



TLEF Project – Final Report

Report Completion Date: (2021/03/05¹)

1. PROJECT OVERVIEW

1.1. General Information

Project Title:	Improving Educational Feedback with a Speech- and Gesture-based Online Commenting System		
Principal Investigator:	Dongwook Yoon		
Report Submitted By:	Dongwook Yoon		
Project Initiation Date:	2018/04/01	Project Completion Date:	2020/04/01
Project Type:	<input type="checkbox"/> Large Transformation <input checked="" type="checkbox"/> Small Innovation <input type="checkbox"/> Flexible Learning <input type="checkbox"/> Other: [please specify]		

1.2. Project Focus Areas – Please select all the areas that describe your project.

- Resource development (e.g. learning materials, media)
- Infrastructure development (e.g. management tools, repositories, learning spaces)
- Pedagogies for student learning and/or engagement (e.g. active learning)
- Innovative assessments (e.g. two-stage exams, student peer-assessment)
- Teaching roles and training (e.g. teaching practice development, TA roles)
- Curriculum (e.g. program development/implementation, learning communities)
- Student experience outside the classroom (e.g. wellbeing, social inclusion)
- Experiential and work-integrated learning (e.g. co-op, community service learning)
- Indigenous-focused curricula and ways of knowing
- Diversity and inclusion in teaching and learning contexts
- Open educational resources
- Other: [please specify]

¹ We requested an extension due to the surge of workload in the pandemic. The extended deadline was approved by Jeff Miller.



1.3. Project Summary

The objective of this TLEF project is to deploy RichReview to UBC courses. RichReview is a voice-and-gesture based PDF annotation tool developed by researchers at UBC and Cornell University. Dongwook Yoon, the PI of this TLEF project, led the design and implementation of RichReview. The project had two pronged objectives: the system integration of RichReview to UBC’s CWL Authentication system and the evaluation of the new RichReview system in UBC courses. Through the course of two years of efforts, the technical implementation was successfully finished and the UBC’s RichReview has been tested in 14 courses where total 14 instructors and more than 400 students have used the tool. In the evaluation survey, the instructors and students indicated that RichReview was beneficial for their teaching and learning for its interactivity and communication richness.

1.4. Team Members – Please fill in the following table and include students, undergraduate and/or graduate, who participated in your project.

Name	Title/Affiliation	Responsibilities/Roles
Dongwook Yoon	Assistant Professor/Department of Computer Science	Project Lead/Principal Applicant
Qian Wang	Senior Instructor and Director/ Chinese Language Program at Asian Studies, Faculty of Arts	Curriculum Development/Co-applicant
Eurie Shin	Lecturer/ Korean Language Program at Asian Studies, Faculty of Arts	Curriculum Development/Co-applicant
Bosung Kim	Educational Consultant/CTLT	Course and Tool Management/Deployment Facilitator
Mohi Reza	MSc Student/Department of Computer Science	Tool Management/Deployment Facilitator

1.5. Courses Reached – 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 reached by your project, including courses not included in your original proposal (you may adapt this section to the context of your project as necessary).

Course	Section	Academic Year	Term (Summer/Fall/Winter)
KORN 102	001	2018/19	Summer
CHIN 134	001	2018/19	Summer
KORN 302	001	2018/19	Winter
CHIN 131	001	2018/19	Winter
CHIN 131	005	2019/20	Fall
CHIN 481	001	2019/20	Fall
KORN 200	003	2019/20	Fall
LLED 201	V96, VE4, V95, VE1, VE2,V92	2019/20	Winter



VANT 140D	V03, V05	2019/20	Winter
CHIN 463	001	2019/20	Winter
JAPN 101	005	2019/20	Winter
JAPN 201	002, 004	2019/20	Winter
KORN 302	001	2019/20	Winter
KORN 200	003	2019/20	Winter



2. OUTPUTS AND/OR PRODUCTS

2.1. Please *list* project outputs and/or products (e.g. resources, infrastructure, new courses/programs). Indicate the current location of such products and provide a URL if applicable.

