

Improving the Quality and Quantity of Feedback via Interactive Score Reporting

Okan Bulut

Project Description

Background

As universities and colleges strive to enhance student access, completion, and satisfaction, providing high-quality formative feedback has become an indispensable part of an effective teaching-learning environment in higher education. The primary goal of assessments with formative feedback is to monitor each learner's growth as a way of providing ongoing feedback that can be used both by instructors to improve their teaching, and by learners to improve their understanding of the content (Bennett, 2011). If feedback derived from formative assessments is timely, detailed, and specific, it can guide future learning, motivate learners to investigate other resources, and identify learners who need additional support (Merry *et al.*, 2013; Tett *et al.*, 2012).

Despite claims about the power of formative feedback to produce positive learning outcomes (e.g., Falchikov, 2013; Gikandi *et al.*, 2011), there are still concerns regarding the perceived lack of impact of feedback in practice (Carless *et al.*, 2011; Price *et al.*, 2010). Considerable variability in the quantity and quality of feedback for university students mirrors concerns highlighted by earlier research studies, within and across higher education subject areas and institutions (e.g., Bailey & Garner, 2010; van der Kleij *et al.*, 2012; Tucker, 2015). In addition, formative feedback from paper-and-pencil assessments often comes too late to enable students to improve their performance, especially for large size classrooms (Higgins *et al.*, 2002).

To provide students with formative feedback in a more efficient and effective way, universities have begun to implement online assessments that students can complete using their computers, tablets, and similar devices. There are many benefits of using online assessments for formative purposes. First, online assessments ensure that students can take formative assessments whenever they or their instructors believe feedback is required. Second, students' answers in online assessments are immediately marked so that they learn about their performance very quickly. Third, students' performance on online assessments can be archived easily, which would allow them to review previous assessments results and feedback any time in the future.

At the University of Alberta, the eClass management system (<https://eclass.srv.ualberta.ca/>) allows instructors to provide their students with online assessments for formative purposes. Students can complete online assessments on eClass using their personal computers, tables, or similar devices. Once a student completes an online assessment, eClass provides a summary report including the student's correct/incorrect responses and total score. Depending on the settings on eClass, students can have multiple attempts to complete the assessment. In addition, eClass archives the results from online assessments, which allows students to review their results any time during the semester. Results from online assessments can also be used by instructors to address gaps in student learning and improve their teaching.

Receiving results quickly from online assessments on eClass can be viewed as a great convenience for instructors who wish to increase the quantity and quality of feedback provided to their students. However, despite providing timely results, such online assessments do not guarantee

that students will become active members of the learning process. In fact, reporting scores to students in an interpretable manner can be quite challenging (Cohen & Wollack, 2006, p. 380; Huhta, 2013). Because the depth and breadth of feedback returned from eClass is quite limited, students may not be able to benefit from online formative assessments. In most cases, the score report from eClass only includes a total raw score and a pass/fail decision based on a cut score determined by the instructor. Although the instructor can enter some comments depending on the pass/fail decision, such comments are often of limited use to students as they fail to point the students to specific areas on which to focus their future learning. Instead of just static information, score reports should be able to transform scores and feedback into a dynamic and meaningful form tailored to the needs of students. Furthermore, score reports should allow learners to make correct and appropriate inferences from scores and, in turn, take further actions (Ryan, 2006).

To enhance the effectiveness of feedback from online assessments, last year we developed a new reporting system called ExamVis (<https://lac.educ.ualberta.ca/examvis>) for a SSHRC-funded project. ExamVis is a score reporting system capable of producing high-quality score reports for online assessments. Using ExamVis, instructors first create a detailed blueprint for their assessments. This blueprint includes content categories for the questions, key concepts measured by each question, and written feedback for each content category, a list of available resources available for further study. After a student completes an exam, ExamVis transforms the student's responses into multiple scores (e.g., total score and scores by content categories) and presents the scores in multiple formats (i.e., interactive visualizations and tables). In addition, ExamVis automatically generates written feedback based on the instructor's pre-defined comments, which explains whether the student's performance for each content category was adequate, what key concepts were missed based on incorrect responses, and what resources are available for studying those key concepts further. So far, ExamVis has been used in three large-size courses with more than 1000 students. The students' reactions to the feedback given in the ExamVis reports have been highly positive. In addition, the initial results show a positive impact of score reports from ExamVis on students' performance in the course examinations.

Currently, ExamVis is only available for summative assessments administered at the Learning Assessment Centre (LAC; <https://lac.ualberta.ca/>). Given that ongoing feedback from formative assessments (i.e., assessment *for* learning) is more important for promoting student learning, it is essential to extend the capabilities ExamVis to online formative assessments. Therefore, this project aims to (1) expand the ExamVis system into eClass so that it can be used for providing students with detailed, specific, and timely feedback from formative assessments used in the classroom environment and (2) investigate the effectiveness of ExamVis in enhancing student learning.

Methods and Scope

This project will involve three stages. The first stage of the project involves the integration of the ExamVis system with eClass. The second stage of the project includes the preparation of formative assessments on eClass (i.e., questions, test blueprint, feedback statements, etc.). The final stage of the project focuses on evaluating the impact of formative feedback given via ExamVis on student learning.

