (better), regardless of program

But mean score is not close to 16, and wide range of scores

Subtest 2 Recognition of Assumptions (max = 16)

The ability to recognize unstated assumptions or presuppositions in given statements or assertions

Response	N	Mean	SD	Range
SLP	1 (N = 25)	12.00	3.63	4-16
	2 (N = 23)	12.00	3.50	4-16
AUD	1 (N = 7)	12.28	3.55	6-16
	2 (N = 7)	9.57	3.99	6-14

Source	df	Mean Square	F	Sig.
Program	1	12.44	0.96	0.33
Year	1	19.96	1.53	0.22
Program x Year	1	19.96	1.53	0.22

No significant differences for program or year

Wide range of scores

Subtest 3. Deduction (max = 16)

The ability to determine whether certain conclusions necessarily follow from information in given statements or premises

Response	N	Mean	SD	Range
SLP	1 (N = 25)	12.08	2.18	7-15
	2 (N = 23)	11.43	2.87	5-16
AUD	1 (N = 7)	12.57	1.90	9-15
	2 (N = 7)	10.57	2.37	7-13

Source	df	Mean Square	F	Sig.
Program	1	0.38	0.06	0.80
Year	1	18.95	3.13	0.08 ^T
Program x Year	1	4.97	0.82	0.37

Trend toward significance with 1st year students scoring higher, regardless of program

Subtest 4. Interpretation (max = 16)

The ability to weigh evidence and decide if generalizations or conclusions based on the given data are warranted

Program	Year	Mean	SD	Range
SLP	1 (N = 25)	11.48	2.80	6-16
	2 (N = 23)	12.30	1.92	8-16
AuD	1 (N = 7)	12.00	1.83	10-15
	2 (N = 7)	10.86	2.12	8-13

Variable	df	Mean Square	F	Significance
Program	1	2.33	0.43	0.52
Year	1	0.28	0.05	0.82
Program x Year	1	10.48	1.92	0.17

No significant differences for program or year

Wide range of scores

Subtest 5. Evaluation of Arguments

The ability to distinguish between arguments that are strong and relevant and those that are weak or irrelevant to a particular question or issue

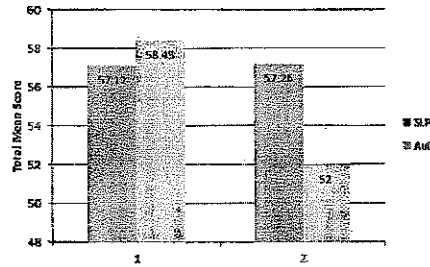
Program	Year	Mean	SD	Range
SLP	1 (N = 25)	11.56	3.28	7-16
	2 (N = 23)	11.91	3.04	4-16
AuD	1 (N = 7)	11.00	1.63	9-14
	2 (N = 7)	13.29	1.70	11-16

Variable	df	Mean Square	F	Significance
Program	1	1.79	0.21	0.65
Year	1	18.86	2.21	0.14
Program x Year	1	10.12	1.18	0.28

No significant differences for program or year

Wide range of scores

Comparison of Total Scores (points possible = 80)



Group	Year	Mean	Std. Deviation	Min.	Max.
SLP	1 (N = 25)	57.26	9.28	40.00	70.00
	2 (N = 23)	57.26	9.28	40.00	70.00
AuD	1 (N = 7)	58.43	8.54	40.00	70.00
	2 (N = 7)	52.00	11.03	40.00	70.00

Source	Type III Sum of Squares	df	Mean Square	Sig.
Program	42.31	1	42.31	0.45
Year	107.09	1	107.09	1.13
Program x Year	116.90	1	116.90	0.27

No significant differences for program or year of study; limited number of AuD students may have affected AuD comparison

Does speaking English as a Second Language make a Difference?

