USING PEER AND SELF-ASSESSMENT TO FOSTER THE DEVELOPMENT OF PRE-SERVICE TEACHERS' PRESENTATION SKILLS

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Abstract

Research in assessment and evaluation indicates that providing students with a variety of formats to "show what they know" and formative feedback in multiple ways and from varied sources greatly enriches their learning experience (Waugh & Gronlund, 2013; Miller et al., 2013). Student evaluation is traditionally conducted by the teacher; however, two types of feedback that have been shown to impact student learning are peer and self-assessment (Wormelli, 2006; Guskey, 2009; Airasian et al., 2012). Students in secondary science and math education courses at St. Thomas University were given opportunities to participate in peer and self-assessment of their pre-internship teaching skills through mini-lesson video analysis. Within 24 hours of the mini-lesson presentation, both the presenting students and a cohort of their colleagues were provided with a digital copy of the video to carefully review for the purpose of generating specific, formative commentary. Both the students receiving the reflective peer-feedback and the peer evaluators reported that the process greatly improved their teaching skills. Although used in this case for pre-internship teacher training, the assessment methods described can be adapted to a variety of undergraduate and graduate courses.

Introduction

Research in assessment and evaluation indicates that providing students with a variety of formats to "show what they know" and formative feedback in multiple ways and from varied sources greatly enriches their learning experience, since it increases the likelihood that their individual learning styles will be accommodated (Waugh & Gronlund, 2013; Miller et al., 2013). At the post-secondary level, the most common forms of student assessment are homework assignments and in-class tests, the majority of which are required to be completed in written form and are almost exclusively evaluated by the course instructor (Biggs & Tang, 2011). While some university and college professors and instructors have expanded their student evaluation toolkits to include a wider range of assessment strategies, the majority of those teaching at the post-secondary level continue to rely on very limited and traditional means to determine student learning levels. Compared with the recent eruption of new learning assessment techniques like electronic portfolios, Prezis, exit slips, concept maps, skits, dioramas, and teacher/student interviews being employed at the K-12 level, the post-secondary milieu generally lags behind in the exploration of which evaluation practices work best for supporting student learning.

At all learning levels, student evaluation has traditionally been conducted by teachers. However, two types of feedback that have been shown to impact student learning are peer and self-assessment (Wormelli, 2006; Guskey, 2009; Airasian et al., 2012). Hanrahan & Isaacs (2001) recognize that the recent emphasis in many university courses has switched from teaching to learning, and from teacher management to student self-direction. As a result, interest has mounted in the educational advantages of students assessing their own work and that of other students. Currently, it is common for post-secondary course syllabi to state goals such as, "students will become lifelong learners" and "students will be able to function effectively in teams." Such new goals reflect changing expectations of graduates in the workplace and, as such, both self- and peer-assessment skills are becoming more highly sought after (van Zundert et al., 2010). Hanrahan & Isaacs (2001) suggest self-assessment can help students set goals and thus learn for themselves, and peer-assessment can help them to contribute constructively in collaborative efforts.

An Example of Peer and Self-Assessment in Pre-Service Teacher Education

In the secondary science and mathematics education courses I teach in the School of Education at St. Thomas University, students participate in peer and self-assessment of their pre-internship teaching skills. In order to understand the context in which this peer and self-evaluation occurs, it is important to first provide an overview of the structure of our B.Ed. program.

In our one year post-baccalaureate program, students begin with intensive course-based study during the months of September and October. During the months of November and December, they complete the first of two student teaching field placements, working with a cooperating teacher and university supervisor in a public school setting. In January and February, the students return to campus to embark on a second semester of coursework and reflection on their first teaching internships. During the months of March and April, the B.Ed. students participate in their second field placement, this time in a different school setting, with a new cooperating teacher and university supervisor. In May and June, the students resume study with a final semester of coursework. In July, the graduates of the program are certified as public school teachers in the province of New Brunswick, transferrable to all Canadian provinces and territories.

