

CAN A WEB-BASED COURSE IMPROVE COMMUNICATIVE COMPETENCE OF FOREIGN-BORN NURSES?

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INTRODUCTION

In the years since World War II, the United States has grown increasingly dependent on foreign-born healthcare personnel at all levels of the healthcare system. Currently, 1.46 million immigrants account for 15% of all healthcare providers in the United States. (Clearfield & Batalova, 2007). Current estimates indicate that 17% of the total U.S. nursing workforce are foreign-born, a dramatic increase from 1998 when they were approximately 4.5% of the total (Brush, Sochalski, & Berger, 2004; Spry, 2009). Recruiting foreign-born nurses has been recommended as a solution to the U.S. shortage of nurses (Xu, 2003; Gamble, 2002; Neal, 2002) and as a means of diversifying the nursing work force to meet the needs of an increasingly multicultural patient population (Abriam-Yago, Yoder, & Kataoka-Yahiro, 1999). The American Nurses Association (ANA), however, questions the ethics of recruiting nurses for immigration to the United States. The ANA objects to the resulting “brain drains” in less wealthy nations as well as the failure to remedy the root causes of the nursing shortage in the United States (Trossman, 2002; Buchan & Aiken, 2008). Nevertheless, shortages in the U.S. health-care labor force are not expected to disappear anytime soon (McMahon, 2004; Buerhaus, Auerbach, & Staiger, 2009; Ellenbecker, 2010) and reliance on immigrant professionals is likely to continue.

Foreign-born professionals, whether educated in the United States or abroad, face tremendous challenges adjusting to differences in language, culture, and healthcare practices in the United States (Doutrich, 2001; McMahon, 2004; Yi & Jezewski, 2000; Xu & Davidhizar, 2004). Foreign-born nurses report that while they may feel clinically competent, they often feel unprepared for the use of English in the healthcare setting (Davis & Nichols, 2002; Guttman, 2004). Immigrant health professionals experience communication difficulties with patients and coworkers that are easily exacerbated in a healthcare setting where situations can quickly become emotionally charged and stressful. Their U.S.-born peers identify a number of difficulties in working with foreign-born nurses, including lack of communication skills and differences in decision making, behavioral norms, role expectations, and attitudes (Yi & Jezewski, 2000). Patients may express distress at being unable to understand physicians who are not native English speakers, and, whether their complaints reflect prejudices or not, they are undermining for the immigrant practitioner (McMahon, 2004).

The Commission on Graduates of Foreign Nursing Schools (CGFNS) conducted focus groups with

foreign-born nurses, identifying major challenges around language, culture, and the practice of nursing (Davis & Nichols, 2002). These challenges point to the need for competencies in four aspects of language use: 1) intelligibility (phonology and syntactic patterns), 2) vocabulary, 3) conversation, and 4) context-dependent speech (discourse).

Participants in CGFNS focus groups report feeling unprepared for using English in the healthcare setting. They had difficulty with colloquial expressions and abbreviated medical terms and found using the phone especially problematic. Participants identified difficulties with medical and pharmacological terminology, the U.S. system of weights and measures, and the variety of medications U.S. patients take. Participants were too embarrassed to ask about procedures they did not understand. Additionally, they felt that patients and coworkers perceived them as unskilled rather than as professionals. Participants suggested that instruction would be helpful in basic communication techniques in the healthcare setting and in conversational English. Nurses from more homogenous countries also reported that they were unaccustomed to the cultural diversity among U.S. patients. They lacked knowledge of diverse dietary and religious needs and communication styles. They also found aspects of U.S. culture challenging, including exposure to substance abuse, unfamiliar sexual orientations, and religious customs. Maintaining a nonjudgmental stance was a challenge for them in many situations (Davis & Nichols, 2002).

