A survey of undergraduate capstone course objectives in communication sciences and disorders: Current practice and future implications.

Article *in* Journal of Allied Health · December 2017

CITATIONS
6

READS
251

2 authors, including:

Beula M Magimairaj
Utah State University
32 PUBLICATIONS **684** CITATIONS

SEE PROFILE

A survey of undergraduate capstone course objectives in communication sciences and disorders: Current practice and future implications

Beula M. Magimairaj

Kathy McDaniel

Communication Sciences and Disorders

University of Central Arkansas

Corresponding author:

Beula M. Magimairaj, Ph.D.
Communication Sciences and Disorders
University of Central Arkansas
201 Donaghey Avenue
UCA Box 4985
Conway AR 72035
USA
bmagimairaj@uca.edu
Phone: 501-450-5775
Fax: 501-450-5474

Abstract

Purpose: Undergraduate capstone courses are culminating experiences that allow seniors to integrate and demonstrate the knowledge and skills gained during undergraduate studies. To date, there are no published studies about capstone course standards/designs in the discipline f communication sciences and disorders (CSD). The purpose of the study was to determine what capstone experiences are considered critical for CSD undergraduates.

Method: Faculty were asked to rank order 15 potential learning objectives (suitable to a senior capstone) based on their relative importance from most important to least important. Some respondents provided optional feedback. Sixty-four CSD faculty responded to the nationally distributed survey.

Results: The three highest ranked objectives for capstone courses were: written and oral communication proficiency, understanding of human communication, and understanding theories of learning from a multidisciplinary perspective. Undergraduate research experiences received the lowest rankings.

Conclusion: Survey results and CSD faculty feedback are discussed in the context of the standards expected of a capstone course, CSD undergraduate requirements, and enhancing student interest in research. The degree to which students are being prepared for evidence-based practice, the doctoral shortage, and the challenges to Master's programs are also discussed.

Overview of the capstone experience

Capstones refer to a set of culminating experiences that bring together different aspects of curricula (Boyer commission report, 1998, 2001). These experiences allow students to integrate and demonstrate knowledge and skills relevant to a discipline in a cohesive and coherent manner. Moreover, capstones can be designed to evaluate student success in meeting typical undergraduate requirements regardless of major, such as critical thinking ability, oral and written communication proficiency, and depth of subject knowledge (Wagenaar, 1993). Capstone courses appear to have their early roots in a publication by the Association of American Colleges (AAC) in 1985. This report highlighted the need for reform in college education in the United States, in response to the noted failures of elementary and secondary education (e.g., National Commission on Excellence in Education, 1983). Follow-up AAC reports proposed specific principles, one of which was to incorporate culminating experiences that contribute to the overall goals for students in their major area of study. Since then, several disciplines have incorporated capstone experiences in different formats.

Endorsed by the Carnegie Foundation for the Advancement of Teaching, the *Boyer commission* was established in 1995. Dr. Ernest L. Boyer, then president of the foundation, was a prominent driving force in American education reform. The main goal of the Boyer commission was to re-evaluate undergraduate education at *research* universities and make recommendations on ways to improve undergraduate education given the resources available at research universities. Key recommendations of the Boyer commission included, but were not limited to: research or inquiry-based learning, integration of communication skills to coursework, enhancing interdisciplinary education, and a culminating capstone experience. The goal of a culminating capstone experience is generally established by departments. The capstone allows students to use

communication and research skills learned during their university program. According to a survey (Boyer Report, 2001), about 70% of research universities required a capstone project or senior seminar in some majors or programs (commonly in engineering departments and honors programs). It is ideal if the capstone course is team-taught (Wagenaar, 1993) so that students are able to appreciate multiple approaches and competing viewpoints. Capstones commonly include seminar style lectures and discussion formats along with products contributed by students towards a grade. The capstone thus also serves as an assessment mechanism in the senior year.

