

Improving Communication for Experienced Hearing Aid Users with Audiologic Rehabilitation: A Service-Learning Project

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This paper describes an audiologic rehabilitation (AR) service-delivery model at a university speech-language pathology program, targeted toward experienced hearing aid users with unresolved problems. AR has been shown to alleviate the negative impact of hearing loss, leading to greater hearing aid satisfaction and quality of life, but is not readily available in all communities, in part by lack of third-party reimbursement. While American Speech-Language-Hearing Association (ASHA) guidelines no longer define specific courses or practicum experiences related to AR training, AR is still within the scope of practice of speech-language pathologists (SLPs). A challenge for SLP training programs is to ensure in a cost-effective manner that students meet requisite knowledge and skill outcomes. One possible solution to breach both the gap in AR training of SLPs and the gap in AR services is a service-learning program.

INTRODUCTION

Service learning, though not a new concept, has gained considerable momentum in education over the last decade. One noteworthy example in the field of speech-language pathology and audiology is the Summer Intensive Aural Rehabilitation Conference (SIARC) described by Thibodeau and Cokely (2003). By definition, service learning is a course-based experience in which students provide a service in response to community-identified needs and learn about (a) the context in which the service is provided, (b) the connection between academic

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coursework and their service, and (c) their roles as citizens (Bringle & Hatcher, 1995). This article presents a program of community service learning for speech-language pathology students that meets these objectives while providing needed clinical experiences for students.

A challenge for speech-language pathology training programs is to ensure in a cost-effective manner that students meet requisite knowledge and skill outcomes (American Speech-Hearing-Language Association [ASHA], 2001a, 2001b). While new ASHA guidelines no longer define specific courses or practicum experiences related to audiologic rehabilitation (AR) training, AR is still within the scope of practice of speech-language pathologists (SLPs; ASHA, 2001c) and it is likely that they will encounter clients with hearing loss as the incidence of hearing loss increases (ASHA, 2006), as new hearing aid users grow in number (Kochkin, 2005), and as technology use expands beyond traditional hearing aids. Studies of the pre-professional AR training of SLPs indicate that they are not well prepared for clients who are deaf or hard-of-hearing (Moseley, Mahshie, Brandt, & Fleming, 1994). For example, the practical and written examinations of the majority of SLPs in a 1989 study (Woodford, 1989) showed a lack of the basic knowledge needed to assist clients in the use of amplification (e.g., troubleshooting). A recent emphasis on teaching the principles of evidence-based practice (EBP) further challenges programs to develop appropriate course content and clinical experience (ASHA, 2005a, 2005b). Service learning can help to meet these challenges by providing in-depth exploration of hearing aids and assistive devices, social interaction with clients, and first-hand observation of the positive impact of AR, experiences that may not qualify as practicum hours or fit traditional service delivery models.

Importance of AR

Because AR is not typically covered by third-party payers, hearing aid fittings today are often limited to hearing aid orientation, communication strategies training, and counseling (Prendergast & Kelley, 2002; Schow, Balsara, Smedley, & Whitcomb, 1993; Warner-Czyz, 2000). Prendergast and Kelley (2002) found that these services were typically provided informally and that most practitioners (83%) offered the information in handout form. Communication partners (significant others [SOs]), who also are affected by the hearing loss, are frequently not included. Beyond hearing aid fitting, a comprehensive model would include (a) information on assistive listening devices; (b) training in speechreading, listening, communication strategies, and coping strategies; (c) educational and psychosocial adjustment counseling; and (d) training for communication partners (Arlinger, 2003; Chisolm, Abrams, & McArdle, 2004; Heine, Erber, Osborn, & Browning, 2002; Hull, 2004; Montgomery & Houston, 2000; Prendergast & Kelley, 2002; Spitzer, 2000; Wayner, 2006).

With AR intervention, clients are likely to realize improved problem solving in

difficult listening situations (Abrahamson, 2000), increased assertiveness, more fluent communication, increased use of appropriate repair strategies (Tye-Murray, 1998), and overall higher quality of life, resulting in a decreased perception of handicap over time (Backenroth & Ahlner, 2000; Thibodeau & Cokely, 2003). When family members and SOs are included in the process, there is increased awareness and acceptance, or acknowledgement, of the impact of hearing loss (Preminger, 2003).

Gap in Service Provision

Despite the known benefits of AR, there continues to be a gap in service provision (Prendergast & Kelley, 2002). According to Carmen (2003), fewer than 25% of audiologists provide AR. In this author's locale, the number is even smaller (less than 10%). According to the practitioners studied by Pakulski and Hinkle (2003), reasons included (a) lack of third-party reimbursement; (b) clients' reluctance to pay more after purchasing costly hearing aids; (c) inadequate training and knowledge about AR; and (d) lack of time, resources, or interest. These practitioners' clients reported not knowing about AR, its benefits, or who provides it. Barriers to appropriate intervention services are complex (Jerram & Purdy, 2001; Walden & Walden, 2004), but a common barrier is financial constraint (Warner-Czyz, 2000). This barrier would be difficult to remove unless clients realize the potential benefit of services beyond the hearing aid fitting.