Growing numbers of educators and employers are providing orientation courses for newly immigrated healthcare workers, incorporating content on American English and culture (McMahon, 2004; Guttman, 2004; Xu et al, 2010). It may, however, take years for foreign-born healthcare professionals to feel fully comfortable with American English, culture, and healthcare (Yi & Jezewski, 2000) and “the initial measures must be continued and reinforced to ensure that cultural and linguistic competence are consistently implemented in the healthcare setting” (Guttman, 2004, p. 265).

The communicative approach has been dominant in the field of second language instruction in the U.S. and abroad since the 1970s (Nunan, 1991; Hiep, 2007). This approach emphasizes the importance of meaningful dialogue and frequent interaction for second language acquisition in the belief that the individual will become fluent in English if provided with sufficient meaningful communication opportunities. While the communicative approach encourages conversations in naturalistic settings, it does not provide a framework for the improvement of pronunciation and grammar, nor does the communicative approach promote the mastery of specific vocabulary sets (Levis, 2005; Sikorski, 2005a). Many foreign-born adults who have learned English using the communicative approach acknowledge gaps in their grasp of English and further indicate that these gaps frequently put them at a disadvantage in the workplace (Sikorski, 2005a). Specifically, these adults experience difficulties with speech intelligibility, or the amount of information a listener can obtain from a spoken message. Derwing & Munro argue that mutual intelligibility is the “paramount concern” for second language learners who must be understood in a context where native speakers are the majority and when they wish to integrate socially in the native culture (2005, p. 380).

To address the need of foreign-born nurses for continued language and cultural support, we developed and evaluated the first phase of a multimedia, Internet-based educational tool, the Intercultural Communication Workshop (ICW), designed to improve the overall communicative competence of foreign-born nurses. The ICW is not designed to “erase” accents. Rather, it expands the user’s knowledge of intonation (appropriate stress and pitch) and phonological rules specific to American English, enhancing their oral communication skills and improving listener understanding (Sikorski, 2005a; Derwing & Munro, 2005). Participants in the ICW learn a three-fold set of rules for improving their speech intelligibility: consonant clarity, vowel accuracy, and appropriate intonation (Sikorski, 2005a). Instruction in the ICW is tailored to the healthcare workplace whenever possible and includes contextual information about communication, culture, and healthcare in the United States, thereby avoiding the “one size fits all” approach to second language instruction rejected by Derwing & Munro

(2005).

The Intercultural Communication Workshop is designed as a supplement to formal in-person instruction and orientation programs. When such programs are lacking, this e-learning course can stand alone as self-paced instruction. While some may argue that the ICW cannot take the place of face-to-face interactions in a well-designed and executed ESL course, the e-learning environment offers several advantages: it is self-paced, private (thus less threatening), and provides continuous opportunities for practice and reinforcement.

RESEARCH METHODS

The Course

The first version of the ICW is a web-based course that integrates instruction in speech intelligibility with contextual information on communication and culture in U.S. healthcare, along with instruction on common idioms and figures of speech relevant in the healthcare setting. Instruction in the ICW is centered on multimedia recording exercises that encourage learners to apply "insider information" about the phonological and prosodic rules that govern American English pronunciation and intonation. This distinctive approach enables users to progress quickly by making patterned changes to their speech. Whenever feasible, exercises are built on words and phrases that are likely to occur in conversations nurses have with patients and their families and with other members of the healthcare team.

The core instruction in speech intelligibility was adapted from an established curriculum (Sikorski, 2004) in collaboration with the author. Lessons in the ICW are grouped into three chapters—intonation, vowels, and consonants—corresponding to the most important components of speech intelligibility. The intonation chapter explains that English requires stress timing (at odds with the syllable-timing rules of many FBNs' native languages). The focus is on typical intonation patterns at the word, phrase, and sentence level and the unique ways that intonation patterns change meaning. The vowels chapter teaches the vowel inventory of American English, where and how to make these sounds, and common changes in vowel sounds based on word stress. The final chapter on consonants teaches the consonant inventory of American English, how and where to make these sounds, and common changes to consonant sounds that must occur in conversational English. Additional examples of speech intelligibility topics included in ICW are provided in [Table 1](#).