The above overview sets the stage to examine capstone courses in communication sciences and disorders (CSD). Senior capstones in CSD are now becoming part of the curriculum at many universities in the United States and serve to provide students experiences that enable them to use their skills of critical inquiry and effective communication and demonstrate their knowledge of diversity and responsible living (e.g., University of Central Arkansas Task Force Report, 2012). A capstone course for CSD seniors has numerous potential benefits beyond students having the opportunity to synthesize knowledge and demonstrate skills acquired in their courses. CSD students must go on to graduate school if they are to become licensed speech-language pathologists or audiologists. A capstone can facilitate transition to graduate work by providing insights about the nature of graduate training. Students at this juncture must also consider what aspect of the discipline is of greatest interest to them (for example, medical speech-language pathology or educational speech-language pathology).

To make informed decisions, seniors need information about the realities of clinical practice in various settings and with individuals of different ages. However, regardless of setting, type of disorder, or age of client population, students must appreciate the relation of research to providing evidence-based practice. A capstone can provide experiences that enable them to see

this relation. Moreover, it can stimulate research-oriented students to consider the benefit of doctoral education and becoming a researcher and teacher. Indeed, as a result of the graying of the professoriate, there is a serious shortage of doctoral level speech-language pathologists and audiologists. Some reports highlight the importance of undergraduate research experiences towards overcoming this shortage (Friberg, Folkins, Harten, & Pershey, 2013; Mueller & Lisko, 2003) as well as for a range of potential positive outcomes such as student retention and professional success (Eigren & Hensel, 2006).

The present study was driven by two motivations: a) the need to establish an undergraduate capstone course in CSD at our department; and b) the lack of empirical data about what constitutes as best practice in the content and delivery of a capstone course in CSD. In keeping with evidence-based educational practices, we first reviewed the literature on capstone courses in general and current practice in senior capstone courses in CSD. Specific capstone course objectives are generally established at the departmental level. Several publications (such as those reviewed in previous paragraphs) make general recommendations about capstone course design and outcome measurement, however, results of a study specific to CSD capstone course content, design, or implementation have not been published. The present study was designed to address this gap and to inform best practices in capstone course development in CSD. We believed that this effort would advance the scholarship of teaching and learning, and that the results of the study could benefit other CSD programs in the nation.

Current practice in senior capstone courses in CSD

Through internet searches we accessed and reviewed 13 senior CSD capstone course syllabi. Course outcomes varied across programs. Common outcomes included: completing and presenting a research study; presenting a research proposal; analyzing an observed field

experience/case study; completing creative projects (e.g., developing videos); class participation and discussion; written submission; oral presentation; portfolio development; and participation in Service Learning Projects. A few programs (3/13) allowed students to choose one of several options such as the above.

To date, there are no national databases that have information about how many CSD programs offer a senior capstone. To obtain this information we distributed a brief 2-question survey to 302 CSD program contacts nationally[1]. To this initial survey, 61 program contacts responded. Of the respondents, 44% offered an undergraduate senior capstone course (27/61). Credit hours for the capstone course ranged from 1 to 6 credit hours (*Mean*=3). Given the variability in capstone designs across programs, we felt the need to examine what experiences CSD faculty considered to be most critical for CSD undergraduates. We believed that such an examination would inform best practices and facilitate consideration of current and emerging issues in CSD education.

Study Aim: To develop a survey and obtain responses from CSD faculty nationally, on the relative importance of potential learning objectives for a senior capstone.

Method

The method included two phases: I) a pilot survey and II) a final survey. In the first phase, survey items were developed and Institutional Review Board approval procedures were completed. The study was conducted in full compliance with IRB requirements at the University of Central Arkansas.

Survey items were to include potential learning objectives suitable to a senior undergraduate capstone course. Items were developed and revised jointly by 3 CSD faculty (early, mid, and late career) by taking into consideration capstone requirements of the university, academic standards required by the American Speech-Language-Hearing Association (ASHA), and the Council of

[1] Program contact information was obtained from the American Speech-Language and Hearing Association (ASHA) website.