One possible solution to breach both the gap in AR training of SLPs and the gap in AR services is innovative service-delivery with "multiskilling and support personnel" (Johnson & Danhauer, 1999, p. 214). SLPs who provide communication intervention for individuals in healthcare and long-term residential-care facilities are well situated to bridge the gap in service provision for individuals already in their care. University speech-language pathology training programs are in a unique position to meld EBP with the interpersonal aspects of AR that are key to client satisfaction (Taylor, 2006). This paper describes a model AR program designed to respond to unmet clinical needs in one community, as well as provide an EBP learning opportunity for graduate students in a university speech-language pathology program. Similar to the program of Thibodeau and Cokely (2003), the workshop blended service delivery, student training, and community awareness in a university setting, although it was not as intensive. Unique to the current program was that the student clinicians were SLPs. In addition, the program included home visits, focused on experienced hearing aid users with unresolved problems, and provided customized home activities. Although there was benefit to the clients with hearing loss who participated in the workshops, the main purpose of the current paper is to encourage SLP programs to consider service learning, one example of which is presented here.

METHOD

The program described here was designed as a service-learning project in a graduate AR course to meet needs of community members with hearing loss and their SOs in a meaningful hands-on learning experience driven by EBP for speech-language pathology graduate students. The study was reviewed and approved by a university Human Subjects Review Committee. Client-centered goals and expected outcomes for the student clinicians are provided in Table 1.

Student Clinicians

Over a 3-month pre-workshop period, 10 graduate speech-language pathology students who were enrolled in an AR course developed four training modules and a comprehensive workbook under the direction of a supervising faculty member

Table 1

Goals of the Audiologic Rehabilitation (AR) Workshops and Service-Learning Program

Client-centered goals
<ol style="list-style-type: none"> 1. Promote an understanding of hearing aids, their care and maintenance and promote realistic expectations regarding their capabilities. 2. Maximize sensory input by providing the best possible visual and auditory signal. 3. Understand and resolve (to the greatest extent possible) the psychological and social problems resulting from hearing impairment. 4. Promote the use of cognitive processes necessary to derive meaning from incomplete sensory messages. 5. Promote an understanding of how to create a positive communication environment. 6. Develop within the individual assertive and interactive ways of communicating and repairing breakdowns. 7. Empower the person with disabling and handicapping hearing impairment. 8. Involve, educate and empower significant others in the AR process.
Learning and service outcomes for student clinicians
<ol style="list-style-type: none"> 1. Obtain practicum hours to meet licensure and certification while developing knowledge and skill in AR methods. 2. Develop an empathetic and sympathetic approach to the communication needs of adults with hearing loss and their significant others. 3. Develop an understanding of the speech-language pathologist's role as a member of an interdisciplinary team in assessing and treating people with hearing loss and advocating for them in the community. 4. Develop and provide an AR program that reduces the negative impact of hearing loss on communication ability. 5. Obtain experience working with community partners to enhance auditory access by all people.

and audiologist (the author). Each module was to include 45-60 min of group instruction, 30 min of individual intervention, and take-home activities and exercises. The student group was comprised of nine females and one male, with a mean age of 21.3 years. Two students were African-American; the others were Caucasian/European.

Clients

Client referrals were sought from audiologists in a large private practice in a Midwest city. The audiologists agreed to distribute an informational flyer to their experienced hearing aid users who had unresolved difficulties. The flyer invited the potential participants and their SOs to register for an AR workshop provided by university students under direct supervision of an audiologist and faculty member at no cost. It stated that registration was first-come, first-served; that the training would occur across four consecutive weeks (one evening per week for 2 hr); and that participants must commit to all 4 weeks. Five slots, for 5 clients and 5 SOs, were planned based on the number of students in the course and the ability to provide adequate supervision. The first five groups who inquired and were willing to complete all the tasks were registered. One group was selected to be on a waiting list in case another group dropped out prior to initiation of the workshop.

Four experienced hearing aid users participated with their SOs. The fifth client dropped out after the second meeting because of illness and, due to the late dropout date, an alternative family was not invited to participate. Clients ranged in age from 48 to 63 years and included 2 females and 2 males and their SOs. All 4 clients had experienced hearing loss for 5 or more years. Three of the clients were employed; 1 was retired. SOs ranged in age from 50 to 64; none initially reported hearing loss. A client and SO description is provided in Table 2.