Table 1. *Examples of Topics Included in ICW Speech Intelligibility Lessons*

Intonation	Vowels	Consonants
Pitch	Front vowels	/t/ variations (such as the /t/ sound in "butter")
Typical patterns for words and phrases	Similar sounds (minimal pairs, e.g. "cot" v. "cat")	Initial aspiration
Special patterns for words and phrases	Vowel length	/p/ v. /b/ and /k/ v. /g/ (e.g. minimal pairs "pin" v. "bin")
Stress	Vowel reductions in unstressed syllables	Unreleased stops
Word reductions	Vowel additions	Linking
Inflection	Linking	Consonant voicing
Falling inflection		Endings with "-s" and "-ed"
Statements		Consonant reductions
WH-questions		

Throughout the course, users also view hundreds of tips about American English communication, language practice strategies, and idiomatic healthcare expressions. "Tip" boxes are inset on most pages in

the course and allow users to read succinct information with examples on the social and cultural context of healthcare in the United States. Examples of the types of tips included in ICW are provided in Table 2.

Table 2. Examples of “Tips” for Speaking and Practicing Provided in ICW

Healthcare	“Medical talk is a new language, too / Medical terminology is a new language for everyone. Your patients may not know the meanings of many medical words that you use every day!”
Everyday Talk (idioms)	“‘A frog in one’s throat’ / Meaning: Hoarseness or phlegm in the throat; unable to speak clearly until you give a slight cough. / ‘Ahem, excuse me, I seem to have had a frog in my throat!’”
Mr. Formal vs. Informal Guy	“Offering Help / Formal & Polite: How may I help you? / Informal: What do you need?”
U.S. English	“Are you bored? / If you don't use a significant pitch rise, listeners may think you are bored or want to get away!”
Mirror	“You may want to use a mirror as you practice the contrasts in this section.”

Providing immediate, tailored feedback to learners is one of the most significant challenges in the web environment. To meet the need for feedback, we designed the “listen-record-compare object” (hereafter LRC), which allows users to listen to a model speaker, record their own speech, and then compare their recorded utterances to the model. The ICW presents learners with 86 LRC lessons (with 10 to 20 target utterances each) for a total of 1,932 opportunities to compare their speech with a native speaker. The usefulness of the LRC is limited for those users who cannot distinguish between their utterances and the model’s; however, it is expected to aid intonation and pronunciation of U.S. vowels and consonants for the majority of learners.

Research Design

We evaluated the feasibility and usability of the ICW and used a single-group, pre- post-test design to conduct a preliminary evaluation of usefulness of the ICW in improving speech intelligibility. All procedures were reviewed by the Western Institutional Review Board, in accordance with requirements for the protection of human subjects in all research funded by the National Institutes of Health. Participants received an incentive of \$125 for participation in the study.

Measures

The following screening and testing measures were completed online by all study participants:

- *Demographic Questionnaire*: includes questions about participants’ age, gender, education, native language, and employment, as well as questions about their use of American English.
- *Test of English Proficiency Level - Online (TEPL-Online)*: a placement tool challenging the full range of American English language skills—listening comprehension, oral expression, reading of correct structures, reading comprehension, and writing—that is scored on a 7-level scale (A = Survival English – G = Advanced English) with results shown for each skill area. Field tests with adult students have shown it to be an appropriate placement and proficiency instrument. The *TEPL-Online* was administered at baseline (Rathmell & Sikorski, 2006).
- *Knowledge Test*: a test consisting of 30 items, 15 true/false and 15 multiple choice questions based on information presented in the course (e.g., “Your best clues for how to pronounce words comes from American English spelling.”; “The word ‘comfortable’ is typically

pronounced as a three-syllable word.”; “Saying the words below aloud, which word contains the /ae/ vowel: a) Last b) Calm c) Mammogram”).

