



# Near Real-Time Student Feedback to Facilitate Continuous Improvements to Course Delivery Using Mobile Apps

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**Abstract**—The ultimate primary objective of a course and end-of-course (EoC) evaluations should be to enhance the effectiveness of instruction and the learning experience. The evaluation process is traditionally done by the students filling out a survey (on paper or online) as a means of providing feedback to the instructors about how they feel about their own learning experience, the course content, and aspects of the instructor's teaching. Currently, (in almost all institutions) the evaluations are done at the end of the course, which cannot facilitate improvements to the current course delivery.

In this paper, we present the case for a Mobile App for providing almost real-time feedback (*fine-grained evaluations*) on the lectures and other course-related items. This enables the instructors to modify/adjust/fine-tune the instructions in near real-time so that it makes the instruction and learning experience better in a continual manner. This is of immense benefit to the instructors as well as to the current students.

**Keywords**—course evaluations, instructor evaluations; student feedback; real-time feedback; continuous improvement; mobile App

## I. INTRODUCTION

The course and instructor evaluations at the end of the courses in higher education institutions in the United States started to be used increasingly in the 1960s. Their administration and use have increased over the years. In almost all institutions of higher learning in the United States, the end-of-course (EoC) evaluations are performed at the end of the courses. These evaluations generally consist of questions addressing three components: (a) the instructor's teaching, (b) the course content and activities, and (c) students' own learning assessment/experience. It usually consists of two broad parts – (a) responses to a series of questions on a Likert-type scale (numerical 1–5 scale), and (b) written comments.

The evaluations of the course and instructor performed at the end of the courses, overall, have remained unchanged over the years. The process consists of the students filling out a

survey (on paper or online), developed ten or more years ago, as a means of providing feedback to the instructors about how the students feel about their learning experiences, the course content, and the instructor's teaching.

The life cycle of a typical (traditional) course delivery is shown in Figure 1.

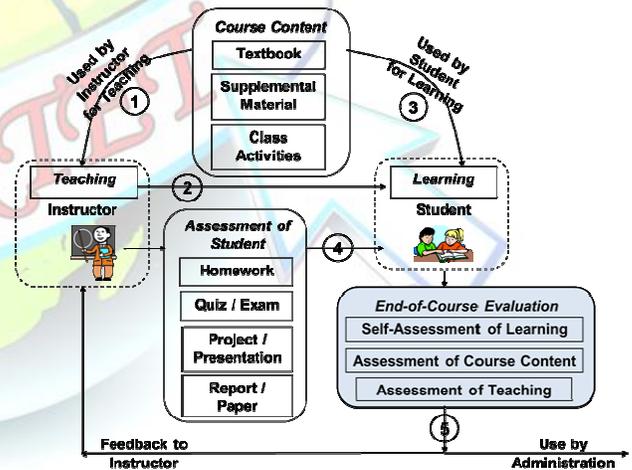


Figure 1. The flow of activities in a typical "life-cycle" of a typical (traditional) course delivery

There are five distinct parts or components in this course delivery model:

1. The instructor uses the course content (consisting of textbook, supplemental material, class activities, etc.) to develop the course delivery content.
2. The instructor performs instruction and delivers the course content.



3. The student participates in the class activities and also uses the course content in order to learn.
4. The instructor administers assessment of student learning of course content (consisting of homework, quiz, exam, project, etc.).
5. End-of-course (EoC) evaluation is performed by the students by completing the forms. These EoC evaluations are conveyed (with anonymity) to the instructor.

In spite of the dated evaluation forms, there have been significant changes in many aspects of teaching and learning: the delivery modality of the course, the use of new teaching methods, use of newer technologies, changes in programs resulting in course modifications, offerings of newer programs and courses, etc. Thus, the evaluations are no longer accurate indicators of the metrics they are trying to evaluate; they are ineffective in their overall objective and irrelevant in the present day.