Workshop Components

Home visit. Participation in the workshop began with a home visit prior to the AR meetings. During the home visit, student clinicians gathered information about the client's hearing loss and communication problems (realized and perceived), and obtained input from the SO. The following tools were used by the student clinicians, under supervision of the author, to develop a communication profile: (a) interview, (b) Hearing Handicap Inventory for Adults administered with paper and pencil (HHIA; Newman, Weinstein, Jacobson, & Hug, 1990), (c) Abbreviated Profile of Hearing Aid Benefit also administered with paper and pencil (APHAB; Cox & Alexander, 1995), (d) Utley Lip Reading Test Form A presented face-to-face without voice (Utley, 1946), (e) Hearing Handicap Inventory for Significant Others (HHIA-SO; Newman & Weinstein, 1988), and (f) a 15- to 20-min videotaped conversation between the client and SO about their ex-

Table 2
Description of Workshop Participants and Pre- and Post-Workshop Assessments

Client & SO^a	Gender & age (years)	Work	HHIA^b	Conversational fluency^c	Utley^d	Client's hearing status	Client's aided status and APHAB^e
C 1	F, 48	Office worker	Pre: 63 Post: 48	5 9	36 58	Predominantly mild to moderately-severe SN loss in right ear; profound loss in left ear. Good word recognition in right ear; none in left ear. Last test: 3 months prior to workshop.	Analog BTE aid in right ear (7 years old). Had digital BTE that she did not use because it was "not loud enough." Never wore aid in left ear. Without aid: 55.6 Pre aided: 45.7 Post aided: 40.6
SO 1	M, 52	Not specified	Pre: 32 Post: 26				
C 2	M, 50	Iron worker	Pre: 80 Post: 64	6 9	65 74	Predominantly moderately-severe SN loss bilaterally. Fair word recognition. Last test: 6 weeks prior to workshop.	Programmable CIC hearing aids despite better results with full shell in-the-ear during trial period. Without aid: 64.6 Pre aided: 51.9 Post aided: 42.1
SO 2	F, 50	Homemaker	Pre: 38 Post: 28				

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Client & SO ^a	Gender & age (years)	Work	HHIA ^b	Conversational fluency ^c	Utley ^d	Client's hearing status	Client's aided status and APHAB ^e
C 3	F, 56	Nail technician	Pre: 84 Post: 68	8 9	42 55	Moderately-severe low-to-mid-frequency SN loss. Improves to normal in high frequencies. Good word recognition. Last test: 7 months prior to work-shop.	Digital in-the-canal hearing aids that she used infrequently because "they are too loud" despite numerous attempts to re-program. Without aid: 48.3 Pre aided: 31.2 Post aided: 27.0
SO 3	M, 64	Retired	Pre: 38 Post: 33				
C 4	M, 63	Retired farmer	Pre: 45 Post: 32	4 7	13 61	Mild low-to-mid-frequency SN loss in right ear through 2000 Hz, decreasing to a profound loss. Moderate low-to-mid-frequency SN loss in left ear, decreasing to profound. Good word recognition in right ear; poor in left ear. Last test: 11 months prior to workshop.	Used 5-year old CIC in left ear that provided insufficient gain for hearing loss. Reported he is "not ready for new amplification or a second aid." Without aid: 67.3. Pre aided: 52.1 Post aided: 47.5
SO 4	F, 61	Homemaker	Pre: 26 Post: 22				

Note. All clients and SOs described themselves as Caucasian/European. SN = Sensorineural. BTE = Behind-the-ear. CIC = Completely-in-the-canal.
^aC = Client. SO = Significant other. ^bHearing Handicap Inventory for Adults (for clients) and the Hearing Handicap Inventory for Adults – Significant Others (for the SOs). ^cBased on a videotaped conversation. See text for scoring; maximum = 10. ^dUtley Lip Reading Test. ^eAbbreviated Profile of Hearing Aid Benefit.

periences with hearing loss. The videotaped conversation was later scored for conversational fluency by the student team and used as an instructional tool with each couple. Five areas were evaluated for level of appropriateness: (a) frequency of topic shifts, (b) frequency of prolonged pauses, (c) interruptions of turn-taking, (d) level of abstraction or superficiality, and (e) degree of understanding. Each area received up to two points, as follows: *appropriate* = 2, *marginally appropriate* = 1, *inappropriate* = 0.

Hearing and hearing aid test results. During the interview, student clinicians were instructed to ascertain whether the couples had any specific venue that was particularly difficult for them in the community (e.g., movie theatre) or any unique needs to be addressed (e.g., cellular phone use). Student clinicians also obtained the most recent audiological test results, which are summarized in Table 2. It was noted that none of the clients had had probe microphone testing. Subsequently, each client's hearing aid was evaluated electroacoustically with a probe microphone by the author to determine hearing aid viability and appropriate function before the workshop began.

Workshop materials. Clients were provided with a comprehensive AR workbook that included presentation notes for pre-learning, exercises, and activities for at-home practice; tips and strategies for the client as well as family and friends; information on goal development and monitoring; and helpful references and resources. The homework exercises and activities provided opportunities for practice that would be discussed at the next meeting. Clients were asked to review new material before attending the workshop each week or practicing techniques. Materials were added according to need throughout the workshop.