It is during the first semester of coursework in September and October that the students in my Secondary Science and Mathematics Education courses are given the opportunity to take part in a program of peer and self-assessment of their emerging teaching skills. In each of these courses, students are required to work in pairs to design and facilitate a 40-minute mini-lesson to engage their classmates in learning a specific concept from the grade 6-10 science and math

curricula. The students are encouraged to develop lessons that are student-centered, inquiry-based, and constructivist in nature, ideally with components of both hands-on and discussion-based learning. These mini-teaching sessions take place in the second half of the courses, such that at least a cursory knowledge base can be established in the areas of pedagogical theory, lesson plan design, and assessment practices before they present their lessons.

Early in the course, students choose their co-teaching partners and sign-up for an in-class presentation date. Typically, the course enrollment is 24-28 students, resulting in 12 -14 mini-lesson presentations throughout the course. The students refer to the provincial middle school and high school curriculum documents to consider and select a topic or concept that they would like to focus their mini-lesson design on. It is important to realize that the students in our B.Ed. program have already earned previous undergraduate degrees, and in some cases, graduate degrees in a variety of content areas. In the case of the students taking my secondary science and mathematics education courses, these are typically degrees in biology, chemistry, physics, earth and environmental science, kinesiology, mathematics, computer science, business and economics.

On the day of their mini-lesson presentations, the presenting pair takes the lead as facilitators of learning for 40 minutes of the class time. The remainder of the class members serves as "students" with the expectation that they participate in all aspects of the lesson as public school students would. Clearly, the students in the class may already possess the content knowledge or conceptual understanding being targeted in the lesson, but the more important focus of the experience is in supporting their colleagues' efforts and concentrating on the pedagogical approaches being utilized. In fact, for each mini-lesson presentation, four members of the class are pre-selected to serve as formal peer-evaluators whose job it is to provide detailed formative feedback to the lesson facilitators. Over the duration of the course, each member of the class will facilitate one mini-lesson and serve as peer-evaluator for two others.

To enable both the mini-lesson facilitators and the peer-evaluators to more easily reflect on the lesson presentation, the mini-lessons are video recorded. In addition to providing an opportunity for later observation of the lesson, this allows the peer-evaluators to focus on playing the role of "students" during the lesson. After the class, I upload a copy of the digital video file to a file sharing website where both the mini-lesson facilitators and the four peer-evaluators can access it. Within one week, the peer-evaluators are expected to review the video file and, using an evaluation checklist developed specifically for this purpose, provide formative feedback to their classmates on their teaching efforts. Once the evaluation checklists are submitted to me via a course Moodle page, I review the comments for appropriateness, request any necessary edits from the peer-evaluators, remove the names of the peer-

evaluators to ensure anonymity, record the grades assigned, and e-mail them to the lesson facilitators for their review. In both the Secondary Science and Mathematics Education courses, the four peer-evaluations are averaged and comprise 25% of the presenters' course grade.

Sample Peer-Evaluation Checklist

Below is a copy of the checklist (in this case from the Secondary Science Education course) that the peer-evaluators use to provide feedback to their classmates. Before the mini-lesson presentations begin, I spend approximately an hour in class introducing the checklist to the students, discussing the performance criteria categories (referred to as "Look Fors") described on it, observing sample mini-lesson video clips from previous years, and reviewing samples of completed peer-evaluations for those videos.

The peer-evaluation checklist is divided into three main performance criteria categories: Presentation, Content, and Implementation. The performance criteria that are described in the Presentation category focus on the mini-lesson facilitators' abilities to present the lesson in a clearly audible, interactive, student-centered manner that is engaging to the learner. The performance criteria listed in the Content category assess the teachers' awareness of and abilities to respond to students' prior knowledge and misconceptions about the concepts being addressed, the creativeness and clarity with which they facilitate the learning activities they have developed, and their abilities to evaluate students' engagement and understanding of the lesson. The Implementation category performance criteria focus on the learners' experience and target such outcomes as participation, knowledge integration, skill development, differentiation, and reflection. For each of the twenty performance criteria on the checklist, peer evaluators assign a quantitative score or 1 to 5 based on the rating scale described, as well as qualitative commentary directed to the mini-lesson facilitators.

As shown here, peer-evaluators are encouraged to be as specific as possible in their provision of evidence to support their comments and grades. This is often done through the citation of particular statements, questions, or comments made by the mini-lesson facilitators at specific times during their interactions with the students. The level of thoroughness, insight, and sophistication with which peer-evaluators typically provide formative feedback to their classmates is evident in this example.