	Language	N	Mean	Std. Deviation
Inference	English only	56	9.7143	2.52056
	English as 2nd language	7	9.5714	4.03556
Recog of Assumptions	English only	56	11.5636	3.69235
	English as 2nd language	7	13.8571	1.86445
Deduction	English only	56	11.8750	2.34375
	English as 2nd language	7	11.0000	3.51188
Interpretation	English only	56	11.8929	2.33299
	English as 2nd language	7	11.2857	2.56348
Eval of Arguments	English only	56	12.0536	2.47474
	English as 2nd language	7	10.2857	5.25085
Total Score	English only	56	57.0893	9.29983
	English as 2nd language	7	56.0000	13.71131

$t = -1.62, df = 61$
 $p = 0.02$

No significant differences between the two groups – except for Recognition of Assumptions where those who speak English as a 2nd language did better (This analysis includes the PhD student)

How can we improve critical thinking skills?

- Recognize that critical thinking is HARD!
 - Humans are not naturally critical
 - Critical thinking is more of a life-long journey than something picked up in a two-week course

How can we improve critical thinking skills?

- Critical thinking takes practice
 - Done with full concentration and aimed at generating improvement
 - Not only involves engaging in the skill itself, but doing special exercises designed to improve the skill
 - Learning critical thinking skills is a graduated task
 - activities gradually become harder
 - There is close guidance and timely, accurate feedback

How can we improve critical thinking skills?

- Practice for transfer
 - Critical thinking skills are general in nature, making them vulnerable to transfer
 - They apply to a wide range of domains and contexts

How can we improve critical thinking skills?

- Understand the practical theory behind critical thinking
 - Learn a new vocabulary (new words and corresponding concepts)
 - Knowing the theory allows you to perceive more of what is going on --- provides the basis for self-monitoring and correction
 - The better you “see” what is going on, the better you will be at understanding what you are doing and how you can do it better

How can we improve critical thinking skills?

- Map it out
 - Makes reasoning more easily understandable
 - Once reasoning becomes “visible”, issues related to the reasoning become more evident
 - When arguments are presented in “diagrams”, relationships and procedures become more understandable
 - Maps provide clarity of insight

 - Maps are a transparent and effective way to represent arguments

How can we improve critical thinking skills?

- Be wary of “belief preservation”
 - The mind has intrinsic tendencies toward illusion, distortion and error
 - These are known as “cognitive biases and blindspots”
 - We seek evidence that supports what we believe and ignore other evidence
 - We rate evidence as “good” or “bad” in relation to whether it supports or conflicts with our beliefs
 - We stick with our beliefs even in the face of overwhelming contrary evidence as long as we can find ONE piece of support

Appendix B: Competencies

The issue for CSD is not that we have competencies that are detailed for undergraduate education because all students in our fields are required to obtain a graduate degree for entry into the profession. What have been defined are the general areas of education that are prerequisite to entry into the graduate program. Below are the knowledge and skill areas defined for CSD in both Audiology and Speech-Language Pathology. I have included the prerequisite (UG) list and the graduate lists.

Implicit in the prerequisite knowledge 'listings' is the intended outcome, that students will gain the necessary breadth and depth of knowledge in the identified areas to undergo graduate competency development. In general statements I would state that as:

The undergraduate general education curriculum prepares students to function as life-long learners, critical thinkers, and culturally competent individuals who have the necessary science, math, social science, and humanities education to prepare them for life following graduation. To that end, the undergraduate curriculum prepares students as critical thinkers, collaborative partners, problem solvers, communicators, and creators who apply a breadth of knowledge in the processes of advanced education, professional vocations, and productive citizenry.

As stated in the Boyer report below:

"The research university's ability to create such an integrated education will produce a particular kind of individual, one equipped with a spirit of inquiry and a zest for problem solving; one possessed of the skill in communication that is the hallmark of clear thinking as well as mastery of language; one informed by a rich and diverse experience. It is that kind of individual that will provide the scientific, technological, academic, political, and creative leadership for the next century."

The following are the specific competencies desired for the undergraduate in CSD. They are separated by SLP and Aud. As relates to general education the competencies are not explicitly stated but are targeted at the foundational knowledge areas that prepare the student for entry into graduate education. The graduate education knowledge competencies are noted separately, below.