Workshop meetings. Each meeting was divided into a group session and individual intervention. During the group session, there was an informational presentation by a local expert and a mini-lecture by the student clinicians. The presentation notes helped couples come to the lectures better prepared to understand the lesson. Presentations were followed by demonstration and individualized practice of the techniques discussed. Whereas lectures focused on exposure to general principles, individual sessions were geared toward a couple's specific needs. For example, clients who had poor communication fluency practiced appropriate facilitative and repair strategies using both provided dialogues and spontaneous conversations. Thus, the couples could extend their workshop experience by working on skills at home throughout the week.

Group meetings were held in an acoustically favorable multimedia classroom using PowerPoint software and classroom amplification. Individual sessions were conducted in private therapy rooms. An overview of the training modules and a list of topics appear in Appendix A.

Workshop evaluation. Upon completion of the workshop, the same examiner repeated the HHIA (and SO version), conversational fluency evaluation (using a second videotaped conversation regarding the topic, "Living Well with Hearing

Loss”), and the Utley Lip Reading test. Each client and each SO was also given a 7-question satisfaction survey (color coded to differentiate) with a self-addressed stamped envelope (see Appendix B). An informal follow-up telephone call was placed to each client by the author 1 month after the workshop.

Student evaluation. Instructional effectiveness and student learning were evaluated by formative assessment tools. Students reflected on their engagement and learning by completing open-ended questionnaires and rating scales. Summative assessment measured the impact of course delivery on the students’ learning of course content, as well as their anticipated effectiveness and confidence in applying it with their first clients. Summary data from the formative assessments are provided in Appendix C.

CASE RESULTS AND DISCUSSION

This program followed contemporary models of AR that addressed informational counseling, social and emotional issues, speechreading, auditory reception, and communication fluency. Individual concerns included device troubleshooting and interfacing assistive devices with personal amplification. Probe microphone testing was also used in developing a realistic understanding of amplification needs.

None of the clients or their SOs had previously been involved in a comprehensive AR program. As summarized in Table 2, all 4 clients in this study showed significant handicap on the HHIA prior to the workshop, regardless of severity of hearing loss, type of amplification, or length of use. Despite years of experience, clients and their SOs reported frustration with amplification and frequent visits to the audiologist for adjustments. Although 2 of the clients had high performance digital instruments, neither used that amplification consistently. They chose to use their older hearing aids more often because they preferred the familiar sounds. One client used only one hearing aid, despite his audiologist’s recommendation for a binaural fitting.

Individual outcomes following the workshop are discussed for each client in the following section. Changes in conversational fluency were observed across clients through exposure to the rules of conversation and basic practice in facilitative and repair strategies. Facilitative repair strategies that improved (as noted in videotapes and client report) included gaining attention of the listener before speaking, looking at each other during conversation and maintaining appropriate distance, using a slower speaking rate, highlighting a topic change before launching into discussion, and using Clear Speech[®] techniques. Use of repair strategies included requesting specific information needed (“What color?” rather than “Huh?”), simplifying the message, confirming the message, not bluffing, and paying attention to visual cues, body language, and emotions.

Client 1

Client 1 began the workshop using an old analog hearing aid despite her purchase of a digital hearing aid approximately 1 year prior. The monaural fitting was due to lack of auditory sensitivity in the other ear. Client 1 struggled significantly and reported dissatisfaction and disappointment with her aided performance. Results of probe microphone measurement between the home visit and the workshop indicated that the old and new hearing aids had similarities, but the old one provided unneeded low-frequency gain. Making use of the visual display, the student clinicians explained the similarities and differences between the two instruments. Client 1 agreed to try using the new digital hearing aid, which she previously found unacceptable because “it didn’t sound loud enough.”

One-month post intervention, after becoming accustomed to the “softer sounding” digital instrument (which was likely due to less noise), she reported improved satisfaction and was continuing to wear it. Additionally, the student clinician team, under the direction of the supervisor, was able to interface this hearing aid, coupled with a donated used FM system, to an assistive listening device at her church, which provided significant improvement in that situation. She and her SO reported less strain on their communication interactions using conversational repair strategies and higher satisfaction with a new understanding of how to “live well with hearing loss.”

Client 2

Client 2 worked in the trades. Due to his hearing loss, he stepped down from his position as foreman when he could no longer hear adequately on a two-way radio. Pre-workshop probe microphone measurement showed inadequate gain from his existing hearing aid. During the course of the workshop, Client 2 arranged with his dispensing audiologist to purchase new amplification to better meet his auditory needs. When the new aids were fitted, the student clinician team interfaced the aids with his two-way radio and he also acquired hearing protection.

In a 1-month follow-up conversation, Client 2 revealed that his new hearing aids provided significant improvement over the amplification he had been using prior to the workshop and he was able to resume his foreman position with the use of the assistive technology. Additionally, Client 2 and his wife discovered that he was an excellent speechreader. Using that knowledge, they reported significantly improved family interactions using face-to-face conversational strategies.