Product(s)/Achievement(s):	Location:
RichReview Tool with CWL Integration	https://richreview.net/
Introduction Workshop Program (reusable in future orientations)	https://bit.ly/335yKZl
A set of new instructional designs	https://bit.ly/2WRQBPa
Instructor Guide	https://bit.ly/300A8ui
Evaluation Report – Student Survey	https://docs.google.com/presentation/d/1kBEUUSjFW92wWAWoDIE6n9X-Nrzc4v2ZK-o-xrMNNCo/
Evaluation Report – Instructor Focus Group Interview	https://docs.google.com/document/d/1HPvSWRI2QE4aleR219YQyRQ1d3sc3jQw-dYI7Z98bET0/

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

Item(s) Not Met:	Reason:
Deployment to CPSC 344	The PI’s parental leave (earlier than expectation date).
Deployment to CPSC 554K	The RichReview component of the course was dropped due to the COVID-19 disruption.

3. PROJECT IMPACT

3.1. Project Impact Areas – Please select all the areas where your project made an impact.

- Student learning and knowledge
- Student engagement and attitudes
- Instructional team teaching practice and satisfaction
- Student wellbeing, social inclusion
- Awareness and capacity around strategic areas (indigenous, equity and diversity)
- Unit operations and processes
- Other: [The RichReview system was made available for all UBC instructors. Two modes of authentication are supported: CWL-based direct sign-in to the RichReview’s LMS system and LTI-based Canvas assignment.]



3.2. What were you hoping to change or where were you hoping to see an impact with this project? – Please describe the intended benefits of the project for students, TAs, instructors and/or community members.

As a multi-media instruction/feedback tool, RichReview has a potential to enhance the expressivity and richness of digitally mediated communication between instructors and students. The students can benefit from the subtle nuances of voice and specific spatial referencing of pointing gesture. The instructor can generate such multimodal annotations with low cognitive overhead using RichReview’s seamless and intuitive interface.

3.3. Were these changes/impacts achieved? How do you know they occurred? – What evaluation strategies were used? How was data collected and analyzed? You are encouraged to include copies of data collection tools (e.g. surveys and interview protocols) as well as graphical representations of data and/or scenarios or quotes to represent and illustrate key themes.

To evaluate the efficacy of RichReview, we deployed the system to 14 courses over the period of two years. The students answered Qualtrics questionnaires on the usability and learning efficacy of the tool in comparison with the legacy feedback mechanism. The instructors and TAs shared their perceptions, opinions, and concerns about RichReview in a series of Zoom-based focus group interviews. We analyzed the survey data using descriptive statistics and visualization. The focus group interviews were analyzed using thematic analysis. As indicated in the specific details in the evaluation reports (linked in 2.1), RichReview allowed students to quickly re-listen to the instructor’s nuanced voice feedback. The instructors find the tool to be a robust and stable multimedia platform for a variety of online instruction activities.

3.4. Dissemination – Please provide a list of past and upcoming scholarly activities (e.g. publications, presentations, invited talks, etc.) in which you or anyone from your team have shared information regarding this project.

The past publications on RichReview. All published to the top-tier venue in the field of human-computer interaction:

- **TypeTalker: A Speech Synthesis-Based Multimodal Commenting System, Ian Arawjo, Dongwook Yoon, and François Guimbretière, CSCW 2017.**
- **SimpleSpeech: Simplified Audio Production in Asynchronous Voice-Based Discussions, Venkatesh Sivaraman, Dongwook Yoon, and Piotr Mitros, CHI 2016.**
- **RichReview++: Deployment of a Collaborative Multimodal Annotation System for Instructor Feedback and Peer Discussion, Dongwook Yoon, Nicholas Chen, Bernie Randles, Amy Cheatle, Steven Jackson, Corinna Loeckenhoff, Abigail Sellen, and François Guimbretière, CSCW 2016.**
- **RichReview: blending ink, speech, and gesture to support collaborative document review, Dongwook Yoon, Nicholas Chen, François Guimbretière, and Abigail Sellen, UIST 2014.**



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?

At least 5 instructors who have used RichReview wanted to continue using the tool in their courses this coming term. They found that speaking is faster and more effortless than typing. They were also encouraged by the positive response from their students. These changes are resultant to the transition from text to voice. Hence, as long as the stakeholders in classrooms exploit the voice commenting features of RichReview, the beneficial effects will persist.

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?

Over the next five years, RichReview will be managed and administered by the PI's research team as part of their research on multi-media interaction techniques. In the short term (<next 5 years), the PI will use his research fund to sustain the technical infrastructure of RichReview. However, to make the system running and updated in the long term, commercialization and business development will be necessary. The PI will seek for this opportunity via HATCH, UBC's startup accelerator.