The applicant must demonstrate knowledge of the principles of:

- Biological sciences
- Physical sciences
- Mathematics
- Social/Behavioral sciences

The applicant must demonstrate knowledge of basic human communication and swallowing processes, including their biological, neurological, acoustic, psychological, developmental, and linguistic and cultural bases

• Basic Human Communication

Processes

- Biological
- Neurological

Acoustic

- Psychological
- Developmental/Lifespan
- Linguistic
- Cultural

• Swallowing Processes

- Biological
- Neurological
- Psychological

- Developmental/Lifespan
- Cultural

Standard IV-A. Prerequisite Knowledge and Skills

A2. The applicant must have prerequisite skills and knowledge of:

- Life Sciences
- Physical Sciences
- Behavioral Sciences
- Mathematics

Standard IV-B. Foundations of Practice. The applicant must have knowledge of:

B1. Professional codes of ethics and credentialing.

B2. Patient characteristics (e.g., age, demographics, cultural and linguistic diversity, medical history and status, cognitive status, and physical and sensory abilities) and how they relate to clinical services.

B3. Educational, vocational, and social and psychological effects of hearing impairment and their impact on the development of a treatment program.

B4. Anatomy and physiology, pathophysiology and embryology and development of the auditory and vestibular systems.

B5. Normal development of speech and language.

B6. Phonologic, morphologic, syntactic, and pragmatic aspects of human communication associated with hearing impairment.

B7. Normal processes of speech and language production and perception over the life span.

B8. Normal aspects of auditory physiology and behavior over the life span.

B9. Principles, methods, and applications of psychoacoustics.

B10. Effects of chemical agents on the auditory and vestibular systems.

B11. Instrumentation and bioelectrical hazards.

B12. Infectious/contagious diseases and universal precautions.

B13. Physical characteristics and measurement of acoustic stimuli.

B14. Physical characteristics and measurement of electric and other nonacoustic stimuli.

B15. Principles and practices of research, including experimental design, statistical methods, and application to clinical applications.

B16. Medical/surgical procedures for treatment of disorders affecting auditory and vestibular systems.

B17. Health care and educational delivery systems.

B18. Ramifications of cultural diversity on professional practice.

B19. Supervisory processes and procedures.

B20. Laws, regulations, policies, and management practices relevant to the profession of audiology.

B21. Manual communication, use of interpreters, and assistive technology.

Graduate education competencies for Audiology:

The curriculum (academic and clinical education) is consistent with the mission and goals of the program and prepares students in the full breadth and depth of the scope of practice in audiology.

The program must provide a curriculum leading to an entry level clinical doctoral degree with a major emphasis in audiology.

The program must ensure that students have opportunities to acquire the knowledge and skills needed for entry into independent professional practice across the range of practice settings (including but not limited to hospitals, schools, private practice, community speech and hearing centers, and industry) and to meet relevant licensure and certification standards.

Doctoral-level programs in audiology must provide evidence of a curriculum that allows students to achieve the knowledge and skills listed below

Instruction in foundations of audiology practice must include opportunities for students to acquire knowledge in the following areas:

- *normal aspects of auditory physiology and behavior over the life span*
 - *interaction and interdependence of speech, language, and hearing in the discipline of human communication sciences and disorders*
 - *anatomy and physiology, pathophysiology and embryology, and development of the auditory and vestibular systems*
 - *principles, methods, and applications of psychoacoustics*
 - *effects of chemical agents on the auditory and vestibular systems*
 - *instrumentation and bioelectrical safety issues*
 - *infectious/contagious diseases and universal precautions*
 - *physical characteristics and measurement of acoustic stimuli*
 - *physical characteristics and measurement of electric and other nonacoustic stimuli*
 - *principles and practices of research, including experimental design, evidence-based practice, statistical methods, and application to clinical populations*
 - *medical/surgical procedures for treatment of disorders affecting auditory and vestibular systems*
 - *client/patient characteristics (e.g., age, demographics, cultural and linguistic diversity, medical history and status, cognitive status, and physical and sensory abilities) and how they relate to clinical services*
 - *genetic bases of hearing and hearing loss*
 - *speech and language characteristics across the life span associated with hearing impairment*
 - *development of speech and language production and perception*
 - *manual and other communication systems, use of interpreters, and assistive technology*
 - *ramifications of cultural diversity on professional practice*
 - *educational, vocational, and social and psychological effects of hearing impairment and their impact on the development of a treatment program*
 - *health care and educational delivery systems*
 - *professional codes of ethics and credentialing*
 - *supervisory processes and procedures*
 - *laws, regulations, policies, and management practices relevant to the profession of audiology*
- Instruction in prevention and identification of auditory and vestibular disorders must include opportunities for students to acquire the knowledge and skills necessary to*
- *interact effectively with patients, families, other appropriate individuals, and professionals*
 - *prevent the onset and minimize the development of communication disorders*
 - *identify individuals at risk for hearing impairment*
 - *apply the principles of evidence-based practice*
 - *screen individuals for hearing impairment and activity limitation or participation restriction using clinically appropriate and culturally sensitive screening measures*
 - *screen individuals for speech and language impairments and other factors affecting communication function using clinically appropriate and culturally sensitive screening measures*
 - *administer conservation programs designed to reduce the effects of noise exposure and of agents that are toxic to the auditory and vestibular systems*
- Instruction in the evaluation of individuals with suspected disorders of auditory, balance, communication, and related systems must include opportunities for students to acquire the knowledge and skills necessary to*
- *interact effectively with patients, families, professionals, and others, as appropriate*
 - *evaluate information from appropriate sources to facilitate assessment planning*
 - *obtain a case history*
 - *perform an otoscopic examination*
 - *remove cerumen, when appropriate*
 - *administer clinically appropriate and culturally sensitive assessment measures*

