Large TLEF Project – Final Report

Report Completion Date: (2017/09/06)

1. PROJECT OVERVIEW

1.1. General Information

Project Title:	**Multimodal Approaches to the Empowerment of Pronunciation Teaching and Learning**		
Principal Investigator:	**Bryan Gick**		
Report Submitted By:	**Bryan Gick and Heather Bliss**		
Project Initiation Date:	**May 1, 2014**	**Project Completion Date:**	**August 31, 2016**

1.2. Project Summary

1.3. Team Members – *(Please fill in the following table and include **students**, undergraduate or graduate, who participated in your project).*

Name	Title/Affiliation	Responsibilities/Roles
Bryan Gick	Principal Investigator	Project Management
Jennifer Abel	Postdoctoral Fellow	Research coordinator
Heather Bliss	Postdoctoral Fellow	Research coordinator
Noriko Yamane	Postdoctoral Fellow	Research coordinator
Masaki Noguchi	Student Research Assistant	Multimedia development
Bosung Kim	Instructional Designer	Course design and implementation
Asami Tsuda	Japanese Instructor	Course design and implementation
Misuzu Kazama	Japanese Instructor	Course design and implementation
Strang Burton	Assistant Professor	Multimedia development, Training
Saurabh Garg	Contractor/Engineer	Software development
Joseph D'Aquisto	Student Research Assistant	Multimedia development
Jonathan de Vries	Student Research Assistant	Multimedia development
Lewis Haas	Student Research Assistant	Multimedia development
Tsuyoshi Hamanaka	Student Research Assistant	Multimedia development
Andrea Lau	Student Research Assistant	Multimedia development
Joyce Tull	Student Research Assistant	Multimedia development
Yoshitaka Matsubara	Student Research Assistant	Multimedia development
Blake Allen	Student Research Assistant	Multimedia/software development
Megan Keough	Student Research Assistant	Multimedia development

Lauretta Cheng	Student Research Assistant	Website development, evaluation, multimedia development
Tiffany Doe	Student Research Assistant	Website development
Melissa Henderson	Student Research Assistant	Website development
Murray Schellenberg	Lab Manager / Narrator	Multimedia development
Matthew Law	Student Research Assistant	Multimedia development
Derek Lew	Student Research Assistant	Website development
Martina Wiltschko	Collaborator / Professor (Linguistics)	Course implementation
Hotze Rullmann	Collaborator / Professor (Linguistics)	Course implementation

1.4. Student Impact – *Please fill in the following table with **past**, **current,** and **future** courses and sections (e.g. HIST 101, 002, 2017/2018, Sep) that have been/will be impacted by your project, including any courses not included in your original proposal (you may adapt this section to the context of your project as necessary).*

Course	Section	Academic Year
LING 100	multiple sections	2014W - ongoing
LING 101	multiple sections	2014W - ongoing
JAPN 100	multiple sections	2014W – ongoing
JAPN 101	multiple sections	2014W – ongoing
JAPN 150	multiple sections	2014W – ongoing
JAPN 102	multiple sections	2015S - ongoing
JAPN 103	multiple sections	2015S - ongoing
JAPN 401	multiple sections	2015S - ongoing
CNTO 301	multiple sections	2016S - ongoing

In addition to the courses listed above, we have been advised that instructors teaching UBC courses in French, German, Spanish, and Mandarin also regularly refer their students to the *eNunciate* website for pronunciation practice. We have developed additional materials for these and other languages that are available for future use.

2. PRODUCTS & ACHIEVEMENTS

2.1. Products and Achievements – *Please **update** project products and achievements as necessary. Indicate the current location of such products and provide an URL if applicable.*

Product(s)/Achievement(s):	Location:
Clickable IPA app	http://enunciate.arts.ubc.ca/linguistics/world-sounds/
Pronunciation station	Physical recording kit for in-community / in-classroom recording of ultrasound overlay videos
Tongue visualizer – for automating video creation	Custom software, housed on server and computers in the Interdisciplinary Speech Research Laboratory
Pronunciation tutorials for a range of languages	http://enunciate.arts.ubc.ca/self-directed-courses/

2.2. Item(s) Not Met – *Please list intended project products and achievements that were not attained and the reason(s) for this.*

Item(s) Not Met:	Reason:
Tongue visualizer – for real-time biofeedback	Focused instead on automating video creation
Prosody visualizer	Working prototype is completed; have not incorporated into website for technical reasons – this is a surmountable problem provided future support

3. PROJECT EVALUATION

3.1. Project Outcomes – *Please list the intended outcomes or benefits of the project for students, TAs and/or instructors.*

The *eNunciate* site provides students with engaging pronunciation learning materials specific to students' language backgrounds. Using the clickable IPA app and self-directed courses on the *eNunciate* website, language learners can repeatedly come and practice their pronunciation at their own pace, focusing on aspects of their learning that need more work. The pronunciation station and automated video creation tools we have developed allow us to quickly generate materials for new languages. The Clickable IPA app embodies an intimate and realistic view of the speech apparatus that makes the learning process enjoyable and engaging for students, from UBC classrooms to indigenous community settings. Accessibility to these tools in an online environment enhances students' phonetic/phonological awareness and interest in language learning, and enables students of both linguistics and language to better understand their own speech production and perception.