Client 3

Client 3 reported low satisfaction with her digital hearing aids at the home visit, although she had been seen for reprogramming many times, and frequently

went unaided or used her older hearing aids instead. She complained that there was too much noise/loudness or she didn't understand what was being said. She also reported that she could no longer attend local theatre productions because she could not hear adequately. Client 3's SO admitted having a hearing loss, too, but had never been tested and did not own a hearing aid. Subsequent probe microphone measurements of Client 3's hearing aids revealed insufficient amplification in the low-frequency range. She was counseled by the student AR team regarding the benefits of low frequency amplification and the importance of a long-term commitment to adjusting to the newer prescription.

Client 3 returned to her dispensing audiologist and her hearing aids were adjusted, based on the probe microphone findings. The AR team, under the direction of the supervising audiologist, also made several visits to the local theatre, corrected some dead regions, and identified devices that required repair. One month later, Client 3 reported that she is "still getting used to the sound," but has noticed improved understanding and overall satisfaction.

Client 4

Client 4 used only one hearing aid despite recommendations for a binaural fitting from both his dispensing audiologist and the workshop providers. The workshop may not have been immediately effective for Client 4 because of inadequate amplification. Client 4 continued to struggle with difficult listening conditions such as listening in background noise, listening at a distance, or understanding an unfamiliar speaker; but he reported in a 1-month post-intervention follow-up that he was using many of the skills gleaned from the workshop to improve his overall communication effectiveness and was considering new amplification.

Student Clinicians

Student surveys, reflections, and course assessments indicated that all students achieved competency for the course outcomes. In a before- and after-workshop comparison of self-reported knowledge and skill level, a significant difference was observed in all areas (see Appendix C). The instructor also judged the course outcomes to be met for each student.

Implications

The purpose of this project was to provide a service-learning opportunity for graduate students in a university speech-language pathology program, with attention to teaching principles of EBP. The project took the form of an AR program that responded to unmet needs of experienced hearing aid users in the community. According to Taylor (2006), the key principle underlying all client experiences – and ultimately what drives customer satisfaction – is the interaction of evidence-based processes and personal contact between client and profes-

sional (or pre-professional). The workshop components were designed to apply this idea.

A post-workshop survey indicated high satisfaction for both the clients and their SOs across all areas that were queried (see Appendix B). There were several factors that contributed to positive outcomes for the clients and their SOs. First, satisfaction was expected to improve by virtue of the fact that the participants chose to attend the workshop and probably had some motivation to change (Kochkin, 2002; Strom, 2005). Second, by using both course time and volunteer time in a service-learning model, the student teams and supervising audiologist could devote a significant amount of energy to investigating the amplification needs of these clients and using technology to solve their listening problems. Lastly, a comprehensive workbook, coupled with group and individual instruction, provided clients and their SOs with doable solutions to their unique communication problems. Outcomes of this study underscore the importance of AR even after years of hearing aid use, as well as the importance of ongoing monitoring of amplification device use.

The project also showed that, with close audiological management and support, SLPs were able to provide AR services to improve clients' communication skills. The university course constituted a forum for general problem solving, as well as information about evidence-based processes. In the clinical workshop, they gained knowledge and skills to work directly as professionals with clients with hearing loss. These findings are similar to those of Thibodeau and Cokely (2003), although their SIARC program had a community event component in contrast to the current program, which was built on information from a pre-workshop home visit and concurrent use of home activities. Implementation in other SLP programs may be limited by the ability to conduct comprehensive home visits, which required approximately 2 hours in the home; however, the value of these visits was significant. Couples and students discussed personal issues and implications related to living with hearing loss and students had the opportunity to witness communication and barriers in natural, everyday settings. The time-intensive aspects of the program can be handled efficiently through a service-learning model because of the availability of student volunteers.

The service-learning model described here did achieve the dual objectives of (a) providing an AR service for clients in the community and (b) equipping SLPs with AR skills that would be applicable, with appropriate support, in rehabilitative and nursing care settings where speech-language therapy is already conducted (and reimbursed). This model is suggested as a cost-effective measure to meet the needs of both clients and students in training.