- perform audiologic assessment using physiological, psychophysical, and self-assessment measures
 - perform electrodiagnostic test procedures
 - perform balance system assessment and determine the need for balance rehabilitation
 - perform assessment for rehabilitation
 - document evaluation procedures and results
 - interpret results of the evaluation to establish type and severity of disorder
 - apply the principles of evidence-based practice
 - generate recommendations and referrals resulting from the evaluation process
 - provide counseling to facilitate understanding of the auditory or balance disorder
 - maintain records in a manner consistent with legal and professional standards
 - communicate results and recommendations orally and in writing to the patient and other appropriate individual(s)
 - use instrumentation according to manufacturer's specifications and recommendations
 - determine whether instrumentation is in calibration according to accepted standards
- Instruction in treatment of individuals with auditory, balance, and related communication disorders must include opportunities for students to acquire the knowledge and skills necessary to*
- interact effectively with patients, families, professionals, and other appropriate individuals
 - develop and implement treatment plans using appropriate data
 - discuss prognosis and treatment options with appropriate individuals
 - counsel patients, families, and other appropriate individuals
 - develop culturally sensitive and age-appropriate management strategies
 - collaborate with other service providers in case coordination
 - conduct self-evaluation of effectiveness of practice
 - perform hearing aid, assistive listening device, and sensory aid assessment
 - recommend, dispense, and service prosthetic and assistive devices
 - provide hearing aid, assistive listening device, and sensory aid orientation
 - conduct audiologic rehabilitation
 - monitor and summarize treatment progress and outcomes
 - assess efficacy of interventions for auditory and balance disorders
 - apply the principles of evidence-based practice
 - establish treatment admission and discharge criteria
 - serve as an advocate for patients, families, and other appropriate individuals
 - document treatment procedures and results
 - maintain records in a manner consistent with legal and professional standards
 - communicate results, recommendations, and progress to appropriate individual(s)
 - use instrumentation according to manufacturer's specifications and recommendations
 - determine whether instrumentation is in calibration according to accepted standards

Graduate education competencies for SLP:

The curriculum (academic and clinical education) is consistent with the mission and goals of the program and prepares students in the full breadth and depth of the scope of practice in speech-language pathology. *The program must provide a curriculum leading to a master's or other entry-level graduate clinical degree with a major emphasis in speech-language pathology. The program must offer appropriate courses and clinical experiences on a regular basis so that students may satisfy the degree requirements within the published time frame.*

Programs of study in speech-language pathology must be sufficient in depth and breadth for graduates to achieve the knowledge and skills outcomes identified for entry into professional practice as listed below. The program must provide sufficient breadth and depth of opportunities for students to obtain a variety of clinical education experiences in different work settings, with different populations, and with appropriate equipment and

resources in order to acquire and demonstrate skills across the scope of practice in speech-language pathology, sufficient to enter professional practice.

The program must provide an academic and clinical curriculum that is sufficient for students to acquire and demonstrate, at a minimum, knowledge of basic human communication and swallowing processes, including their biological, neurological, acoustic, psychological, developmental, and linguistic and cultural bases.