Academic Accreditation (CAA). A list of 20 pilot survey items was created. Readability of the items and survey instructions was judged by 3 CSD faculty and 1 non CSD faculty who did not participate in creating the survey items. Each survey instruction and item were rated as: very easy to read; easy to read; somewhat easy to read; or not easy to read. Greater than 80% of the survey items and 100% of the survey instructions received a rating of "very easy to read". Items that received lower ratings were revised for clarity based on the rater's feedback. The objective of this pilot survey was to have faculty (of only those CSD departments that offer a capstone) rank-order potential survey items and provide any feedback. The pilot survey served as a vetting process for the appropriateness of the selected capstone objectives and also allowed for new inputs to be obtained.

The 20-item pilot survey was imported to Qualtrics software and sent electronically to 271 CSD faculty from the 27 CSD programs who offered a senior capstone. Faculty were asked to rank-order capstone objectives based on their relative importance. Additionally, they were invited to provide feedback. Based on the responses and feedback from 25 respondents, the pilot survey items underwent revision to better reflect the knowledge and skills expected of CSD undergraduates (i.e., the core skills of speaking, writing, and underlying knowledge). The revised survey included 15 items. A readability check was completed. The final 15-item survey is shown in Appendix A.

In phase II, the final 15-item survey was distributed nationally to 300 CSD program contacts who were requested to forward the survey email to all CSD faculty in their department. The survey link was also posted to a discussion forum on the *Council of Academic Programs in Communication Sciences and Disorders* (CAPCSD) website. Given the integrated nature of capstone course objectives it was deemed necessary to survey all CSD faculty and not just those

faculty who taught capstone courses. Prior to beginning the survey all respondents provided informed consent and were provided the option to opt-out of the survey. Information about current work status, years of CSD professional experience (post MA/MS/Au.D.), and current work setting(s) (e.g., university, school, hospital etc.) was also obtained. "Capstone" was defined for all respondents. Survey items were presented in a randomized order. All respondents were asked to rank-order 15 potential learning objectives suitable to a senior capstone course (from most important to least important). The respondents could rank-order by dragging a capstone objective up or down on the computer screen. At the end respondents could provide feedback. The survey was open for 3 months.

Results

The results from the final 15-item survey which was completed by sixty-four faculty are presented. Faculty rank-ordered 15 potential capstone course objectives based on their relative importance. Seven faculty also provided feedback about the capstone. The distribution of faculty respondents by years of experience and academic position is depicted in Figures 1 and 2. Faculty with greater than 20 years of experience comprised the largest proportion of respondents (38%). Those with 16 to 20 years or 11 to 15 years of experience comprised 22% and 13% of the respondents, respectively. Faculty with 5 to10 years or less than 5 years of experience, comprised of 20% and 8% of the respondents, respectively. The majority of respondents (45%) held the rank of Associate or full Professor; 30% were assistant professors, and 25% were clinical instructors and supervisors.

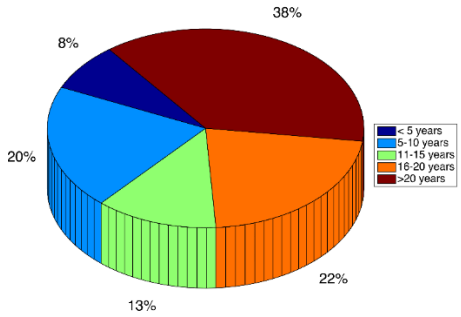

Figure 1. Distribution of faculty respondents by years of professional experience in communication sciences and disorders (*N*=64)

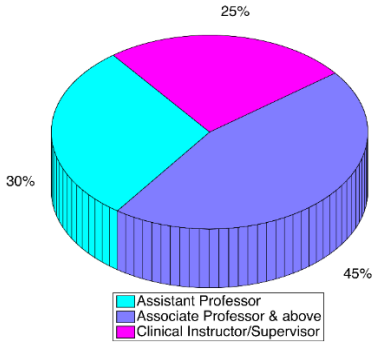

Figure 2. Distribution of faculty respondents by academic position (*N*=64)