3.2. Findings – *Please describe the findings of your project evaluation effort: to what extent were intended project outcomes achieved or not achieved? You are encouraged to include both graphical representations of data as well as scenarios or quotes to represent key themes.*

The project has led to the development of new resources for pronunciation teaching and learning, and based on our internal and published evaluation of these resources (see sections 3.3 and 3.4), these methods are effective and widely applicable. An unexpected and exciting outcome was that a number of First Nations communities learned about these resources through the eNunciate site and have partnered with our team to develop customized resources for teaching their languages.

3.3. Data Collection and Evaluation Methods – *Please describe the data collection strategies used, how the data was analyzed, and perceived limitations.* ***Note: Please attach copies of data collection tools (e.g. surveys and interview protocols) and any additional data or other relevant items.***

We have gathered qualitative and quantitative data to evaluate the products of our project. Qualitative data includes testimonials from UBC instructors and community participants who have been involved in the project, as well as results of surveys conducted with students enrolled in UBC classes that made use of the products. Instructor testimonials can be found at http://enunciate.arts.ubc.ca/research-and-case-studies/case-studies/. Survey results are reported in Tsuda et al. 2015 and Yamane et al. 2015, both of which are accessible in section 3.4 below. The qualitative data all support the effectiveness of ultrasound overlay videos as a means for teaching and learning of challenging sounds in linguistics and language learning. As for quantitative data, we have conducted classroom studies comparing ultrasound overlay videos with other instructional methods for learning pronunciation. One of

these was conducted with LING 101 students, and two others with CNTO 301 students. Results are reported in Bliss et al. 2017 and Abel et al. 2017, both of which are accessible in section 3.4 below. In brief, the studies showed that students who received pronunciation instruction using ultrasound overlay videos performed better than those who received audio stimuli alone.

3.4. Dissemination – *Please provide a list of **past** and **future** scholarly activities (e.g. publications, presentations, invited talks, etc.) in which you or anyone from your team have or intend to disseminate the outcomes of this project.*

We continue to present and publish the results of research related to this project in scholarly venues relating to research in language pedagogy. We maintain a list of these presentations and publications at http://enunciate.arts.ubc.ca/research-and-case-studies/team-research/. A current list is given below.

Journal Articles

Bliss, H., K. Johnson, and B. Gick. In prep. Integrating Ultrasound Visualization for Pronunciation Instruction into University Language Classes: Ultrasound Overlay Videos and their Application in a Blended Learning Paradigm.

Bliss, H., S. Bird, A. Cooper, S. Burton, and B. Gick. To appear. Seeing Speech: Ultrasound-based Multimedia Resources for Pronunciation Learning in Indigenous Languages. *Language Documentation & Conservation* (provisionally accepted pending minor revisions, September 5 2017).

Bliss, H., J. Abel, and B. Gick. In press. Computer-Assisted Visual Articulation Feedback in L2 Pronunciation Instruction: A Review. Paper accepted for publication in the *Journal of Second Language Pronunciation*.

Bliss, H., S. Burton, and B. Gick. 2016. Ultrasound Overlay Videos and their Application in Indigenous Language Learning and Revitalization. *Canadian Acoustics* 44(3): 136-37.

Abel, J., B. Allen, S. Burton, M. Kazama, M. Noguchi, A. Tsuda, N. Yamane, and B. Gick. 2015. Ultrasound-Enhanced Multimodal Approaches to Pronunciation Teaching and Learning. Proceedings of Acoustics Week in Canada. *Canadian Acoustics* 43(3). 124-125.

Conference Proceedings

Bliss, H., L. Cheng, Z. Lam, R. Pai, M. Schellenberg, and B. Gick. 2017. Ultrasound Technology and its Role in Cantonese Pronunciation Teaching and Learning. *Proceedings of the 8th Annual Conference on Pronunciation in Second Language Learning and Teaching*, ed. by Mary O'Brien and John Levis, 33-46.