The program must provide opportunities for students to acquire and demonstrate knowledge of the nature of speech, language, hearing, and communication disorders and differences, as well as swallowing disorders, including etiologies, characteristics, and anatomical/physiological, acoustic, psychological, developmental, linguistic, and cultural correlates. These opportunities must be provided in the following areas:

- articulation
- fluency
- voice and resonance, including respiration and phonation
- receptive and expressive language (phonology, morphology, syntax, semantics, and pragmatics) speaking, listening, reading, writing, and manual modalities
- hearing, including the impact on speech and language
- swallowing (oral, pharyngeal, esophageal, and related functions, including oral function for feeding; (Orofacial myofunction)
- cognitive aspects of communication (e.g., attention, memory, sequencing, problem solving, executive functioning)
- social aspects of communication (e.g., behavioral and social skills affecting communication)
- communication modalities (e.g., oral, manual, and augmentative and alternative communication techniques and assistive technologies)

The program must provide opportunities for students to acquire and demonstrate knowledge in the following areas:

• principles and methods of prevention, assessment, and intervention for people with communication and swallowing disorders across the life span, including consideration of anatomical/physiological, psychological, developmental, linguistic, and cultural correlates of the disorders

- standards of ethical conduct
- interaction and interdependence of speech, language, and hearing in the discipline of human communication sciences and disorders
- processes used in research and the integration of research principles into evidence-based clinical practice
- contemporary professional issues
- certification, specialty recognition, licensure, and other relevant professional credentials

The program must provide opportunities for students to acquire and demonstrate skills in the following areas:

- oral and written or other forms of communication
- prevention, evaluation, and intervention of communication disorders and swallowing disorders
- interaction and personal qualities, including counseling, collaboration, ethical practice, and professional behavior
- effective interaction with patients, families, professionals, and other individuals, as appropriate
- delivery of services to culturally and linguistically diverse populations
- application of the principles of evidence-based practice
- self-evaluation of effectiveness of practice

The Boyer Commission on Educating Undergraduates in the Research University

REINVENTING UNDERGRADUATE EDUCATION:

A Blueprint for America's Research Universities

By admitting a student, any college or university commits itself to provide maximal opportunities for intellectual and creative development. These should include:

1. Opportunities to learn through inquiry rather than simple transmission of knowledge.
2. Training in the skills necessary for oral and written communication at a level that will serve the student both within the university and in postgraduate professional and personal life.
3. Appreciation of arts, humanities, sciences, and social sciences, and the opportunity to experience them at any intensity and depth the student can accommodate.
4. Careful and comprehensive preparation for whatever may lie beyond graduation, whether it be graduate school, professional school, or first professional position.

The student in a research university, however, has these additional rights:

1. Expectation of and opportunity for work with talented senior researchers to help and guide the student's efforts.
2. Access to first-class facilities in which to pursue research— laboratories, libraries, studios, computer systems, and concert halls.
3. Many options among fields of study and directions to move within those fields, including areas and choices not found in other kinds of institutions.
4. Opportunities to interact with people of backgrounds, cultures, and experiences different from the student's own and with pursuers of knowledge at every level of accomplishment, from freshmen students to senior research faculty.

The research university must facilitate inquiry in such contexts as the library, the laboratory, the computer, and the studio, with the expectation that senior learners, that is, professors, will be students' companions and guides. The research university owes every student an integrated educational experience in which the totality is deeper and more comprehensive than can be measured by earned credits.

The research university's ability to create such an integrated education will produce a particular kind of individual, one equipped with a spirit of inquiry and a zest for problem solving; one possessed of the skill in communication that is the hallmark of clear thinking as well as mastery of language; one informed by a rich and diverse experience. It is that kind of individual that will provide the scientific, technological, academic, political, and creative leadership for the next century.

[http://naples.cc.sunysb.edu/pres/boyer.nsf/673918d46fbf653e852565ec0056ff3e/d955b61ffddd590a852565ec005717ae/\\$FILE/boyer.pdf](http://naples.cc.sunysb.edu/pres/boyer.nsf/673918d46fbf653e852565ec0056ff3e/d955b61ffddd590a852565ec005717ae/$FILE/boyer.pdf)