- *Proficiency in Oral English Communication Screen (POEC-S)*: a two-part screen of auditory discrimination and verbal production of key vowel, consonant, and intonation variations unique to American English (Sikorski, 2005b). *POEC-S* scores have been strongly correlated to perceptual ratings made by Speech Language Pathologists (SLPs) and SLP graduate students on accent, articulation, intonation, naturalness, and intelligibility (Morton, Brundage, & Hancock, 2010).
- *Satisfaction and Usability Questionnaire*: a 22-item questionnaire using a 5-point Likert scale on which participants rated their agreement.

Active, unencumbered participation in an online training program demands good visual language skills. For this pilot study, we used the written (nonverbal) portions of the *TEPL-Online* to determine examinees' ability to actively participate in an online language learning program. The two written portions of the *TEPL-Online*, "reading of correct structures" and "reading comprehension," are multiple choice and can be scored automatically in the web environment. All components of the current *POEC-S* were adapted to the web environment. Cuing and prompts were adapted for the multimedia environment, but no changes in content were necessary. The Demographic Questionnaire and Knowledge Test were created specifically for this project. The Satisfaction and Usability Questionnaire was adapted from the System Usability Scale (SUS) (Brooke, 1996) with items tailored for the ICW.

Participants

The participants were 22 foreign-born nurses and nursing students recruited from nine institutions, including schools of nursing, nursing associations, and websites for nurses via fliers (hard copies and online) and e-mail announcements distributed by directors and staff at the sites. All individuals who expressed interest in the study were eligible for participation. Twenty-two participants enrolled in the study and received practice tools (described below). Due to time constraints, 3 individuals did not continue with the course, leaving 19 participants who were invited to complete follow-up measures.

Procedures

The entire study took place online. Participants completed all screening measures and the written components of the baseline measures. Participants were then sent a mirror and a headset with a microphone for use in the study, along with a letter instructing them how to return to the website. Upon receiving their practice tools, participants logged in and completed the auditory components of the baseline measures. Auditory discrimination sections were automatically scored by the software, and scores were included in the participant database for later analysis. Participants' verbal answers were recorded and stored on a secure server for scoring by trained *POEC-S* coders. When the baseline measures were complete, participants were mailed a payment of \$50.

Participants were given 3 months to complete 8 hours of practice time in the online course. They were asked to practice a minimum of three times a week for 15-20 minutes and no more than 20 minutes at a time for a total time of 1 hour per week (for a minimum of 8 weeks). During the study period, study personnel contacted participants by telephone and/or emails, according to the participant's preference, at least every 3 weeks. These "check-ins" were intended to provide support to participants and to learn about their experiences in the course. The "check-ins" also provided an opportunity to answer participants' questions and solve any technical difficulties.

After 8 weeks, participants completed the follow-up measures. When these were completed, the study research assistant conducted an exit interview by telephone or e-mail, depending on the participant's

preference, to allow participants to discuss their experience using the course. The research assistant had a BA in anthropology and was familiar with collecting and analyzing qualitative data. The interview guide included 13 open-ended questions about the participants' experience in the course and covered topics such as what they found most useful and anything they would like to see added. Participants were then mailed a payment of \$75 for a total of \$125 for their participation in the study. Notes taken during phone interviews and the content of e-mail responses were analyzed for similarities and differences in content.

FINDINGS

Participants

All participants (N = 19) were women, ranging in age from 22 to 67 years (M = 39.2, SD = 12.3). Additional participant characteristics are summarized in Table 3, including education, native languages, current employment, the reported percentage of time spent in English-only communication. More than one-third (39%) of participants reported previous training in language/grammar improvement and one-third (33%) reported cross-cultural training.

Table 3. Characteristics of Study Participants

Native Language	Degrees Held*		Employment Position	English-Only Communication (% of day)		
Tagalog / Ilocano	6	BSN	7 Staff Nurse	7	<20%	1
Chinese	3	RN	7 Student	7	20%-40%	6
Thai	2	MSN	5 Project Director	2	40%-80%	4
Russian	2	CNA	1 Research Technician	1	80%-100%	5
Danish	1	LPN	1 Research Assistant	1		
Korean	1	Other	2			
[None reported]	4					

Note.*Some participants held multiple degrees.