Abel, J., Bliss, H., Gick, B., Noguchi, M., Schellenberg, M., and Yamane, N. 2017. Comparing Instructional Reinforcements in Phonetics Pedagogy. *Proceedings of the International Symposium on Applied Phonetics*, ed. by Toshiko Isei-Jaakkola.

Kazama, M., Noguchi, M., Yamane, N., Bliss, H., Kim, B., & Gick, B. 2016. 日本語イントネーション・オンライン学 教材による反転授業. Intonation learning for Japanese L2 learners: A Flipped Classroom Approach. *Proceedings of the Canadian Association of Japanese Language Education*, pp.125-133.

Yamane, N., Howson, P., and Wei, P. 2015. An Ultrasound Examination of Taps in Japanese, Proceedings of the 18th International Congress of Phonetic Sciences, ed. by The Scottish Consortium for ICPhS 2015, Glasgow, UK: University of Glasgow. ISBN 978-0-85261-941-4. https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2015/Papers/ICPHS0815.pdf

Yonemoto, K., Noguchi, M., Hayashi, H., Tsuda, A., & Yamane, N. 2014. 超音波映像を応用した日本語発音指導の可能性 *Ultrasound Application to the Empowerment of Pronunciation Teaching and Learning.* Proceedings of the Canadian Association of Japanese Language Education, 2014, Montreal, ON. Retrieved from http://www.cajle.info/wp-content/uploads/2014/09/Yonemoto_CAJLE2014_Proceedings_248-257.pdf

Conference Presentations and Posters

Percival, M., H. Bliss, and M. Schellenberg. 2017. Methodological Trade-Offs for Dual-Purpose Phonetic Fieldwork. Paper accepted for presentation at Acoustics Week in Canada. Guelph, Ontario: October 11-13, 2017. [abstract]

Bird, S., H. Bliss, and B. Gick. 2017. Visualizing Speech in a Classroom Setting Using Interactive Ultrasound Imaging. 60-minute workshop presented at the 2017 PSLLT Research Methods Workshop. Salt Lake City, University of Utah: August 31, 2017. [slides]

Bliss, H., S. Bird, S. Burton, and B. Gick. 2017. *Seeing Speech: A Pronunciation Toolkit for Indigenous Language Teaching and Learning*. E-poster presented at the International Conference on Language Documentation and Conservation. University of Hawaii at Manoa, March 2017. [abstract]

Cheng, L., with H. Bliss, M. Schellenberg and B. Gick. 2017. Ultrasound Overlay Videos: Testing its Effectiveness for Teaching L2 Cantonese Sound Contrasts. Poster presented at LSURC: Language Sciences Undergraduate Research Conference. Vancouver: University of British Columbia, February 2-3, 2017. [poster]

Bliss, H., S. Bird, and B. Gick. 2016. *Developing Ultrasound Overlay Videos for SENĆOŦEN Learners*. Poster presented at the 5th Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan. Honolulu, HI: November 28-December 2, 2016. [abstract][poster]

Bliss, H., S. Burton, and B. Gick. 2016. *Ultrasound Overlay Videos and their Application in Indigenous Language Learning and Revitalization*. Paper presented at Acoustics Week in Canada. Vancouver, BC: September 21-23, 2016. [abstract][slides]

Bliss, H., L. Cheng, Z. Lam, R. Pai, M. Schellenberg, and B. Gick. *Ultrasound Technology and its Role in Cantonese Pronunciation Teaching and Learning*. Paper presented at the 8th Annual Conference on Pronunciation in Second Language Learning and Teaching (PSLLT). Calgary, AB: University of Calgary, August 12-13, 2016. [abstract][slides]

Kazama, M., N. Yamane, M. Noguchi, B. Kim, H. Bliss, and B. Gick. 日本語イントネーション・オンライン学 教材による反転授業. *Intonation learning for Japanese L2 learners: A Flipped Classroom Approach*. Paper presented at the Annual Conference of the Canadian Association of Japanese Language Education (CAJLE 2016). Niagara Falls, ON: August 17-18, 2016. [abstract][slides]

Abel, J., H. Bliss, B. Gick, M. Noguchi, M. Schellenberg, and N. Yamane. 2016. *Comparing Instructional Reinforcements in Phonetics Pedagogy*. Paper presented at the 1st International Symposium on Applied Phonetics. Nagoya, Japan: March 25-28, 2016.

Noriko Yamane, Phil Howson, Masaki Noguchi, and Bryan Gick. 2016. "When dynamics conflict: Flap dynamics and palatalization in Japanese", LabPhon15: Speech Dynamics and Phonological Representation. Ithaca, NY: Cornell University, July 13-16, 2016.