To facilitate description of the survey data, rank-orders of each survey item was summarized. The five highest ranks were classified as Group 1, the second highest 5 ranks as Group 2, and the lowest five ranks as Group 3. For example, for each survey item, data were tabulated to determine how many respondents placed that item in Group 1, 2, or Group 3. The number of respondents who ranked each survey item in Group 1, 2 or 3 is shown in Figure 3. The highest ranked objectives (items 1, 2, 3, 5, 6, 9) included written and oral communication, anatomy and

physiology, understanding of human communication, and theories of learning from a multidisciplinary perspective. Majority of the faculty ranked research experiences the lowest (items 4, 8, 12, 13).

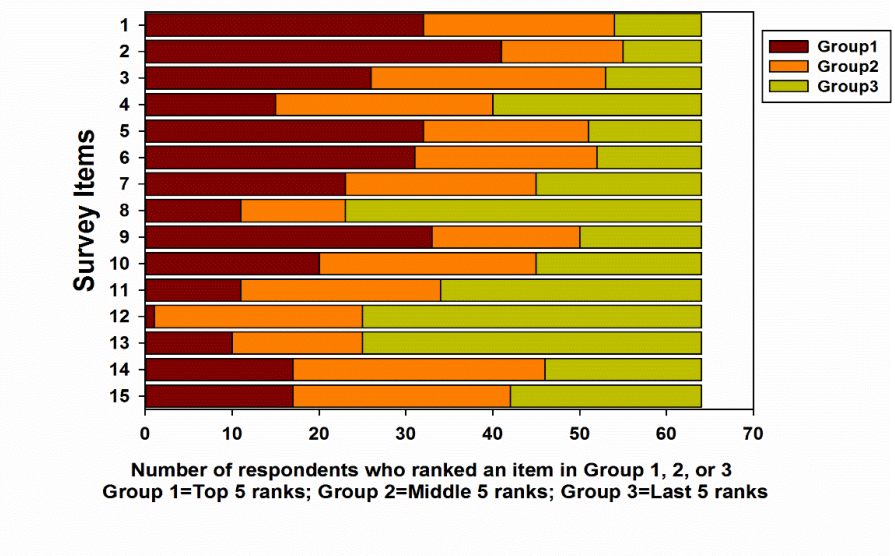

Figure 3. Rank-order summary of survey items (*N*=64)

Optional feedback from faculty respondents focused on the importance of: the ability to coherently write about complex concepts; to understand the role of health care professionals in providing clinical services; being informed about the credentialing requirements for clinical practice; the scope of practice in speech-language pathology and audiology; integration of anatomy and physiology aspects in an advanced way; completing single-subject design study while assisting graduate students in the clinic; focusing on clinical issues relative to research because most master's students would be clinical practitioners. In summary, many of the suggestions offered by respondents related to the themes in the highest ranked items. Core theoretical concepts, oral communication and writing, and integration of curricular components to form a broad view of the profession and related disciplines were regarded as key objectives. Lower ranking of research specific experiences indicated their secondary importance.

Discussion

Capstone courses are increasingly prominent in CSD. However, little information about desirable learner outcomes are available in the literature. Results of the present study fill this gap. The highest ranked objectives were related to oral communication and writing proficiency, and integration of core theoretical concepts (e.g., understanding human communication, theories of learning from interdisciplinary perspectives) to form a broad view of the profession. These rankings represent the views of a good cross-section of CSD faculty because a broad distribution of respondents across years of experience and faculty ranks was obtained. The process of conducting the present study was informative and results revealed multiple themes which are discussed next.