Table 4. TEPL-ONLINE Scores

TEPL Scores	Structure Subscale	Reading Comprehension Subscale
G	6	7
F	7	6
E	2	2
D	1	1
Missing	3	3

As anticipated, participating nurses scored in the mid to upper ranges of the *TEPL-Online* placement tool (Table 4). The *TEPL-Online* is scored on a 7-level scale (A = Survival English – G = Advanced English) with results shown for each skill area. Scores for the *TEPL-Online* correspond to the seven-level system used to place ESL students in classes according to their English proficiency. Upon review of the *TEPL-Online's* Seven Instructional Level Scoring system, the authors chose Level E (Intermediate) as the Participant Placement minimum. This placement level matches the Readability Index (vocabulary

sophistication, sentence structure, etc.) of the course content. Additionally, the authors felt that intermediate English skills would minimally impact participants' speed and comprehension of the information presented, allowing them to move through the course at an appropriate pace.

Participants reported communication challenges in the following five areas: difficulties with dictation/reporting (n=6), problems understanding clinical lectures (n=5), problems communicating with patients and family members (n=4), difficulties with rapport building (n=3), and problems communicating with colleagues (n=3). Nearly three-quarters (71%) of the participants indicated that they had been in clinical situations where their English language affected patient care, and 58% felt that they had been perceived or treated differently by patients, colleagues, family members, or others because of language/accent or cultural differences.

Main Analyses Quantitative Data

Outcome Results: The Knowledge Test and the *POEC-S* were administered before and after completion of the online workshop. Paired t-tests were conducted to evaluate within-subject effects of the course.

As shown in Table 5, participants made significant gains from pretest to posttest in several domains. The largest effect ($d = 1.27$) was observed for the Knowledge Test, suggesting that users were learning the rules which govern American English. Participants also showed significant gains on all subscales of the *POEC-S* Verbal Performance Test with a medium-to-high effect size for the overall verbal performance scale score ($d = 0.66$). These gains are particularly remarkable given the relatively short duration of the course. No significant gains were observed for the *POEC-S* Auditory Discrimination Performance Test.

Table 5. Means, Paired t-tests, and Effect Sizes for the Pre-Post Study Measures

	Pretest		Posttest		t	df	p	d
	Mean	SD	Mean	SD				
Knowledge Test	16.2	3.2	20.4	3.5	-5.33	14	<.001	1.27
Proficiency in Oral English	112.1	36.5	121.9	39.9	-1.64	18	.118	0.26
Communication Screen Total								
Auditory Discrimination	24.1	2.7	23.6	2.6	0.80	17	.433	-0.19
Performance Test Total								
Single Word Discrimination	5.7	0.7	5.4	0.9	0.72	17	.481	-0.29
Word Discrimination within Sentences*	6.6	1.0	6.5	1.0	--	--	--	-0.08
Sentence Completion Discrimination	7.6	1.8	7.6	1.6	0.14	17	.889	-0.01
Word Stress Discrimination	4.2	0.9	4.1	0.7	0.90	17	.381	-0.20
Verbal Performance Test Total	98.3	18.7	111.3	20.5	-4.77	15	<.001	0.66
Vowel Survey	49.9	13.8	56.9	8.9	-2.53	15	.023	0.60
Intonation Survey	13.7	2.4	15.1	3.0	-2.35	13	.035	0.52
Articulation Variations Survey Total	36.3	7.2	41.1	8.6	-4.13	15	.001	0.60

Note. *All variables were normally distributed, with the exception of Word Discrimination within Sentences, which was skewed and kurtotic. Pre and post scores on this measure were compared using a Wilcoxon Signed Rank Test, which was not significant.

