Instructional Technology Applications in a Cooperative Learning Setting for an ESL Classroom

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Abstract

Current focus on the use of technology to develop language skills, using programs such as Computer Assisted Instruction (CAI) and Computer Assisted Language Learning (CALL), provides the basis of this paper. Improvement in language skills and student engagement resulting from the application of technology-enhanced instructional materials has been well established. English language learners (ELLs) could benefit from such instructional materials and activities, especially effective in teaching English pronunciation skills. This paper discusses different technological formats for phonological instruction used to investigate the oral proficiency of Spanish-speaking ESL students in a cooperative learning (CL) setting. The study employed a quasi-experiment with a pre-post test two-treatment, formed by expanding across program design. Findings showed that CL structures cannot be claimed as a decisive factor for the statistically significant improvement in subjects’ oral proficiency. However, the variety in instructional formats positively impacted subjects’ interest in the activities, resulting in student engagement. Based on this study, recommendations are made for incorporating technological applications in language learning.

Introduction

Compared to the original Computer Assisted Instruction (CAI) program by IBM in 1960, computer technology has grown with sophistication in software as well as hardware, and has been developed to a phase beyond imagination. Materials with technology incorporated have been improving learners’ performance not only for different levels of students (Traynor, P. L. 2003) but also at different content areas (Brozo & Puckett, 2008). As Warschauer (1996) categorized Computer Assisted Language Learning (CALL), multimedia and internet are the ‘new’ technology at this phase. There are limitless resources for language learning in all aspects. This paper focused on the pronunciation learning through phonological instructions.

During the phonetic/phonological instruction stage, a “less technical and perhaps less intimidating system of pronunciation symbols” (Cummings, 1988, p. xxxi) may be worth considering for instructional purposes. New terminology and different phonetic alphabets used in phonetic/phonological instruction can be stressful for ESL learners. Instead of implementation of strict IPA symbols and definitions of places and manners of articulation, a wider range of technologically enhanced materials may be one of the feasible alternatives, considering the differences between the subjects’ native language and the target language.

Pronunciation Skills of the English Language Learner

Among the four language skills of listening, speaking, reading and writing, accurate pronunciation in English has been an vital goal in teaching ELLs because it is essential not only in
communication, but also in reading and writing, which pave the path to academic achievement (Badian, 1998). Accurate pronunciation entails phonological awareness, which refers to knowledge of the meaningful differences in the units of the sound system of a language, including its consonants and vowels, syllabic structures, etc. However, an awareness of the phonetic and phonological distinctions among sounds in English and the ELL’s native language cannot be assumed. While acquisition of native-like pronunciation is often a personal choice, it is obvious that miscommunications may occur due to the lack of awareness of phonetic and phonological characteristics of sounds in the target language.

Knowledge of phonetic and phonological concepts may assist ELL in correcting their pronunciation problems (Goswami & Chen, 2008). However, typical exercises in phonetic and phono-logical contrasts among sounds, which often include drills and repetition, may not always engage students, and thus result in off-task and resistant behaviors (Castiglioni-Spalten & Ehri (2003). According to Krashen’s (1994) Pleasure Hypothesis, a more “pleasurable” learning model would be better suited to minimize language learners’ disaffection. The increasingly popular learning model that provides a supportive learning environment and ample opportunities for participation, thereby lowering the risk of language learners’ disaffection, is Cooperative Learning (Ghaith & Shaaban, 2005).

Cooperative Learning for the English Language Learner

Numerous colleges and universities are applying the Cooperative Learning (CL) model content areas because its advantages have been researched and revealed (Johnson & Johnson, 1989; Kessler, 1992). Researchers have discovered the effectiveness of the application of CL principles (Johnson, Johnson & Holubec, 1990) and strategies (Kagan, 1992) in building a safe and supportive learning environment. Especially in ESL/EFL field, the positive effectiveness of cooperative learning is reflected on the learners’ language achievement (Jacobs & Hall, 1994). Research has shown that CL benefits bilingual students in various aspects such as more active interaction, learning attitudes and greater curricular material inclusion (Ovando, Combs & Collier, 2006, p. 97). Kagan (1992), Kessler (1992) and Johnson & Johnson (1994) have enumerated a variety of strategies to assist teachers in CL structures such as team-building, social skill practicing, academic information sharing, content mastery, as well as communication and thinking skills building.


