



TLEF Project – Final Report

Report Completion Date: (2019/09/30)

1. PROJECT OVERVIEW

1.1. General Information

Project Title:	Evidence-based best practices for two-stage collaborative exams		
Principal Investigator:	Joss Ives		
Report Submitted By:	Joss Ives		
Project Initiation Date:	April, 2017	Project Completion Date:	August, 2019
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]



1.3. Project Summary

Two-stage collaborative exams---or group exams, in which students first complete the exam individually and then form groups to complete the same or similar questions---are a flexible and effective method for adding formative feedback to an exam, which is traditionally a summative experience. In this project, we aim to better understand the precise outcomes of this classroom innovation and how different implementation choices affect these outcomes. We will do this by developing a flexible student survey to measure outcomes across implementations (as corroborated by performance metrics and focus group interviews); and developing a faculty inventory to collect both the range of implementations of group exams and expert recommendations about these implementations. Through this process we will create, curate, and disseminate group exam best practices, facilitating further and improved adoption of this teaching innovation across UBC.

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
Joss Ives	Senior Instructor	Co-PI
Jared Stang	Lecturer	Co-PI
Analise Hofmann	Graduate student	Survey development and focus group interviews
Patrick Dubois	Graduate student	Survey development, survey quantitative analysis, performance analysis
Rosanne Persaud	Graduate student	Survey development
Jose Arias-Bustamente	Graduate student	Survey development and qualitative analysis
Joy Chen	Undergraduate student	Group exam performance analysis
Maggie Wu	Undergraduate student	Group exam performance analysis

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)
Phys 100	All	2017-2018	Fall
Phys 101	All	2017-2018	Winter
Chem 223	All	2018	Summer
Phys 100	All	2018-2019	Fall
Phys 101	All	2018-2019	Winter
Phys 101	All	2019	Summer



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:
2-page advice handout for instructors	https://owncloud.westgrid.ca/public.php?service=files&t=nwluQJTdiCmb97W
NVivo tutorial developed to perform qualitative analysis of the student survey	https://owncloud.westgrid.ca/public.php?service=files&t=nwluQJTdiCmb97W
Student survey	https://owncloud.westgrid.ca/public.php?service=files&t=nwluQJTdiCmb97W
Instructor survey	https://owncloud.westgrid.ca/public.php?service=files&t=nwluQJTdiCmb97W
Advice for students	https://owncloud.westgrid.ca/public.php?service=files&t=nwluQJTdiCmb97W
Survey and group exam performance analysis R scripts	Not stored in a public repository

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:
Video analysis	Once we had a team assembled and starting doing the work, we determined that the video analysis sub-project would not produce as broadly useful deliverable as the survey and group exam performance analysis sub-projects would, so we focused our time and resources on those instead.

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: [please specify]

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.

We were seeking to improve the impact of 2-stage exams by providing best-practices advice to instructors and students.

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.

We delivered many workshops on our findings as the project progressed, and have a small handful of people who have come back after the workshops to ask follow-up questions or want feedback on related research projects.

We developed an in-class intervention, which we deployed in one section of Physics 101 in the Jan 2019 term. This intervention leveraged many of our project's findings and we were delighted to discover that it had a positive impact. The details of the intervention and results were disseminated by poster at a conference this past summer (a copy of the poster can be found at <https://osf.io/uh4gr/>)

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.

J. Ives, "Toward evidence-based best practices for two-stage collaborative group exams," Science 113 Science and Society Speaker Series, Nov. 15, 2018; Feb. 15, 2018.

J. Ives, "Two-Phase Collaborative Group Exams: Increasing student enjoyment and providing them with immediate feedback," Science Seminar Series, Thompson Rivers University, Kamloops (BC), Apr 4, 2019.

J. Ives, J. Stang, P. Dubois, A. Hoffman, J. Arias Bustamente, "Evidence-based best practices for two-stage collaborative exams," poster presentation, 2019 Teaching and Learning Enhancement Fund Showcase, May 2, 2019.

J. Ives, G. Rieger, J. Stang "Two-stage group exams," Co-presenter, Physics education brown-bag seminar for the UBC Department of Physics and Astronomy, Feb. 28, 2019.

J. Ives, J. Stang, "Four-way high-fives during exams: Adding a group phase to provide immediate feedback and increase enjoyment," oral presentation, 2019 First Year Experience Symposium, Jan 26, 2019.



J. Ives, J. Stang, J. Chen, P. Dubois, A. Hoffman, R. Persaud, “Evidence-based best practices for two-stage collaborative exams,” poster presentation co-presented with J. Stang, 2018 Teaching and Learning Enhancement Fund Showcase, May 3, 2018.

A. Hofmann*, R. Persaud, J. Stang, J. Ives, “Indirect gender effects in group exams,” poster presentation, UBC Science Education Open House, April 9 2018.

P. Dubois*, J. Stang, J. Ives, “Indirect gender effects in group exams,” poster presentation, UBC Science Education Open House, April 9 2018.

S. Chen*, J. Stang, J. Ives, “Factors Influencing Group Performance in Two-Stage Physics Exams: Group Size, Gender Composition, and Individual Score,” poster presentation, UBC Science Education Open House, April 9 2018.

L. Super*, A. Hofmann, P. Dubois, J. Stang, J. Ives, “How does self-reported extroversion and emotional stability relate to perception of group exams?,” poster presentation, UBC Science Education Open House, April 9 2018.

J. Ives, J. Stang, “Familiarity predicts positive group exam experiences,” poster presentation, American Association of Physics Teachers Summer Meeting, Provo, Utah (USA), July 22 2019.

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?*

Hopefully our instructor advice document has been useful to those that have attended our workshop and that there have been some transformations of teaching practices these.

For us, we plan to follow up on the in-class intervention informed by our findings. In short, we found that a high-impact aspect of the group exam experience is how familiar the group feels with each other. Helping students coordinate their group exam group ahead of time, and then having an in class group activity before the exam, where they work in those groups, showed an improvement in self-reported student satisfaction measures related to the group exam process. We will continue to refine how this activity looks in order to make it as easy to implement as possible for others in their courses.

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?*

In addition to the ongoing work described in teaching practices, we invested a lot of time and energy into group exam performances analyses that have, thus far, only been used to complement our findings from the survey analyses. However, we would also like to dig more deeply into these performance analyses on their own, and supplemented by the survey analyses, to learn more about groups that appear to work better overall together.