In the current EoC evaluation model, the surveys are administered once, at the end of the course, and evaluation data (feedback) is collected. The almost raw EoC evaluation data (except for simple mean/median) is passed on to the instructors and administrators, stopping short of deriving valuable information/knowledge from the data, and making effective use of such information/knowledge in facilitating improvements in the instruction and the learning experiences.

After obtaining the raw data, it is expected that the instructors would interpret them suitably and use the information to improve the course and/or their own teaching. The administrators use the data either to reward or remediate the instructor. This is like an “open-loop” system where the feedback from the students (end users) about the system (instruction) is not utilized in a systematic manner in improving the very system (instruction) that was evaluated. It could be made more effective by developing mechanisms for a “closed-loop” system that incorporates data analysis, consultations, and remedial measures, if any, to develop measures for teaching improvements and learning enhancements.

The ultimate objective of this EoC evaluation process should be to use the collected data to facilitate improvements in instruction and to enhance the learning experience of the students. This is akin to a closed-loop system, where the feedback is used to control the system to act/ behave in a better/optimal manner. In order to achieve this, it is important to facilitate a feedback system which is timely, so that the instructor can use them to improve the quality of the content, instruction mode, the teaching/learning experience, etc., dynamically. This timely feedback can be easily provided using the current mobile technologies, which is ubiquitous.

## II. BACKGROUND

Studies have been made over the decades and literally thousands of research papers have been published, focusing on the nature, methodology, and validity of student evaluation of teaching (EoC evaluation data). At the end of 2010, there were 2,875 references in the ERIC database using the descriptor “student evaluation of teacher performance.” By the additional descriptor “higher education,” the number was 1,852 [1]. Positions have been taken about (a) the capability of students to evaluate objectively, (b) the parameters that can effectively cover the aspects of teaching effectiveness, (c) factors that introduce biases into the evaluations, (d) the very validity of the evaluations, (e) the effectiveness of the evaluations in contributing to the improvement of teaching effectiveness and learning experience, (f) the ways the results of evaluations are (or should be) used by the faculty and administration, etc.

The study in [2] distinguished the factors that directly relate to the course or teacher, and the ones that relate to the interaction between the course or teacher and the students. The study in [3] showed that it is more effective, for the purposes of helping instructors improve and enhance their teaching skills, to have formative evaluations early and frequently during the course, as opposed to the EoC evaluations.

## III. CURRENT SYSTEM

In almost all institutions of higher learning in the US, the student evaluations of teaching are done at the end of the course. This is like giving students just one exam at the end of the course, and evaluating their performance. This model would have the tendency of allowing the most recent experiences to influence the ratings. For example, if the course topics become tougher, or if the lectures become just a little too fast paced for some students, or if the students have pressures of work or other courses, then most of the good experiences in the earlier part of the course are masked by these more recent factors, and the ratings are likely lower. Thus the evaluation numbers are likely to be less accurate.

Most importantly, the only feedback from the students at the end of the course, would not be of any help for improving aspects of the ongoing course. In this sense, the feedback obtained one-time at the end of the course in the current model could be termed “static”. The outline of the current model is shown in Fig. 2.

### Current Model

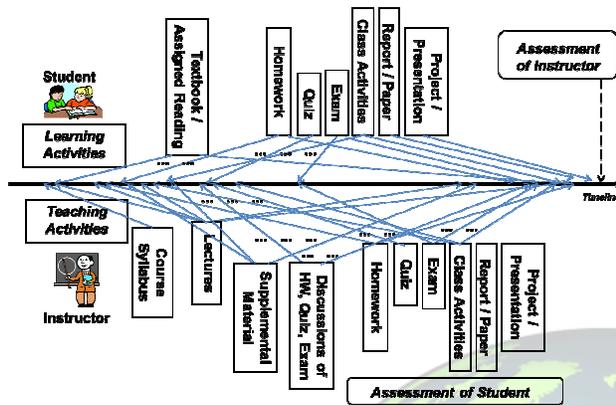


Figure 2. Current model of providing feedback to the instructor at the end of the course

In the current model, there are numerous teaching related activities that the instructor would be engaged in. These include development of the course outline, the lecture plan, development/gathering of supplemental material, development of student assessment items (homework, quiz, exam, project, class activity, etc.), and administering and assessment of the above items.