User Experience

Usage Data: Participants varied in their use of the ICW. Most logged into the course every 2 to 5 days for approximately 20 minutes to 1 hour while others participated every 1 to 2 weeks for 1- to 3-hour sessions.

Some used the course twice in a single day in short, 15- to 30-minute intervals. The majority of users proceeded linearly through the course, although several returned to previously finished sections for additional practice. One user repeated the course in its entirety.

Exit Interviews: Participants (N = 10; 3 by email and 7 by phone) reported generally positive experiences with the course, and several noted that they had already recommended the course to their friends and/or colleagues. The majority of respondents found the ability to play back their own recorded voice for comparison with a model speaker a helpful tool. While one participant had difficulty using the LRC, seven found it instructive and said that it provided a unique opportunity to hear specific features of their own speech that needed improvement. Typically, these participants found that it was helpful, “Being able to hear yourself right away. You know, being able to hear your voice recorded and compared.”

Ten participants emphasized the benefits of instruction in the mechanics of speech while nine commented on the usefulness of the cultural information. They reported improvement in stressing syllables and sentence elements with some stating that they were able to correct the pronunciation of words that had long been stumbling blocks. The following comments reflect the features participants found most useful:

- “Everyday talk was the most helpful. Also how 'stress timing' is done. How to stress certain syllables and words in sentences.”
- “I really liked the part where, at the end of each page, you were shown how people talk in America. Either how to pronounce things properly or what particular sayings mean.”
- “This course in general was helpful to understand why some people don’t understand foreigners sometimes. Although, I am pretty sure that mostly it’s their inability to listen.”
- “When I learned how to pronounce things correctly in English (for example, not pronouncing every syllable like I would normally do), Filipino nurses saying you are speaking 'fake English'. Like you're trying too hard and it doesn't sound right. But now I know it IS right!”

Participants described two key benefits from the cultural information: 1) a better understanding of common American English idioms and 2) ways to speak in the most professional and inoffensive manner. Many acknowledged developing awareness of cultural norms in the United States that they were previously unaware of, and several noted that they were already using the tips’ practical advice for communicating in a more professional style in their workplaces and daily lives. Other respondents stated that they would have liked more of this information, including a greater focus on terms specific to healthcare professionals.

Participants were enthusiastic about the tip boxes, offering comments, such as the following:

- “The cultural information was helpful. I also liked the parts about informal/formal speaking.”
- “I really liked these! They were very helpful and showed me how to speak 'American.' I could learn new sentences (sayings).”
- “I liked learning about how words may have two meanings and what certain phrases mean.”
- “I think these are very helpful. There are things you don't understand unless you understand the culture around it.”
- “I learned that saying I was assisting a ‘crippled’ patient can be offensive, so I would say ‘disabled’.”

Most participants found the quizzes and tests helpful and motivating, and used the feedback to identify areas where they needed more practice. One participant offered the following recommendation, “Also, I found the quizzes very helpful. I think you should have more quizzes.”

Participants noted that it would be very useful for healthcare workers to complete the course *before* coming to the United States. Several noted the absence of any similar educational programs in their countries of origin. Many participants thought the course would also serve as a useful “refresher” for foreign-born healthcare workers who are currently in the United States.

Asked what they would like to see added to the course, participants offered a number of recommendations such as these:

- “It should be required because if it is optional, people won't do it. Not because they are lazy but because they are so busy in school!”
- “I think you should have more practice with consonants. I am from Taiwan, not the Philippines, and we have more trouble with consonants like 'L.'”
- “More practice on communication. If you could add short stories about the habits and culture in America, I think we'd find that useful.”
- “More video! This is more helpful than the graphs and descriptions that show people how to speak. I would rather see someone's tongue placement, jaw movement, etc. than have it described or just listen to it.”

DISCUSSION

Scores on the *TEPL-Online* screening measure confirmed that the study population had the written fluency needed to benefit from an Internet-based course.