However, in a homogeneous CL group, massive use of the non-target language is expected. Learners bear the risk of exposure to inaccurate English pronunciation during the interaction process, which is designed to accelerate their language learning and improve their language proficiency; therefore, the researcher hopes this disadvantage, brought on by common use of non-target language within CL groups, can be counteracted by the implementation of phonetic and phonological instruction, followed by interactive materials, including computer-assisted instructions.

The Study

Grounded on the pilot study (Goswami & Chen, 2008) indicating a positive impact of phonetic and phonological instruction on pronunciation skills of ELLs, and given the benefits of co-
operative learning for ELLs, this study investigated whether Spanish-speaking ELLs benefit from phonetic and phonological instruction delivered through cooperative learning structures. In particular, this paper discussed instructional technology applications utilized in the process during this quasi-experiment.

**Subjects**

There were two groups in this study and the subjects consisted of 44 English language learners in ESL classes at a private high school. There were 19 subjects in the Cooperative Learning (CL) group receiving instruction in a CL setting, and 25 subjects in the Conventional (CV) group, who received instruction in a traditional classroom setting. Subjects ranged in age from fifteen to nineteen years; all subjects’ native language was Spanish, as spoken in Mexico.

**Intervention**

Subsequent to informed consent from the participants, as well as school authorities, the CL group received the phonetic and phonological instruction which incorporated the elements of cooperative learning. These elements included Positive Interdependence, Individual Accountability, Face-to-Face Interaction, Social Skills, and Group Processing. Instruction regarding features of the International Phonetic Alphabet (IPA) such as places and manners of articulation were presented to this group in a cooperative learning setting. Classrooms were arranged in a format that allowed the circulation of different group structures such as base, formal, and informal groups. Techniques such as jigsaw, role-play, note-taking, and collaborative projects were utilized to facilitate learning through cooperative skills among group members. The CV group, on the other hand, received the same phonetic and phonological instruction from the researchers without the cooperative learning elements.

Based on Whitley (2002), seven consonants deemed difficult for Spanish-speakers of English were identified for this study, and grouped according to their phonetic or phonemic dissimilarity, absence, or allomorphic variation. A pre-test was administered to all the participants in both the CL group and the CV group prior to instruction. Subjects’ phonetic realizations of the target consonants were audio taped and video recorded for assessment purposes. Subjects received phonetic and phonological instruction for ninety minutes during each session, five days a week through a six-week period. The instruction was delivered in the classroom, in formats of lectures, handouts, PowerPoint presentations, pronunciation exercises/activities, and computer software.

**Data Collection**

A post-test was given to both CL group and CV group in the identical format as in the pre-test after all the phonetic features of the target sounds were presented in the phonetic and phonological instruction. Subject’s pronunciation of target sounds, according to its phonetic features were independently recorded and evaluated. In the evaluation process of both pre-test and post-test, the subject’s pronunciation was accounted as correct (+) if the evaluator perceived the correct phonetic realization of the target sound; it was accounted as incorrect (−) when the evaluator perceived the target sound as incorrectly pronounced. Results of evaluations were integrated for statistical analysis.

**Results**

SPSS Version 13 was employed in analyzing the data collected. A dependent (paired-
samples) t-test was chosen to answer the research questions. The results showed that there was a statistically significant difference in performance between pre-test and post-test scores in the CL group, with \( t(19) = -15.985, p = .0000 \). That is, the overall performance score of the CL (experimental) group in the pre-test (\( M = 4.90, SD = 3.58 \)) showed a statistically significant difference from that of the post-test (\( M = 5.85, SD = 3.87 \)). The conclusion was made that the implementation of phonetic and phonological instruction in a cooperative learning setting had a statistically significant effect on the pronunciation proficiency in the cooperative learning group of this study. With regard to the CV (control) group, the results showed that there was a statistically significant difference in performance between pre-test and post-test scores in the CV group with \( t(25) = -13.687, p = .0000 \). That is, the overall performance score of the control group in the pre-test (\( M = 4.93, SD = 3.59 \)) showed statistically significant difference from that of the post-test (\( M = 5.88, SD = 3.88 \)). Again, it was concluded that the implementation of phonetic and phonological instruction in a conventional setting had a statistically significant effect on the pronunciation proficiency in the conventional group of this study.