Integrating components of the curriculum: The hallmark of a capstone experience is integrating the curriculum. Students are expected to demonstrate the ability to integrate multiple concepts cohesively and coherently. The capstone should provide students opportunities to demonstrate learning in different ways such as: comprehension, application, analysis, synthesis, and evaluation (Bloom et al., 1956). Well-designed rubrics to accompany capstone learning outcomes are essential for faculty and students so that performance expectations are clear. We suggest that the rubrics for the capstone be developed jointly by faculty given the integrated nature of the capstone experience. Finally, the nature of the capstone is influenced by the size of the graduating class and the faculty-to-student ratio. Therefore, it is a challenge for faculty to design the capstone to assess students on in-depth service learning/research projects if a single faculty is responsible for a large class size.

Integrating research experience through the capstone: Capstone models often include student research projects (Boyer commission, 1998; 2001). The rationale for having seniors complete a

small-scale research project is that it stimulates inquiry-based learning, integration of multiple core concepts within and across disciplines, integrates measurement and statistics, involves review of the literature, and critical thinking, writing, and oral presentation components. That is, it encompasses all objectives expected of a capstone. The present CSD faculty survey results however, did not support an emphasis on research experience through the senior capstone. CSD faculty ranked undergraduate research experiences to be of secondary importance and also provided clear subjective feedback on this. These survey results align with a recent review that reported the lack of documented benefits from undergraduate research experiences, owing in part to a) the reduced quantity and quality of mentoring that may be available to undergraduates and b) students' fragmented ideas of research (Linn, Palmer, Baranger, Gerard, & Stone, 2015). We discuss this next in the context of initiatives that are designed to facilitate undergraduate student research.

Federal grants such as the SURF (Student Undergraduate Research Fellowship) provide research awards to eligible undergraduates to conduct research projects. Similarly, ASHA initiatives such as PROGENY (Promoting the next generation of researchers) are designed to pair faculty researchers with undergraduate students who present posters as first authors at ASHA. Such initiatives allow undergraduates to engage in research, and discuss and learn from experts. There is an emphasis to stimulate student research early on because not enough of CSD graduates are interested in pursuing research (Friberg et al., 2013). While the doctoral shortage in CSD is one issue, a related issue is having all students understand the value and importance of research as they become future clinical practitioners and consumers of research. The results of this faculty survey indicated that hands-on research experience was not considered a priority for CSD seniors by the respondents. While faculty time necessary for such experience is a challenge,

a second aspect emphasized by faculty respondents was that theoretical and practical clinical aspects are more relevant for graduating seniors than research experience. Undergraduate research experience through a capstone appears to be a best fit for select seniors who show keen interest and initiative in research. Identifying these students early and mentoring them is important.

Given the results from the survey it is evident that an undergraduate degree in CSD has broad requirements with little clinical emphasis. During the typical 2-year master's program in speech-language pathology, students must learn a substantial amount of information about disorders, assessment, and treatment. As a consequence, there is little time devoted for students to conduct an in-depth research study or frame specific research questions for critical inquiry. This curricular design may in-part be responsible for a doctoral shortage in CSD because the curriculum does not allow graduate students adequate time to consider involvement in research projects. Even a small-scale faculty-guided research project typically would need at least 2-3 semesters for completion. This in-part leads to the need for a longer master's program in speech-language pathology (such as the clinical doctorate). While this aspect is not the focus of the present study, the process of understanding the capstone, results from the survey, and curricular needs lead to this discussion point.

Perceived distinction between research and clinical practice: The perceived distinction between research methods and clinical practice as reflected in the above discussion is concerning. The scientific method is central to many concepts and is not limited to a 'research methods' class. When students learn about typical language development milestones or other aspects of typical development/function, they are expected to understand statistical concepts such as "measurement", "mean", "normal distribution" etc. Considering the survey rankings and

feedback in this context, consistent lower rankings of basic research experiences were intriguing {for example, Item 12: *Perform basic statistical analyses on simulated data (e.g., mean, standard deviation, analysis of variance, correlation)}*. Faculty feedback and rankings clearly indicated that the capstone must help students understand the professional scope of practice in CSD and allow them to form a broad view of related disciplines. Research experience was considered less critical. Demonstrating the importance of basic research experience at the undergraduate level is much needed in CSD. This experience is crucial to better understand and interpret tests used to assess variability in human communication. Research experience is fundamental to critically evaluate assessment and intervention methods.