Science Mini-Lesson Look Fors:

Lesson Facilitators:___Virginia & Sonia_____ Date:_Oct. 10, 2013_____
Observation by:_____ Grade:___8____ Topic: __Inter-Tidal Zones_____
Rating Scale:

1 **Weak** – below satisfactory performance, considerable improvement required
2 **Adequate** – satisfactory performance, some improvement required
3 **Good** – competent performance, only minor improvement required
4 **Strong** – more than competent performance
5 **Exemplary** – outstanding performance

Look For	Rating	Comments
PRESENTATION		
The teachers have clear and audible verbal presentation	5	Could hear the presenters throughout the entire presentation, even over groups talking.
The teachers move freely and frequently about the learning space	5	Presenters kept moving throughout the entire lesson, bringing attention to both the fronts and back of the classroom. Very dynamic use of space.
The teachers employ non-verbal interaction techniques with students	5	During lecturing periods, Virginia and Sonia were both making eye contact with members of the class. While stopping by tables during the modeling exercise Virginia didn't speak at certain groups (I'm not sure if it was on purpose or not), this let the students discuss their ideas and allowed for evaluation of student understanding of the task.
The teachers exhibit an awareness of participants' engagement	5	The brainstorm at the beginning was a great way to ensure that plenty of students were able to contribute their ideas. During the building of organisms, both presenters circulated the class making sure to stop by each group of students and keeping everyone on task.
The teachers address students on an individual basis (uses their names)	5	There wasn't a student who wasn't called on by name. Very good job making sure to use students names frequently.
The teachers exhibit a positive and enthusiastic teaching attitude	5	**Sonia** your explanation of tidal forces on the white board at about (**6:00**) was awesome and you could tell you were excited to talk about the tidal zones.

		Virginia you seemed to be having a very good time especially when discussing the "Not Since Moses" race.

Look For	Rating	Comments
CONTENT		
Early in the lesson, the teachers articulate the concepts that will be addressed	4	Brief outline of curriculum outcomes, and what was to be discussed. Told us our main goal of the day was to help Mr.Clam find a friend. Although this was not brought up again until later in class. It would've been fun to have Mr.Clam journey with us.
The teachers utilize activities/ strategies that are crafted to lead to the understanding of those concepts	5	Used a brain storm to get us thinking about the topic for the day. The sea-critter model activity was fun and gave us the chance to be as creative as possible. Use of videos to re-asses student understanding of group discussions, and generate new discussions.
The teachers identify student misconceptions and consider them	3	**Sonia**: "Try it, there's no wrong answer!"- This was a beautiful phrase! Let the students know they're in a safe environment where all ideas are considered. During the discussion on Neap and Spring tides Sonia evaluated an idea proposed by one of the students and directed them towards the correct path to understanding (telling them where to look instead of telling them what the answer is). During the discussion on tidal bulges we didn't get a clear explanation on why both sides of the Earth experience a tidal bulge. There could've been more time spent on this to clear up any misconceptions
The teachers assess student understanding in a systematic, varied and ongoing manner	3	Most of the assessment of student knowledge was based around discussion in front of the class via student-teacher interactions. It seemed as though once ideas were understood for one student it was assumed they were understood for all the students.
The teachers use representations, abstractions, and models as appropriate	5	Through the use pictures and white board drawings the reasons for tidal influences due to the gravity of the moon and sun were

		explained. Later on the use of a diagram was again used to show the effects of Neap and Spring tides. Used the "Not Since Moses Race" to reinforce the dramatic effects of the tides in the Bay of Fundy.
The teachers appear knowledgeable about the topic and its connection to the course	5	They sure do! Sonia is very well versed in the use of tidal charts and the reasons as to what causes the tides. Virginia seemed to be more strongly suited towards the biological side of lesson, knowing a lot about the environment of the inter-tidal zone and the qualities required to live there.