Abel, J., B. Allen, S. Burton, M. Kazama, M. Noguchi, A. Tsuda, N. Yamane, and B. Gick. 2015. *Ultrasound-Enhanced Multimodal Approaches to Pronunciation Teaching and Learning*. Paper presented at Acoustics Week in Canada. Halifax, NS. October 2015.

Noguchi, M., Yamane, N., Tsuda, A., Kazama, M., Kim, B. and Gick, B. 2015. *Towards protocols for L2 pronunciation training using ultrasound imaging*. Poster presented at the 7th Annual Pronunciation in Second Language Learning and Teaching (PSLLT) Conference, Dallas, Texas. October 2015.

Tsuda, A., Kim, B., Gick, B, Kazama, M., Yamane, N, & Burton, S. 2015. *Ultrasound-integrated pronunciation tutorials*. Roundtable discussion presented at the Society for Teaching and Learning in Higher Education, Vancouver, BC.

Tsuda, A., K. Yonemoto, & H. Hayashi. 2015. *Teaching pronunciation using the online pronunciation learning website eNunciate!.* Paper presented at the 2015 Annual Conference of the Canadian Association for Japanese Language Education, Vancouver, BC.

Tsuda, A., K. Yonemoto, & H. Hayashi. 2015. オンライン発音学習教材の効果と意義ー音声研究の成果の応用可能性 *[Meanings and effects of online pronunciation learning material: Possibilities of applying the outcomes of speech research.]* Paper presented at the Annual Spring Conference of the American Association of Teachings of Japanese. Chicago, Illinois.

Yamane, N., Abel, J., Allen, B., Burton, S., Kazama, M., Noguchi, M., Tsuda, A. and Gick, B. 2015. *Ultrasound-integrated pronunciation teaching and learning*. Ultrafest VII, University of Hong Kong.

Yonemoto, K., Noguchi, M., Hayashi, H., Tsuda, A., & Yamane, N. 2014. 超音波映像を応用した日本語発音指導の可能性 [Ultrasound Application to the Empowerment of Pronunciation Teaching and Learning.] Paper presented at the Canadian Association of Japanese Language Education. Montreal, ON.

Yonemoto, K. 2014. Flipped Learningを取り入れた音声指導の試み [Implementing flipped learning into phonetics education.] Paper presented at the 10th International Symposium for Japanese Language Education and Japanese Studies, Causeway Bay, Hong Kong.

Other Dissemination

Kazama, M., and B. Kim. 2016. Promoting Active Learning for Japanese Pronunciation through Flipped Learning. Presentation at the Centre for Teaching, Learning, and Technology (CTLT) Summer Institute. University of British Columbia, August 22-25, 2016. [slides]

Bliss, H., S. Burton, B. Kim, B. Allen, and B. Gick. 2016. *eNunciate! Empowering Pronunciation Teaching and Learning*. Poster presentation at the TLEF Showcase, Celebrate Learning Week. University of British Columbia, May 5, 2016.

Bliss, H., S. Burton, B. Kim, M. Kazama, B. Allen, and B. Gick. *Empowering Pronunciation Teaching and Learning with the Use of Ultrasound Technology and Prosody Visualization*. 2-hour interactive workshop given at the Centre for Teaching, Learning and Technology (CTLT) Spring Institute. University of British Columbia, May 2, 2016. [slides]

4. **TEACHING PRACTICES** – *Please indicate if **your** teaching practices or those of **others** have changed as a result of your project. If so, in what ways? Do you see these changes as sustainable over time? Why or why not?*

   Instructors in Linguistics and language programs at UBC are using the website and video materials generated by the project every day. We have also heard feedback from a number of linguists and language instructors at other university campuses worldwide who are making use of the materials. First Nations communities in British Columbia are using customized pronunciation videos we developed for teaching pronunciation in their languages; in at least one community language program, the resources are already a regular part of their curriculum.

5. **PROJECT SUSTAINMENT** – *Please describe the sustainment strategy for the project components. How will this be sustained and potentially expanded (e.g. over the next five years). What challenges do you foresee for achieving the expected long-term impacts listed above?*

   • Our team applied for a SSHRC Insight Grant to support ongoing developments related to this project in fall 2016 (Principal Investigator: Strang Burton; Co-applicants: Bryan Gick, Sonya Bird). While this application was unsuccessful, the reviews were encouraging and we were approved for SPARC/Hampton reapplication funds to reapply this coming fall.

   • We are also working with individual language programs and the Faculty of Arts to determine ongoing support for the pedagogical side of the project.

   • Enunciate has become a sponsored project of the UBC Language Sciences Initiative.