Clinical focus in the senior year: Many faculty indicated that in-depth knowledge of common clinical disorders or clinical methods (assessment and treatment goals) were not critical for seniors and that these were more relevant to graduate students. Exceptions to this are select CSD programs that actively engage undergraduate students in the clinic especially in their senior year. Faculty feedback also included examples of seniors assisting or shadowing faculty or graduate students in the clinic to complete a single-subject design study or to summarize their experience in a report. There appear to be opposing views among CSD faculty regarding this. Limiting clinical depth is proposed because undergraduates are not expected to practice in most states. On the contrary, some clinical experience is encouraged by those faculty who consider the capstone as an important bridge to a graduate program. We need to develop a shared understanding of the objectives of a senior capstone. That is, whether it should integrate course content and function as a "looking back/review" process for the seniors or whether it should serve as a "separation process" that allows seniors to go one step further into critical roles (e.g., Durel, 1993).

A note about clinical simulation softwares is relevant here. Simulation softwares (e.g., *Simucase*) include a library of virtual clients with communication disorders. Users can select assessments, make a diagnosis, and make recommendations. Marketing on these suggest that these tools can be used for student training in a no-risk environment and that they facilitate critical thinking and inter-professional education. Faculty must evaluate whether clinical simulation softwares can be utilized effectively at the undergraduate level or not, given the undergraduate student's limited knowledge in disorders of communication and clinical methods.

The CSD undergraduate education model was recently revisited by the Academic Affairs Board of ASHA (2015). Results of the present survey are in alignment with the board's final recommendations that the CSD undergraduate degree must broadly focus on human communication with a strong foundation in the basic sciences and fundamentals of research. Undergraduate CSD education must prepare students for a range of potential future careers/fields (not just CSD) as well as Ph.D. studies. The report states that CSD graduate programs have grown at a slower rate in comparison to undergraduate enrollments. Hence, student preparation must be foundational to other prospective fields as well so that students can be accommodated into graduate programs. Enhancing interprofessional education and increasing resources towards graduate education has also been emphasized by the board (ASHA, 2015).

Limitations of the present study: In rank-ordering survey items certain limitations must be considered. That is, even when an item is ranked lower it does not necessarily mean that the respondent does not consider the item to be important to student learning. Second, some items that are ranked higher may be broader and more encompassing than the lower ranked objectives. For example, effective written and oral communication (Items 1 and 3) may effectively be combined with research experience such as reviewing and critiquing a research article (Item 4

and 7). Similarly aspects of individual variability in human communication across the lifespan (Items 5 and 6) may be effectively integrated with analyses using data from neuro-typical children and adults (Item 10) or anatomy and physiology of speech, language, cognition, and hearing (Item 9). In summary, survey results and feedback indeed provided important data that allowed consideration and discussion of multiple themes. The survey results and the discussion must be interpreted within these limitations.

Conclusion

The present study obtained faculty responses and feedback about the relative importance of potential course objectives for a senior capstone. Factors that emerged as key capstone objectives were related to a) integration of curricular components to form a broad view of the profession and related disciplines, b) core theoretical concepts within and across disciplines, particularly as they applied to human communication across the lifespan and theories of learning, and c) oral and written communication skills. In addition, we discussed current and emerging themes in CSD education in context of the survey results and current curricular designs in CSD. Of particular concern was the limited time and opportunity in the curriculum to facilitate student research experiences. The findings from the present study are currently being utilized to design a senior capstone course. Effectiveness of the newly designed course will be evaluated in a future study. We hope that the survey results and discussion themes will prove useful to departments currently designing or considering the inclusion of senior capstone courses.