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REFERENCES

- Abrahamson, J. (2000). Group audiologic rehabilitation. *Seminars in Hearing, 21*, 227-233.
- Arlinger, S. (2003). Negative consequences of uncorrected hearing loss — A review. *International Journal of Audiology, 42* (Suppl. 2), 17-20.
- American Speech-Language-Hearing Association (ASHA). (2001a). *Knowledge and skills required for the practice of audiologic/aural rehabilitation*. Rockville, MD: Author.
- American Speech-Language-Hearing Association (ASHA). (2001b). *Preferred practice patterns for the profession of speech-language pathology*. Available at: <http://www.asha.org/members/deskref-journals/deskref/default>
- American Speech-Language-Hearing Association (ASHA). (2001c). *Scope of practice in speech-language pathology*. Rockville, MD: Author.
- American Speech-Language-Hearing Association (ASHA). (2005a). *Background information and standards and implementation for the Certificate of Clinical Competence in speech language pathology*. Available at: <http://www.asha.org/members/deskrefjournals/deskref/default>
- American Speech-Language-Hearing Association (ASHA). (2005b). *Evidence-based practice in communication disorders* [Position statement]. Available at: <http://www.asha.org/members/deskrefjournals/deskref/default>
- American Speech-Language-Hearing Association (ASHA). (2006). *The prevalence and incidence of hearing loss in adults*. Retrieved on April 22, 2006 from: http://www.asha.org/public/hearing/disorders/prevalence_adults.htm
- Backenroth, G.A., & Ahlner, B.H. (2000). Quality of life of hearing-impaired persons who have participated in audiological rehabilitation counseling. *International Journal for the Advancement of Counseling, 22*, 225-240.
- Bringle, R., & Hatcher, J.A. (1995). A service-learning curriculum for faculty. *Michigan Journal of Community Service Learning, 2*, 112-122.
- Carmen, R. (2003). *Survey of audiologists from an on-line questionnaire (2/24/03)*. Retrieved on May 7, 2006 from: http://www.audiologyonline.com/articles/article_detail.asp?article_id=409
- Chisolm, T.H., Abrams, H.B., & McArdle, R. (2004). Short- and long-term outcomes of adult audiological rehabilitation. *Ear and Hearing, 25*, 464-477.
- Cox, R., & Alexander, G. (1995). The Abbreviated Profile of Hearing Aid Benefit. *Ear and Hearing, 16*, 176-186.
- Heine, C., Erber, N.P., Osborn, R., & Browning, C.J. (2002). Communication perceptions of older adults with sensory loss and their communication partners: Implications for intervention. *Disability and Rehabilitation, 24*, 356-363.
- Hull, R. (2004). Fourteen principles for providing effective aural rehabilitation. *Hearing Journal, 58*, 28-30.
- Jerram, J.C., & Purdy, S.C. (2001). Technology, expectations, and adjustment to hearing loss: Predictors of hearing aid outcome. *Journal of the American Academy of Audiology, 12*, 64-79.
- Johnson, C.E., & Danhauer, J.L. (1999). *Guidebook for support programs in aural rehabilitation*. San Diego, CA: Singular.
- Kochkin, S. (2002). MarkeTrak VI: 10-year customer satisfaction trends in the US hearing instrument market. *Hearing Review, 9*. Retrieved April 30, 2006 from: <http://www.hearingreview.com/articles.ASP?ArticleId=H0210F01>
- Kochkin, S. (2005). MarkeTrak VII: Hearing loss population tops 31 million. *Hearing Review, 12*. Retrieved April 12, 2006 from: <http://www.hearingreview.com/articles.ASP?ArticleId=H0507F01>
- Montgomery, A.A., & Houston, T. (2000). The hearing-impaired adult: Management of communication deficits and tinnitus. In J.G. Alpiner & P.A. McCarthy (Eds.), *Rehabilitative audiology: Children and adults* (pp. 377-401). Baltimore, MD: Lippincott Williams and Wilkins.
- Moseley, M.J., Mahshie, J.J., Brandt, F.D., & Fleming, L.F. (1994). A survey of professionals deliv-

- ering speech-language services to children with hearing loss. *Language, Speech, and Hearing Services in Schools, 25*, 100-104.
- Newman, C., & Weinstein, B. (1988). The Hearing Handicap Inventory for the Elderly as a measure of hearing aid benefit. *Ear and Hearing, 9*, 81-85.
- Newman, C., Weinstein, B., Jacobson, G., & Hug, G. (1990). The Hearing Handicap Inventory for Adults: Psychometric adequacy and audiometric correlates. *Ear and Hearing, 11*, 430-433.
- Pakulski, L.A., & Hinkle, A. (2003, March). *Improving communication for experienced hearing aid users*. Paper presented at the Ohio Speech-Language Hearing Association 57th Annual Convention, Columbus, OH.
- Prendergast, S.G., & Kelley, L.A. (2002). Aural rehab services: Survey reports who offers which ones and how often. *Hearing Journal, 55*, 30-35.
- Preminger, J.E. (2003). Should significant others be encouraged to join adult group audiologic rehabilitation classes? *Journal of the American Academy of Audiology, 14*, 545-555.
- Schow, R., Balsara, N., Smedley, T., & Whitcomb, C. (1993). Audiologic rehabilitation by ASHA audiologists: 1980-1990. *American Journal of Audiology, 2*, 28-38.
- Spitzer, J. (2000). Toward contemporary models of adult audiologic rehabilitation. *Seminars in Hearing, 21*, 205-212.
- Strom, K. (2005). Twenty trends influencing the hearing health care field. *Hearing Review, 12*. Retrieved April 30, 2006 from: <http://www.hearingreview.com/articles.ASP?ArticleId=H0512F01>
- Taylor, B. (2006). Raising the bar on quality and professionalism. *Hearing Review, 13*. Retrieved May 1, 2006 from: <http://www.hearingreview.com/articles.ASP?ArticleId=H0604F04>
- Thibodeau, L., & Cokely, C. (2003). Maximizing auditory rehabilitation for clients, students, and faculty through an intensive training program. *Journal of the Academy of Rehabilitative Audiology, 36*, 67-79.
- Tye-Murray, N. (1998). *Foundations of audiologic rehabilitation: Children, adults and their family members*. San Diego, CA: Singular Publishing Group.
- Utley, J. (1946). A test of lipreading ability. *Journal of Speech and Hearing Disorders, 11*, 109-116.
- Walden, T.C., & Walden, B.E. (2004). Predicting success with hearing aids in everyday living. *Journal of the American Academy of Audiology, 15*, 342-352.
- Warner-Czyz, A. (2000). Clinical application of audiologic rehabilitation programs. *Seminars in Hearing, 21*, 235-244.
- Wayner, D. (2006). Aural rehabilitation adds value, lifts satisfaction, and cuts returns. *Hearing Journal, 58*, 30-38.
- Wayner, D.S., & Abrahamson, J.E. (2000). *Learning to hear again: An audiologic rehabilitation curriculum guide*. Austin, TX: Hear Again.
- Woodford, C. (1989). Speech-language pathologists' knowledge and skills regarding hearing aids. *Language, Speech, and Hearing Services in Schools, 18*, 312-322.