Stage 1 – Integration of ExamVis with eClass

Stage 1 focuses on the development and optimization of an eClass extension that will connect online assessments on eClass with the ExamVis system. Currently, ExamVis is limited to online assessments administered through the TAO testing system (<https://www.taotesting.com>) at LAC. Therefore, it is necessary to build an additional platform that will establish a connection between

ExamVis and eClass. During this stage, my co-applicant Dr. Maria Cutumisu and I will work closely with the eClass team and the programmers from the Technologies in Education unit (<https://techined.ualberta.ca/>). We already contacted the eClass team and discussed the technical requirements of this project. Asim Aziz, a senior support analyst for the eClass team, has agreed to provide us with technical support for this project. In addition to the eClass team, the programmers from the Technologies in Education who also built the original ExamVis system will be involved in this process. We will complete the integration of ExamVis with eClass until December 2018 and then pilot test the integrated system during Winter 2019.

Stage 2 – Preparation of Formative Assessments on eClass

In Stage 2, we will develop a series of online formative assessments for two large-size courses from the Faculty of Education. For this project, we will work with the instructors of EDPY 303 Educational Assessment (around 800 students during Fall and Winter) and EDU 210 Introduction to Educational Technology (around 400 students during Fall and Winter). We selected these two courses because:

- 1) Both courses are large-size courses taken by students with different backgrounds. This will allow us to work with a diverse group of students with different learning styles.
- 2) Both courses use online assessments for their summative assessments and thus students are familiar with using computers for writing their examinations.
- 3) Both courses provide students with several practice assessments so that students can assess their knowledge in the course.
- 4) Dr. Maria Cutumisu is one of the instructors of EDU 210 and I am the instructor and course coordinator of EDPY 303. Therefore, we are very familiar with the content of these courses.

In collaboration with other instructors who will also be teaching these courses, we will transform the existing formative assessments in the paper-and-pencil format into online formative assessments in eClass. In addition, we will develop new formative assessments to allow students to practice their knowledge throughout the course. Dr. Cutumisu will take the lead on developing new formative assessments for EDPY 210, while I will be primarily responsible for developing new formative assessments for EDPY 303. Lastly, we will develop blueprints for all formative assessments that link the questions from these assessments into content categories, key concepts to be learned, and resources available for students to learn more about the key concepts measured by each question.

Stage 3 – Evaluating the Effects of ExamVis on Student Learning

The ExamVis system will be implemented during the 2019-2020 academic year with all formative assessments used in EDU 210 and EDPY 303. The instructors of EDU 210 and EDPY 303 will provide students with several formative assessments on eClass during Fall 2019 and Winter 2020. The results of the formative assessments will not be used for grading purposes. Instead, these assessments will help students assess their knowledge and prepare better for the summative assessments and assignments required for the courses.

After completing the formative assessments on eClass, students will receive a detailed score report generated by the ExamVis system. The report will consist of interactive visualizations of the scores (i.e., total score and scores by content categories), a table of key concepts based on the questions students could not answer correctly, the instructor's comments on students' performance in each content area, and further information on additional resources for students. At the end of Fall 2019 and Winter 2020, we will evaluate the success of the ExamVis score reporting system. This evaluation will be based on three primary outcomes:

- 1) Surveys of students to assess their satisfaction with the ExamVis system

- 2) Follow-up focus groups of students from EDU 210 and EDPY 303 to learn more about how receiving detailed and timely feedback from formative assessments affected their learning throughout the semester
- 3) Any improvement in summative assessment scores during the 2019-2020 academic year that would not have been expected based on the data from the 2018-2019 academic year

References

- Bailey, R., & Garner, M. (2010). Is feedback in higher education assessment worth the paper it is written on? Teachers' reflections on their practices. *Teaching in Higher Education, 15*(2), 187–198.
- Bennett, R. E. (2011). Formative assessment: A critical review. *Assessment in Education: Principles, Policy & Practice, 18*, 5–25.
- Carless, D., Salter, D., Yang, M., & Lam, J. (2011). Developing sustainable feedback practices. *Studies in Higher Education, 36*, 395–407.
- Cohen, A., & Wollack, J. (2006). Test administration, security, scoring, and reporting. In R. L. Brennan (Ed.), *Educational measurement* (4th ed., pp. 355–86). Westport, CT: ACE.
- Falchikov, N. (2013). *Improving assessment through student involvement: Practical solutions for aiding learning in higher and further education*. New York, NY: Routledge.
- Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education, 57*(4), 2333–2351.
- Higgins, R., Hartley, P., & Skelton, A. (2002). The conscientious consumer: Reconsidering the role of assessment feedback in student learning. *Studies in Higher Education, 27*(1), 53-64.
- Huhta, A. (2013). Administration, scoring, and reporting scores. In A. J. Kunnan (Ed.). *The companion to language assessment* (pp. 1–18). John Wiley & Sons, Inc., Boston, MA.
- Merry, S., Price, M., Carless, D., & Taras, M. (2013). *Reconceptualising feedback in higher education: Developing dialogue with students*. New York, NY: Routledge.
- Price, M., Handley, K., Millar, J., & O'Donovan, B. (2010). Feedback: all that effort, but what is the effect? *Assessment and Evaluation in Higher Education, 35* (3), 277 – 289.
- Ryan, J. (2006). Practices, issues, and trends in student test score reporting. In S. Downing & T. Haladyna (Eds.), *Handbook of test development* (pp. 677–710). Mahwah, NJ: Erlbaum.
- Tett, L., Hounsell, J., Christie, H., Cree, V. E., & McCune, V. (2012) Learning from feedback? Mature students' experiences of assessment in higher education. *Research in Post-Compulsory Education, 17*(2), 247-260.
- Tucker, B. M. (2015). *The student voice: Using student feedback to inform quality in higher education* (Unpublished doctoral dissertation). Curtin University, Australia.
- Van der Kleij, F. M., Eggen, T. J. H. M., Timmers, C. F., & Veldkamp, B. P. (2012). Effects of feedback in a computer-based assessment for learning. *Computers & Education, 58*, 263-272.