Look For	Rating	Comments
IMPLEMENTATION		
Students are given opportunities to apply existing knowledge to new situations and integrate new and prior knowledge	5	At about (**8:00**) when describing tidal forces, students were able to contribute their thoughts on why the moon and sun affect the tides, and how this is done. Students were provided with the opportunity to discuss why the tides are much higher in the Bay of Fundy then in between N.B and P.E.I. This allowed students to apply their previous knowledge of fluid dynamics to the geography for Atlantic Canada. At about (**15:00**) Leighanne and Cory got to apply their previous experience with tide charts to group discussion.
Students are given opportunities to do more than follow procedures – they ask their own questions, choose their own strategies, or design investigations	4	I think it was Colleen who asked in response to James' point about the video being taken over a time period longer than 12 hours; "Why do you think it's longer than 12 hours?" This opened up discussion that was carried forward by the class. At about (**18:15**) Jennie answered a question concerning why the Bay of Fundy has higher tides, but wasn't given the opportunity to explore her idea. Discussion fell back on the teacher, and a prime Volley Ball opportunity was missed.
Students are given opportunities to manipulate materials and equipment	5	Building an inter-tidal creature with clay and assorted materials gave students a hands on and personal attachment to the activity. Having

		students create physical "things" was a great way to make the students feel like their ideas were valued.
Students are given opportunities to utilize higher-order thinking skills through evaluation, synthesis and creation.	4	Through the use of the model activity students had to apply the ideas learned in class to create an ideal sea-critter. This allowed for students to form their own ideas and reasoning, critique each other's thoughts, and create an end product. The majority of questions were very basic explanation based questions that weren't terribly open for discussion.
Students' contributions are incorporated into the lesson	5	The whole point of the model exercise was to allow for students to share their original ideas as to what made an ideal friend for Mr.Clam. **Virginia** After the video said "What do you guys see?" this allowed for students to discuss what was shown in the video, and then discussion arose from students' prior knowledge (more specifically how long the video was recorded over).
Students are provided a variety of differentiated learning opportunities	4	Made use of videos, clay molding activities, lecture, and power point. The clay was exceptionally well done because students had to apply their knowledge of what they learned in class to creating an inter-tidal zone species.
Students are provided adequate time to complete the learning activities	5	Yep. Given about 10 minutes to build our inter-tidal organism and the remaining time to discuss what we had created.
Students are given opportunities to reflect on their learning in a formative way	5	Students got to build their own creature, there's not much better application than that. Students were able to collaborate with class mates and learn from one another. Re-teaching is an excellent strategy for students to really understand what they discussed.

Total Rating: 92/ 100

Reflections on the Peer-Evaluation Process

At the end of the semester, in an effort to gain the peer-evaluators' perspectives on their role in the process, a focus group with students from one of the courses (Secondary Math

Education) was established. This was done in order to better understand their peer-evaluation practices and question them about the experience. Using their laptop computers and a copy of one of the mini-lesson video files, the students were asked to demonstrate how they evaluated their peers' teaching efforts. In order to capture their thoughts during the evaluation process, the students were encouraged to "think-aloud", describing what they were doing. The students were also interviewed about their impressions of the peer-evaluation process and their role in it. These think-aloud sessions and interviews were video recorded for review and analysis.

Below are excerpts from the think-aloud peer-evaluation reflections and interviews.

One of the peer-evaluators explains the technical process he utilized when reviewing the mini-lesson video on his laptop computer:

> *Jack: So what I like to do when I'm reviewing these mini-lessons, is I put the video on one side of my computer screen and then I have my evaluation sheet to work on, on the other side. So, I can see the video on one side of my screen and I can type at the same time and if I need to, I can stop and pause the video to collect a thought in case I don't want to miss the next thing coming up.*

Another peer-evaluator provides a step-by-step commentary of the math mini-lesson she was evaluating:

> *Rachel: So for their activity, they're doing a good job incorporating manipulatives to have students who are kinesthetic learners have hands-on equipment. And they are allowing students to work in groups to discuss their own answers and discover the patterns for themselves. This activity was a good one to get students to understand the pattern before they showed them the formula.*

In interviewing the students on their roles as peer-evaluators, one pair had the following to say:

> *Interviewer: What did you find was the most difficult part of being a peer-evaluator, using the evaluation form, and going through this whole evaluation process?*
>
> *Rachel: I thought it was difficult sometimes to assign marks to specific sections. I know that you think that they (teachers) did a good job but*

then when you watch it again you try to pick up on little things. You don't want to necessarily give them full marks on everything because I mean we're still learning how to teach.
Interviewer: So how did you go about it? Did you put the grade first and then the comment, comment first and then the grade? What worked for you?