Similarly, the students would be engaged in numerous student related activities including attending the lectures, reading the textbook and supplementary material, problem solving (as applicable), performing any required laboratory/field activities, doing homework, taking quizzes and exams, doing projects, etc. One important thing to note in this models is that the student feedback is obtained just once, at the very end of the course. The instructor never gets any feedback on any component of the course until after the course is over, and the grades have been posted. Thus, there is no formal mechanism for the students to convey their experience/feelings about the course, and for the instructors to get feedback on their course content and delivery, and possibly improve them dynamically during the progression of the course.

### IV. PROPOSED SCHEME

The overall objective of the proposed scheme is to provide the students a means of providing objective, relevant, and effective feedback on various aspects of course (the lectures, the textbook, the content in and use of the slides, the relevancy/difficulty of exams, etc.) to the instructor multiple times in a timely manner during the progression of the course, so that the relevant aspects of the course can be dynamically

modifies/adjusted to make the student learning more effective and enjoyable.

It is neither practical nor feasible to use the existing system to obtain student feedback multiple times. This is due to the sheer overheads and the drudgery involving. However, the pervasiveness of mobile devices, the ease of use of mobile Apps, and the ubiquity of social media, especially among the student population can be used effectively to advantage in the proposed system. Central to the proposed system is the use of well-designed mobile Apps for providing the students a means of providing frequent feedback on multiple aspects of a course while the course is being run.

### Proposed Model

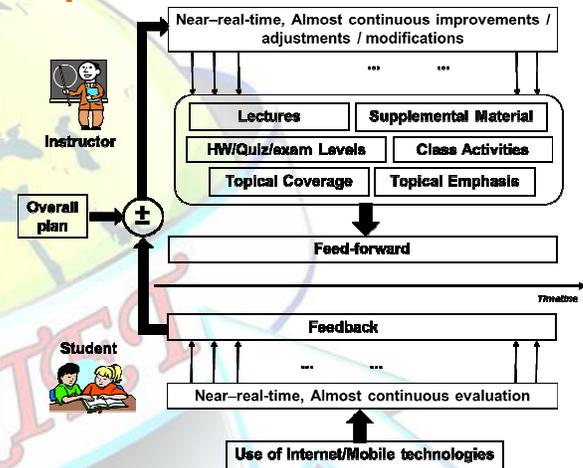


Figure 3. Proposed model of providing feedback to the instructor after every major milestone in the course

The overall schematic is shown in Fig. 3. The overall plan of instruction (topical coverage and student assessments plans) is one of the inputs to the system, which serves as a reference. After (a) every lecture, (b) class activity, and (c) every major student assessment (quiz, exam, project), the students are given an opportunity to provide feedback. It is crucial for the feedback to be objective, and cover elements of the lecture/pedagogy, relevance of the supplementary materials/handouts, the ease/difficulty of the quizzes and exams, the deviations, if any, of the questions from the topics covered/assigned, etc. The feedback could be a combination of both a series of questions on a Likert-type scale (numerical 1–5 scale), and free format written comments.

A rather simple summarization system is built into the system, which provides summarizations of the



feedback/comments to the instructor. This would facilitate the instructor to analyze the various components of the immediate past/ current lecture such as, (i) style, (ii) modality, (iii) pace, (iv) examples used, (v) level of interactivity, etc., and other parameters such as related to quizzes and exams, in the light of the feedback data, and dynamically adjust the suitable factors in order to improve the content and delivery of lectures. The system would also facilitate long-term storage of data which could possibly be analyzed for several insights and trends, such as, certain concepts being inherently hard, topics which need more rigor, areas which require increased interactivity, etc. These go a long way in improving the effectiveness of instruction and the learning experience.