Changing an accent is a slow and difficult process (Corrigan, 2010), and we did not expect to see improvements on the *POEC-S* over the short duration of the study period. As expected, participants' scores on the *POEC-S* for auditory discrimination did not improve significantly but were relatively high at pretest. On the other hand, participants' scores on the *POEC-S* for verbal performance improved significantly, suggesting that the practice presented in this early version of the course was beneficial. Moreover, participants made significant gains on the Knowledge Test from pretest to posttest, suggesting that they were learning the rules that native speakers of American English employ unconsciously.

There are several limitations to this study. First, the study sample was small and lacked a control group. Second, 8 hours of practice time over a 3-month period is not sufficient for most speakers to show major improvement. Third, users received telephone calls or emails to support their participation in the course, a procedure that will not always be possible outside a research environment. Fourth, as mentioned earlier in this paper, there may be some who would not find computer-based practice an acceptable substitute for in-person instruction. Additionally, the LRC exercises will not be helpful for participants who do not hear the difference between their own recordings and the model speaker's. However, in the exit interviews, participants frequently reported that the comparison with a model speaker was most helpful for identifying areas for improving their own speech intelligibility.

In the next phase of development, we will add several features to support users, including a personalized homepage where they will set personal goals and view an automated record of their progress in the course. Content will be presented in small units suited to 20 minutes of practice in one sitting, and the personal progress report will encourage daily practice. We will also incorporate social network support, including automatically generated emails offering tips and encouragement and a discussion forum where learners can share their experiences with other foreign-born nurses. We will evaluate the effectiveness of the complete ICW in a two-group randomized controlled trial in which participants have access to the course for 6 months. We will attempt to recruit nurses who are preparing to emigrate while they are still in their native countries as well as newly arrived and recently employed nurses in the United States.

When complete, the ICW will address several of the challenges presented in developing web-based

training for adult learners, particularly those working in healthcare. Highly contextualized for nursing and other healthcare professionals, the course is immediately relevant and useful, two crucial criteria for adult learners. With automatic feedback, learners can readily see the areas where they need improvement and are reinforced for their effort and progress. Learning strategies that generally work for adult learners, visual memorization or self-tutoring, won't improve speech intelligibility. A self-directed course with ample opportunities to practice speaking can be effective and should be worthwhile and engaging for busy adults.

Healthcare professionals work under tremendous time constraints, making speech improvement classes at community colleges, for example, unattractive. Speech trainers are often reluctant to offer courses at hospitals because absenteeism is such a chronic problem. Yet the stakes are high for ineffective communication in the stressful healthcare environment. Web-based training will appeal to healthcare professionals who are already savvy with computers and who appreciate the convenience and flexibility of working online at their own pace. Furthermore, technology that makes it possible to record speech to a remote server and receive immediate feedback offers learners a dynamic practice environment free of embarrassment in front of colleagues or burden on patients.

The ICW is a self-directed, rather than instructor-driven, course and is dependent on how self-directed users are. It could be integrated into instructor-driven courses, either classroom or web-based, where it would provide opportunities for review and practice with guidance from an instructor who is not always present. Busy professionals could benefit from the structure and interaction provided in an instructor-driven course and take advantage of the flexible practice time and the anonymity of a virtual community of learners in the ICW.

CONCLUSION

This early field test of the ICW demonstrated that it is feasible to deliver speech intelligibility training over the web. While computer-based speech intelligibility instruction is no substitute for in-person, human feedback, an online course can provide a low-stakes environment for learners who wish to work on the "readability" of their speech at their own pace.

In the next phase of development of the course, we intend to:

- Expand the speech intelligibility content to meet the training needs of native speakers of the major language groups represented in the nursing work force;
- Develop additional content on vocabulary, communication practices, and culture in the U.S. healthcare workplace, including interactive role play simulations;
- Restructure the navigation to simplify the learning process for users and increase the length of time users spend in the course; and
- Add social networking features to promote learners' commitment and deepen their engagement by participating in a learning community.

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