Rachel: It varied. Some sections, I knew 100% that they deserved 5 out of 5 on it. In those sections I usually put the grade first and then the comments. The other ones, I'll usually write the comments and then based on what I said, I'll assign them a grade.

Jack: My approach was more so as I watched the video and I heard a comment or observed a certain strategy being employed, I would pause the video and go to the checklist right away and find where that applies, like in which of the three main categories. Then I would type up my comments and I might use a quote from the classroom conversation as evidence. I feel like that approach is pretty practical because right there in the moment you can have it and you don't always remember that from the lesson alone. That's why it's nice to have the video to see that.

Reflections on the Self-Evaluation Process

In addition to the feedback received from their peer-evaluators, the mini-lesson facilitators are encouraged to engage in self-evaluation of their teaching. This is a two-step process in which the pair meet to: 1) review the video recording of their mini-lesson and engage in open commentary about what they observe, and 2) review the completed checklists from the peer-evaluators to compare comments and to reflect on the suggestions made.

During one such facilitator meeting, I witnessed the following conversation between two mini-lesson facilitators as they reviewed their video for the first time:

Brad: Yeah, I remember this part when Ray picked up on the pattern too quickly.

Liz (laughing): Yeah.

Brad: It really threw me off. I talked to him afterward and he said he didn't realize that wasn't what he was supposed to do.

Liz (laughing): Right. But you did a good job posing more questions to get those students who didn't see the pattern caught up and on the same page.

Brad: I hope so.

Liz: I think we have good awareness of the classroom. We're using the space very well.
Brad: Yeah, I think we did. We didn't just stay in one space, we moved throughout the room and I think it kept the students engaged.

During the second part of the self-evaluation process, while they were reviewing the peer-feedback evaluation forms, this same pair of mini-lesson presenters had the following to say:

Brad: One thing I noticed really we were quite weak on was promoting student-to-student interaction. It was all pretty much us (teachers) and them (students).

Liz: Right.

Brad: It's going to have to be something we develop, getting them to talk about each other's answers.

Liz: Yeah, I see the same thing on this evaluation. It says we didn't really give the students a chance to provide feedback on each other's responses. The evaluator recommended using different techniques, like instead of just student to teacher dialogue, maybe using some volleyball style student to student conversation. That's something we could try in the future.

In discussing their participation in these peer and self-evaluation exercises, the students made the following comments about the impact on their teaching skills:

Interviewer: So how does participating in these peer and self-evaluation activities make you better as an emerging teacher, getting ready to start your first practice teaching field placements?

Rachel: I think you can learn a lot from watching yourself. As much as I hated being videotaped, you learn a lot about what you do; your mannerisms, the things you say too much, that kind of stuff. So, definitely what you need to work on and what you're doing well. It will help you when you can see that.

Jack: It's actually, like, confidence building for those moments. Because, for some of the moments you just put your head down and say, 'Wow – I just tripped over myself there', but then other times you're like, 'Wow – I really had a good handle on the class', or 'I think I explained that well – people seem to understand it.' So, it can be confidence building too.

Brad: Having worked in the chemical industry before deciding to become a teacher, I can tell you that the majority of professionals I have encountered are generally not good presenters. They know their stuff but they don't necessarily do a good job explaining it to others. This peer-evaluation process has given me the opportunity to learn what makes for good teaching and presenting skills and has allowed me to both provide and receive critical feedback from my colleagues in the class.

Liz: I know that in my undergrad degree I had to do class presentations, but we never had a chance to get formative feedback on a level like this. I think the prof just gave us a grade based on what he or she saw in class, but having four of your peers take the time to review the entire mini-lesson and critically review it with a checklist is way more helpful than just having the prof evaluate you. I have become aware of so many more aspects of my teaching and presenting skills this way.