APPENDIX A

AURAL REHABILITATION WORKSHOP OUTLINE

<p>Sessions Group 5:30-6:45 followed by break/ social time</p>	<p>Student Team Responsibilities and Individual therapy 7:00-7:30</p>
<p style="text-align: center;">Home Visit</p> <ol style="list-style-type: none"> 1. Videotape interview and communication exchange with significant other. 2. Develop communication profile. 	<p style="text-align: center;">Home Visit</p> <ol style="list-style-type: none"> 1. Arrange home visit; schedule use of camera. 2. Obtain copy of most recent testing (e.g., audiogram, probe microphone). Obtain signed consent form and release of information authorization. 3. Develop individual goals.
<p style="text-align: center;">Session 1</p> <p>Introduction</p> <p>Course Goals</p> <p>Group Presentation: Communication, Hearing, and Hearing Loss</p> <ol style="list-style-type: none"> 1. Understanding the audiogram 2. Hearing aid assessment and troubleshooting 3. The impact of hearing loss and hearing aid use on communication 	<p style="text-align: center;">Communication, Hearing, and Hearing Loss</p> <ol style="list-style-type: none"> 1. Discuss individual audiogram and aided results as well as recommendations. Perform Ling six sound test and discuss benefits of Significant Other performing this test. 2. Discuss communication rules, fluency, and impact of hearing impairment: <ul style="list-style-type: none"> • Assertiveness and responsibility • Preparing and pre-learning • Social and emotional impact 3. Develop week-long homework plan, including objectives to work on individually and as a couple.
<p style="text-align: center;">Session 2</p> <p>Guest Speaker “Advances in hearing aid technology”</p> <p>Group Presentation: Visual Awareness and Speechreading</p> <ol style="list-style-type: none"> 1. Overview of speechreading techniques 2. Awareness of facial expressions 3. Observation of situational cues 	<p style="text-align: center;">Visual Awareness and Speechreading</p> <ol style="list-style-type: none"> 1. Discuss results of assessment and individual’s abilities. 2. Discuss ways of maximizing visual cues: <ul style="list-style-type: none"> • Environmental influences • Significant Other’s influences • Use of Clear Speech^{®a} for visual and auditory benefit 3. Develop week-long homework plan, including objectives to work on individually and as a couple.
<p style="text-align: center;">Session 3</p> <p>Guest Speaker “Assistive listening devices”</p> <p>Group Presentation: Listening Strategies</p>	<p style="text-align: center;">Listening Strategies and Auditory Training</p> <ol style="list-style-type: none"> 1. Discuss results of assessment and individual’s abilities. 2. Discuss potential benefits of using strate-

<p>and Auditory Training</p> <ol style="list-style-type: none"> 1. Knowledge of linguistic constraints 2. Recognizing prosodic features 3. Environmental manipulation 	<p>gies and practicing audition.</p> <ul style="list-style-type: none"> • Problem-solving in mock situations • Attentiveness and listening strategies checklists • Examples of analytic and synthetic exercises <ol style="list-style-type: none"> 3. Develop week-long homework plan, including objectives to work on individually and as a couple.
<p style="text-align: center;">Session 4</p> <p>Guest Speaker “Experienced and successful hearing aid user”</p> <p>Group Presentation: Facilitating and Repairing Conversation</p> <ol style="list-style-type: none"> 1. Knowledge of facilitation strategies 2. Use of repair strategies 	<p>Facilitating and Repairing Conversation</p> <ol style="list-style-type: none"> 1. Discuss results of assessment and couple’s conversational fluency. 2. Discuss use of strategies. <ul style="list-style-type: none"> • Problem-solving in mock situations 3. Develop week-long homework plan including objectives to work on individually and as a couple. 4. Complete re-evaluation (Note: an additional 30+ minute segment was set aside for this purpose).

Note: Exercises and additional information adapted from “Guidebook for Support Program in Aural Rehabilitation” by C.E. Johnson and J.L. Danhauer, 1999, San Diego, CA: Singular and from “Learning to Hear Again: An Audiologic Rehabilitation Curriculum Guide,” by D.S. Wayner and J.E. Abrahamson, 2000, Austin, TX: Hear Again.