## V. IMPLEMENTATION FACTORS

The most natural means of providing feedback in near real-time is by using a mobile App. Mobile phones are ubiquitous and can be safely assumed that all students carry one. The design of the mobile App is very crucial in the successful adoption and effective use of the mobile App in terms of providing meaningful feedback. A well-designed App would not be burdensome to the students, and be meaningful to the instructor. When the students feel that their feedback is effective in terms of improving the course delivery, it becomes more accepted and used.

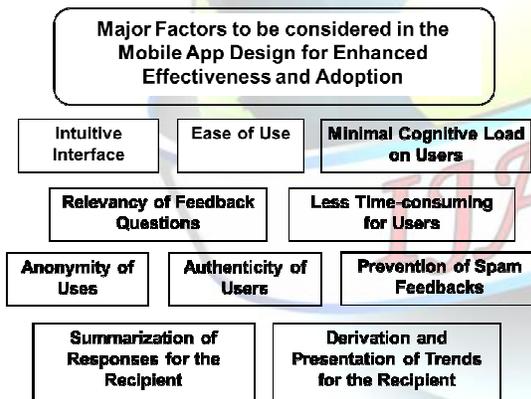


Figure 4. Factors to be considered in the design of the mobile App

In this section, we describe the major factors which must be taken into account in the design of the proposed mobile App for gathering student feedback more frequently, in order for the successful deployment of the mobile App in terms of wide adoption and effectiveness. These are summarized in Fig. 4.

There are four broad areas (dimensions) in the design – (a) User Interface (UI) for the user to provide feedback; (b) the validity and relevance of the questions in the feedback; (c) ensuring the authenticity and anonymity of the users; (d) provision of meaningful summaries and trends of the feedback data to the instructors (recipients).

The UI is a critical part of a mobile App. Given the short attention spans of mobile users, it is extremely important to design the UI so that it is intuitive and easy to use. Some elements of UI for mobile content is given in [4]. A few elements of customization of mobile content are given in [5]. Intuitiveness refers to not requiring detailed instructions for its use. Ease of use refers to minimal use of user inputs (taps/slides) to accomplish a given task. The cognitive load should be minimal in order not to burden the users, so that they can participate in the frequent evaluation/feedback process.

The second dimension is with regard to the feedback questions per se. Overheads of taking the survey/questionnaire multiple times is an important issue that needs to be addressed. The questions should be carefully developed (not too many nor too few) and should be relevant, and should effectively cover the aspects of the course for which feedback is required. One possible solution would be to have a very short but terse survey/questionnaire with well defined “orthogonal” questions (some of them could relevant “Yes/No” questions), which is not perceived as daunting. One might even consider incorporating elements of gaming to make it fun, while at the same time being meaningful.

The third dimension is ensuring the authenticity of the users, while at the same time preserving their anonymity. It should also prevent “spam” feedback – very many feedback (good or bad) generated by the same user at the same time.

The last dimension is about the presentation of the feedback data to the authorized recipient (instructor) in a useful manner. The data coming from numerous (several tens or hundreds) users (students) should be summarized for easy comprehension. In addition, trends could be derived from data collected over a sufficient period of time to enable the instructor to plan strategies to enhance the instruction effectiveness and learning experience.

## VI. CONCLUSION

The end-of-course (EoC) evaluations are performed at the end of the courses in almost all institutions of higher learning. Numerous studies over the years analyzing the compiled data have suggested that the EoC evaluations have not been effective in their ultimate objective, and in many cases have been irrelevant. One of the major problems in the current model is that it is done just once at the end of the course, and the feedback is useless for the purposes of improving that particular course. Also, there has been no known mainstream efforts in performing analytics to derive any knowledge from the data gathered to improve effectiveness of instruction and/or learning experience.

This paper proposed a scheme of using a mobile App for providing frequent feedback by students to instructors, so that the parameters of the course delivery could be adjusted dynamically to improve the effectiveness of the lectures, student assessment, and the learning experience. The paper also



outlined the major factors to be taken into account in the design of such an App.

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