



Enhancing the Feedback Experience for Instructors and Students

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Introduction

One of the most challenging tasks for an instructor is to provide feedback about student writing that is high-quality, timely, and aligned with the course objectives. This is particularly true in student writing about a technical subject, where students may have problems with either the technical content or expressing their ideas through language, figures, and tables. In addition, if the instructor uses a grader or teaching assistant to provide feedback, they need to train those graders to provide feedback that is consistent with the instructor's feedback.

Therefore, the purpose of this project is to create a feedback system using **Evidenced-Centered Classroom Assessment (ECCA)** to enhance the feedback experience for instructors, their teaching assistants, and students. ECCA is a theory describing that learning may be optimized when there is alignment between teaching activities, learning activities, assessing activities, and learning objectives. In this project we are creating a feedback system that assists instructors in aligning learning activities like student technical writing (See Figure 1 Student Document), with the assessing activity of grading the student writing (See Figure 2 Rubric), and the teaching activity of providing high-quality timely feedback (See Figure 3 Feedback Note) to the learning objectives (See the Scale/Criteria column in Figure 4 of the Feedback Database).

Methods

The Co-Principal investigators and three undergraduate assistants have been developing this Feedback system. We have completed the design phase by conducting a Use-Case Analysis. **At present we have developed a "mock-up" of the prototype to guide coding.** We are currently using Java code to build the first working prototype. Then we will test the prototype and gather feedback to improve the system. The following tools are being used:

- Java & BlueJ
- Git
- Umbrello & Figma
- Ticktick
- Junit

Results

The "Mock-up" prototype of the Feedback System is displayed below in Figures 1-4. Figure 1 is an example of student "Pseudo Albert's" learning task, a final writing assignment for instructor James' undergraduate Educational Psychology course. On the right-hand side of this figure there are feedback notes James has/is making to assess Albert's learning performance. This feedback note also acts as a teaching activity to specifically signal to Albert how close their performance matched the learning objectives. For example, Albert received three "+2's" and one "-2" points, for a total of 6/8 points on the Constructivism learning objective (See Figure 2 of the Rubric). Figure 3 represents the elements of a newly generated feedback note. The minimum viable product we are creating is for a grader like James to type in their note and for the feedback system to automatically search and generate results from the database of feedback notes (see Figure 4). If James has not made a similar feedback note, or wants to make changes to an existing note, the system will automatically add a new entry into the database for James to use on the next student's assignment.

Figure 1
Student Document

Figure 2
Assignment Rubric/Scale

Criteria	Ratings	Pts
Section 1 - Learning Theories: Constructivism	8 to >6 pts Meets Expectations Student provided clear and accurate definitions of constructivism (2pts) and at least two of its key components (2pts). Student applied the two defined key components to specific examples from the lesson plan (4pts).	6 / 8 pts
APA Format/Spelling & Grammar	12 to >8 pts Meets Expectations Students' explanations are clear with few grammatical and spelling errors. Students also included references and proper citations. Students provided a brief introduction and conclusion.	12 pts

Figure 3
Feedback Note Features

Figure 4
Feedback Pallet Database

Context			Triggers from Document (highlighted)		Score on Rubric and Note		Display on Note							
Course Name	Course Number	Assignment	Dataset	Grader	Student	Incorrect Example	Correct Example	Scale (criteria)	Value (change in points)	symbol/keyword (in note and document)	Dataset Specific (linked to column D)	Feedback Description	Corrective description	Reinforcing Description
EDF 4210 Educational Psychology	2275	CSLPA Section 1 Draft	N/A	James	Pseudo Albert			Constructivism	2	Good Definition				Good definition of Constructivism
EDF 4210 Educational Psychology	2275	CSLPA Section 1 Draft	N/A	James	Pseudo Albert			Constructivism	2	Good definition of components				Great definitions of both Cognitive and Social Constructivism
EDF 4210 Educational Psychology	2275	Any	N/A	James	Pseudo Albert	This lesson plan relates to constructivism because the teacher is guiding the students in their construction of their knowledge, mostly through inquiry-based learning.		APA Format/Spelling & Grammar		Missing indent			All paragraphs need to be indented.	
EDF 4210 Educational Psychology	2275	CSLPA Section 1 Draft	Solar System	Artificial Intelligence	Pseudo Albert			Constructivism	2	Applied Social Constructivism				Good application of Social Constructivism to a specific event in the Solar System lesson plan.
EDF 4210 Educational Psychology	2275	CSLPA Section 1 Draft	Any	James	Pseudo Albert			Constructivism	-2	Missing Application of Cognitive Constructivism			Missing application of the lesson plan to Cognitive Constructivism.	
EDF 4210 Educational Psychology	2275	CSLPA Section 1 Draft	Solar System	James	Pseudo Albert	This lesson plan relates to constructivism because the teacher is guiding the students in their construction of their knowledge, mostly through inquiry-based learning. The teacher is giving the students a problem to solve, and they must use what they know and the materials before them to make hypotheses about the solar system and the bodies within it. For example, when the class modeled the solar system with students acting as the planets, they had to observe the differences in orbit of each planet and think about the implications of that.		Constructivism		Be Explicit	Solar System		Be explicit about which component of Constructivism you are applying to this lesson plan. For example, state that "The [Solar System] lesson plan includes Social Constructivism. For example..."	This is a good start

References



<https://bit.ly/ECCAFFeedback23>

Implications

This Feedback System may assist instructors in enhancing the quality and timeliness of the feedback they provide on their students' writing documents. By designing this Feedback System around ECCA, this may improve the quality of teacher feedback by aligning this feedback to specific features of student performance, with the learning objectives of the course, and providing more accurate ratings of student performance on the rubric. Additionally, instructors may save time using the Feedback System because of the intuitive search feature of the note and with the well-organized Feedback Pallet Database.