^aClear Speech[®]: Guidelines and additional information can be obtained at www.oticon.com

APPENDIX B

AURAL REHABILITATION WORKSHOP EVALUATION

Instructions: Please check the box that best represents your opinion of each statement.

	Strongly Disagree		Neutral		Strongly Agree	
	1	2	3	4	5	
1. The workshop was beneficial to me and/or my family member.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>Client n =</i>					<i>0</i>	<i>4</i>
<i>SO n =</i>					<i>1</i>	<i>3</i>
2. The group presentations were informative and well prepared.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>Client n =</i>					<i>1</i>	<i>3</i>
<i>SO n =</i>					<i>0</i>	<i>4</i>
3. The individual intervention was helpful and tailored to fit the needs of me and/or my family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>Client n =</i>					<i>0</i>	<i>4</i>
<i>SO n =</i>					<i>0</i>	<i>4</i>

4. The workshop was organized and well planned.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Client n =</i>				<i>0</i>	<i>4</i>
<i>SO n =</i>				<i>1</i>	<i>3</i>
5. The workbook provides useful information and is an important part of the overall effectiveness of the workshop.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Client n =</i>				<i>0</i>	<i>4</i>
<i>SO n =</i>				<i>0</i>	<i>4</i>
6. I would recommend this workshop to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Client n =</i>				<i>0</i>	<i>4</i>
<i>SO n =</i>				<i>1</i>	<i>3</i>
7. I believe my/my family member's overall communication ability has/will be improved by participating in this workshop.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Client n =</i>				<i>0</i>	<i>4</i>
<i>SO n =</i>				<i>0</i>	<i>4</i>

What I liked best about this workshop:

- C 1: "It made me feel more empowered. . . . I am learning to cope with the problem [hearing loss]."
- SO 1: "It helped my husband with his self-esteem."
- C 2: "I now understand that my hearing aids will not replace my ears. They are an aid and I am learning to cope with the problem."
- SO 2: "It helped me realize what a good lipreader my husband is. I never took the time to look at him when I talked. Now I do and he understands me much better."
- C 3: "I never realized there are so many assistive devices. Now I can hear my workmates much better."
- SO 3: "I learned so many ways of bridging communication gaps with my wife . . ."
- C 4: "I wish I could have done this 10 years ago. . . . I could have avoided so much struggle."
- SO 4: "It helped me and my wife communicate better than we have in years . . . longer than I can remember."

What I think should be changed:

Summary of comments by Clients and SOs:
 "It should be offered by more practitioners, more often."

APPENDIX C

STUDENT CLINICIAN ASSESSMENT RESULTS

Section I.

1 = no knowledge or understanding; 3 = moderate knowledge or understanding; 5 = extensive knowledge or understanding

My knowledge/understanding of . . .	Before	After	<i>p</i>
1. The types of community resources available for clients with hearing loss.	2.2	3.4	<.001*
2. How health care delivery systems impact my work in the community.	2.4	3.2	.001*

3. The communication needs of the clients whom I served.	2.4	3.4	<.001*
4. The responsibilities of other professionals in a multidisciplinary team (and the community).	2.9	3.3	.02*
5. The barrier to receiving audiologic rehabilitation in the community that I served.	2.5	3.0	.05*
6. The impact of socioeconomic status on hearing health related issues.	3.1	3.4	.04*
7. How to work with clients who have various levels of hearing health care needs and knowledge.	2.7	3.4	.002*
8. What the terms "community resources" and "community service" mean.	3.0	3.7	.01*

* Reflects a statistically significant change based on a paired *t*-test.

Section II.

Student Reflections (After)

1. "I have learned how to better relate to individual with hearing loss and know more about their concerns and their family's."
2. "Working with a team to present information to the public has been challenging and also a good learning experience."
3. "I learned to interface with the community in a way I never realized would be in my job description (e.g., to get equipment working at a church or a theatre)."
4. "I learned about real-world skills that I couldn't get out of a traditional AR class such as public relations and patience!"
5. "This experience has helped me to understand how important it is to inform the public/community about the resources available, how they can take advantage of those resources, and some functional activities to do."
6. "I now feel I am capable of providing AR services to individual in need; that's really important because I never had an AR client and I couldn't have become knowledgeable or skillful without this hands-on and positive experience."
7. "Experiencing the emotion and difficulties that these families go through will stay with me forever. I truly have learned "an empathetic and sympathetic" approach that will drive my future therapy. I never realized the negative impact hearing can have not only on the client but his family as well."
8. "I have truly gained a unique experience and knowledge base through this workshop that I intend to use in the future."
9. "If all classes provided this type of hands-on experience, students would be much better prepared."
10. "Learning through hands-on techniques studied in a course is much more useful and meaningful. I learned to think on my feet and that my job doesn't start and stop at the therapy table. There are many unique and useful ways of delivering services."