One of the research questions of the study was to examine whether there existed a statistically significant difference between the improvement of pronunciation skills in the CL and CV groups. An independent t-test showed \( t(44) = 0.2404, p = .8101 \). That is, the overall performance score of the CL (experimental) group (\( M = 1.38, SD = 2.00 \)) was not statistically significantly different from that of the CV (control) group (\( M = 1.35, SD = 2.07 \)). This indicates that the cooperative learning elements cannot be claimed as the decisive factor to the subjects’ improvement on the oral proficiency.

Discussion

Instructional Technology

Although the improvements of subjects’ oral proficiency of the CL and CV groups were not significant enough, the overall significance did show in the pre-post tests results of each group. That is, one of the treatments, which was phonological instruction, has significantly improved subjects’ overall oral proficiency. There might be other factor, other than cooperative learning element, contributed to this significant improvement.

During the implementation, some of the instructional technology applications had been adopted in this study. In this section, ‘tools’ of this instructional technology are presented and discussed based on the knowledge that author knows or uses but does not necessarily carry author’s endorsement on such commercial products.

Various technological applications utilized

1. Powerpoint

Instead of sequential slideshow that has been widely employed in the presentation since Microsoft launched Office Suite, powerpoint can be interactive as designers want it to be. Templates of various TV game shows such as ‘Jeopardy’ and ‘Who Wants to be a Millionaire’ were designed and available for users (or members) interested in interactive materials designing. The ‘Jeopardy’ format of powerpoint was utilized in this study and subjects’ participation in this particular activity was highly rated. One of the online resources for this type of templates is http://www.jmu.edu/ madison/ teacher/ jeopardy/jeopardy.htm
2. **Add-ins**

Rather than being restricted by Powerpoint, some add-in programs such as Articulate (http://www.articulate.com/) tries to empower users ‘easily create engaging courses, presentation, quizzes and surveys’ by adding the program in Powerpoint. Integration of programs of enhancing e-learning may increase teachers’ enthusiasm in developing such materials. There are other add-in programs such as iSpring (http://www.ispringsolutions.com/), Showroom for Powerpoint (http://www.globfx.com/products/showroom/) and etc.

3. **Ready-made programs**

Even for some of the ‘digital-native’ generation, using different computer languages such as HyperText Markup Language (HTML) or Extensible Markup Language (XML) to encode information in a ‘machine-readable’ form is still a challenging task, not to mention how intimidating it sounds to the ‘digital-immigrant’ educators. The needs for relatively less-stressed software for language teachers/researchers have become so great that more of the Education Software Cooperative (ESC) devoted themselves in developing programs aiming at helping teachers/educators create interactive, and fun, materials for learning purpose. One of the examples that have been used in this study was some ‘eLearning Game Show’ from Bodine Training Games LLC at http://www.almorale.com/summary.html. Other purchasable templates are available online such as http://e-learningtemplates.com/store/flash-game-templates/

Being able to create multimedia interactive activities by following certain instruction steps and then apply such activities in the class is a ‘blessing’ to many teachers. The accessibility of these kinds of programs is truly a bridge between the ‘high-tech’ multimedia equipment in almost every academic institute and the in-service teachers who wish to utilize technology and develop materials for learners to fit specific purposes. However, templates of such programs have not been meeting various needs from educators who are always in different demands for innovative approaches. Limitation of this kind of ‘ready-made’ programs has on the other hand inspired teachers in reaching out for some other alternative ‘semi-ready-made’ programs that give users more flexibility in designing.

4. **‘Semi-ready-made’ programs**

Compared with lower-leveled computer language such as Basic, higher-leveled language such as C++ has been developed to a phase that strong discipline of programing is essential to programmer. With the ambition in having more control of designing multimedia material, teachers try to employ another type of programs such as Flash which allows room for animation and interaction that are critical elements in multimedia materials. Having the ability in utilizing various effects in Flash, teachers are able to start creating materials without being limited by single-purposed templates in most of the ready-made programs. Other than Adobe Flash, there are programs with more user-friendly interface such as SwishMax which engages scripts and templates with freedom of plugging in effects.

Creativity of Flash design over internet has been vibrant and wide-spread. Many online resources sites congregate competitions and offer original scripts developed by contestants within their communities. The accessibility of these truly genuine elements, or movies,
has stimulated teachers in designing materials meeting learners’ needs. These inspiring resources can be attained at internet websites such as Flash Kit (http://www.flashkit.com) and/or the homepage of Swish program as mentioned above (http://www.swishzone.com).