We conclude with a few statements retrieved from the Boyer report (1998) about the culmination of academic effort – "The experience should enable the student to bring to a symbolic conclusion the acquisition of knowledge and skills that has preceded this final effort…..It should allow the student to understand her or his potential for serious work and

develop the aspiration to do it well.....The flexibility that should mark the graduate of a research university should be fully developed in this final, culminating experience."

Acknowledgements

The authors thank all faculty who responded to the survey for their time and feedback. We thank Prof. Kathryn Bayles, Prof. Bill Lammers, Dr. Dee Lance, Dr. Brent Gregg, and Mrs. Barbara Jones for their invaluable inputs and assistance with readability checks. We also thank Graduate Research Assistants: Kristen Johnson, Taylor Wentz, and Sara Huneycutt.

References

American Speech-Language-Hearing Association (2015). Academic Affairs Board Final Report: *The role of undergraduate education in communication sciences and disorders.* Retrieved from www.asha.org/uploadedFiles/AAB-Report-Role-Undergrad-Ed CSD.pdf#search=%22academic%22

Bloom, B., Engelhart, M., Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of educational objectives: The classification of educational goals.* Handbook I: Cognitive domain. New York: David McKay Company.

The Boyer Commission on Educating Undergraduates in the Research University (1998). *Reinventing Undergraduate Education: A blueprint for America's Research Universities.* Stony Brook, NY.

Boyer Commision (2001). Reinventing undergraduate education: Three years after the Boyer Report.

CAPCSD Position statement: http://capcsd.org/resources/sotl_position.php

Eigren, T. & Hensel, N. (2006). Undergraduate research experiences: Synergies between scholarship and teaching. *AAC&U Peer Review*, *8(1)*, 4–7.

Durel, R. (1993). The capstone course: A rite of passage. *Teaching Sociology*, *21(3)*, 223-225.

Linn, M., Palmer, E., Baranger, A., Gerard, E., & Stone, E. (2015). Undergraduate research experiences: Impacts and opportunities. *Science*, *347*, 1261757.

Mueller, P. & Lisko, D. (2003). Undergraduate research in CSD programs: A solution to the PhD shortage? *Contemporary Issues in Communication Sciences and Disorders*, *30*, 123–126.

Wagenaar, T. (1993). The capstone course. *Teaching Sociology*, *21(3)*, 209-214.

Appendix A – Final survey items/learning objectives

IN THE UNDERGRADUATE SENIOR CAPSTONE COURSE THE STUDENT SHOULD DEMONSTRATE KNOWLEDGE AND SKILLS TO:

1. Compose a logical and grammatically correct assignment on a selected topic.
2. Understand and describe what it means to have a communication impairment from a client's and caregiver's perspective.
3. Effectively make an oral presentation on a selected topic.
4. Frame specific research questions with instructor guidance.
5. Integrate and apply interdisciplinary knowledge to better understand individual variability in human communication across the lifespan (e.g., psychology, biology, neuroscience, physics).
6. Integrate and apply interdisciplinary knowledge to better understand theories of learning and re-learning in relation to human communication across the lifespan (e.g., psychology, biology, neuroscience).
7. Demonstrate basic skills required for research (e.g., do a literature review, abstract a research article, critically evaluate an article, evaluate research evidence, design a study).
8. Design and implement a research project with instructor guidance.
9. Describe fundamental aspects related to the anatomy and physiology of speech, language, cognition, and hearing.
10. Perform speech and language analyses using data from typically developing children and neuro-typical adults (e.g., phonetic/speech/language/voice analysis/behavior analysis).
11. Describe basic instrumentation and technology related to communication sciences (e.g., hearing aid components, acoustical/speech analysis software).
12. Perform basic statistical analyses on simulated data (e.g., mean, standard deviation, analysis of variance, correlation).
13. Participate in research lab visits and compose a written/verbal response to specific questions.
14. Identify and use basic APA professional writing rules (e.g., how to mention authors in text, appropriate use of quotes when citing others, appropriate use of punctuations).
15. Describe common preventive methods related to communication disorders (e.g., noise protection, early identification, language stimulation/enrichment).