5. Components
As for ‘elements’ to be incorporated into multimedia materials for interactive purposes, there are ready-made components and/or ones contributed by other developers. However, certain specific multimedia needs are never easily met by online resources; and commercial custom-made materials are usually over-priced and time-consuming. Abilities in converting different formats of certain materials back and forth are necessary for teachers in incorporating various features in the desired multimedia materials.

For instance, sound effects are essential in designing multimedia materials. Special sound effects can be found online but pieces for specific purposes are not as conveniently accessible. Programs converting from text form to speech, or vice versa, are helpful to teachers when producing materials. TextAloud (http://www.nextup.com/TextAloud/) - from text to speech, and Dragon NaturallySpeaking (http://www.nuance.com/company/index.htm) - from speech to text) are examples of these particular assisting programs. Nevertheless, programs converting video formats from one to another are certainly not less important than the ones do to audio forms, and there are many more shareware and freeware across different platforms accessible.

6. Virtual Communities
With 3D and virtual reality (VR) technology, Second Life (http://secondlife.com/) has recruited members to join their community which is advertised as ‘a place to connect, shop, work, love and explore’. Because of its advantages of role-playing, not only for audio/video connectivity as other communities such as Facebook (http://www.facebook.com/), Second Life has won attentions from many computer users, including educators who wish their students (or ‘residents’ in such community) could benefit themselves by exploring the ‘real world’ to gain desired skills, including language skills. Based on the Communicative Approach, materials aim at interactions (between learners) in class have been designed and applied with success, especially in EFL setting. Being able to practice or try out the target language functions in the real-life scenarios one of the passages closest to the real language acquisition process for ESL/EFL learners. Having virtual communities such as Second Life where learners can practice target language in ‘virtual real-life’ situations takes learners one step closer to the goal under such approach; and it also compensates the lack of ‘natural’ speaking environment in most EFL settings.

7. Commercial Language Learning Packages
One of the successfully advertised products for language learning software package in the U.S. is Rosetta Stone (http://www.rosettastone.com/). With its advocate of total immersion and ‘interactive’ speaking elements, the product has been integrated in ESL curriculum of certain number of institutions. These self-study language learning package can be complementing, but not replacing, the real face-to-face interaction during language learning process because the
indefinite possibilities of purposes and/or effects of real language is not yet programmable, as far as we know, with the current Artificial Intelligence (AI).

For pronunciation practice purpose, software such as Pronunciation Power 1 & 2 (Buffel, 2000) developed by English Computerized Learning, Inc. were utilized in the quasi-experiment to ensure subjects have massive chances for practice.

**Interpretation of IPA by different language speakers**

Technological enhancement may also be effective in teaching English to speakers whose native language is one other than Spanish, for instance, Chinese. Being a non-alphabetic language, Chinese does not share the similarities with English as Spanish does. Chinese Mandarin speakers who receive phonetic/phonological instruction may find internalizing IPA more stressful than Spanish speakers. However, in Chinese there are certain characters with phonetic elements (radicals) which denote the sounds of the characters (Lockhart, 1883). In fact, some Chinese characters which originated from the shape/image of the object (pictograph) can be computer-animated to induce the relationship not only between the contour and the semantic meaning of the character but also between the symbol and the sound realization, for the purpose of phonetic/phonological instruction. Technologically enhanced interactive materials can further motivate learners to participate. The negative effects of repetitive exercise in phonetic training can be replaced by Computer Assisted Instruction (CAI) and/or Computer Assisted Language Learning (CALL) activities or programs.

**Conclusion**

This quasi-experiment investigated the impact of phonetic and phonological instruction on the oral proficiency of Spanish-speaking English as a second language learners in a cooperative learning setting. Although the improvement between the experimental and control groups was not statistically significant enough to claim cooperative learning elements to be the decisive factor of subjects’ improvement in oral proficiency, it is the researchers’ strong belief that the subjects of both groups had benefited from the instructional technology applications implemented during the quasi-experiment. Through the discussion of this study, the author hopes such instructional technology applications can be less-intimidating and more approachable to in-service teachers whose goal is to support learners with the latest and best technology offered.
References