Implications

Although used in this case for pre-internship teacher training, the peer and self-evaluation methods described here can be adapted to a variety of undergraduate and graduate course

formats. For instance, Ashley & Goldin (2012) describe a peer-evaluation process at the University of Pittsburgh's School of Law in which students in legal writing courses review and evaluate one another's written assignments and provide feedback supplementary to that of the course instructor. Davis (2003) describes a similar process at the Arizona State University Law School in which students in a first year legal research and writing course critique and peer-edit their classmates' work prior to submission. She states that "peer review encourages cooperation between students – often absent from the first year experience but an essential part of legal practice." [2]

A review of the literature on training practices in North American law schools indicates that peer and self-evaluation activities utilizing the kinds of video review processes described in this paper are uncommon. While many law schools utilize videotapes of experienced lawyers in the courtroom to highlight specific legal processes and strategies (Galves, 2004), there are very few that appear to engage law students in the peer and self-evaluation of one another's developing skills through the review of video recordings. Applying such practices to law school courses focusing on the development of legal oratory skills such as debate, refutation and cross-examination would provide valuable peer-generated feedback to emerging lawyers.

Research has shown that medical students can provide reliable, valid evaluations of their peers and can be valid predictors of success in residency, provided their assessments are both honest and thoughtful (Cottrell et al, 2006). Student peer assessment (SPA) has been used in medical education for more than four decades, particularly in connection with skills training. Eldredge et al. (2013) recount a study conducted with first-year medical students at the University of New Mexico School of Medicine to engage them in the peer-assessment of classmates' PubMed article and case searches. It was determined that students' searches of these databases were much more accurate and comprehensive when guided by peer feedback.

The Peer and Self-Assessment Program at the Indiana University School of Medicine involves all students in the first three years of medical school. Students rate themselves and their peers on professionalism, communication and collegiality using a 9-point Likert scale supplemented by comments, then generate individualized reports allowing students to see their self-perception compared with the way they're perceived by peers. Students meet with their mentors to review their reports and explore the difference between self- and external perception (IU School of Medicine website, 2013).
A review of the literature on training practices of North American and British medical schools indicates that student peer and self-evaluation using video review processes such as those described in this paper is rare. Although some medical schools utilize video recordings of actor role-plays and actual doctor/patient debriefing sessions to teach specific medical practices and

techniques (Dearnley et al., 2013), it appears there are very few that engage medical students in the peer and self-evaluation of one another's developing skills through the review of video recordings. Physician training programs could adopt processes similar to those in the teacher preparation program described herein. Courses that develop medical students' skills in patient interviewing and examination, symptom diagnosis, emergency and operating room procedures, etc. could engage students in the review and peer and self-evaluation of video recordings of practice sessions of these important practices.

The video-based peer and self-evaluation activities described above are not limited to use in post-graduate professional school programs such as education, law, and medicine. Undergraduate courses in a wide range of content areas may be able to utilize some aspects of the practices described here. This video review and peer/ self-evaluation process could be used in performance-based courses in music, dance, theatre, and drama. Similarly, courses in English, Spanish, French and German that promote the development of students' speaking skills could also benefit. Science laboratory skills such as dissections, titrations, and data analysis could easily be video recorded for later peer and self-review. The possibilities are wide ranging.

Conclusion

In post-secondary education, the most common forms of student assessment have traditionally been homework assignments and in-class tests; the majority of which are required to be completed in written form and are almost exclusively evaluated by the course instructor (Biggs & Tang, 2011). While some university and college professors and instructors have begun to include a wider range of strategies and methods in their assessment practice, the majority of those teaching at the post-secondary level continue to rely on very limited and traditional means to determine student learning levels.
Developments in self and peer-assessment practices in K-12 education have demonstrated their effectiveness (Airasin et al., 2012) and are gradually being adopted by post-secondary educators. Providing college and university students with opportunities to critically reflect on their own performance and to receive peer feedback on developing skills is a component of learning that is becoming increasingly common and accepted (Hanrahan & Isaacs, 2001). Providing students with a wide variety of feedback permits them to gain a deeper insight to the degree of their learning than is possible with traditional teacher-only evaluation.

Through the process of engaging students in reviewing video recordings of various knowledge and skills-based presentations and performances and embarking on critical peer and self-assessment practices as described herein, it is suggested that valuable insights to their

learning can be gained. As demonstrated by the sample peer evaluation checklist included and the transcript from focus group interviews about the peer and self-evaluation processes of students in the B.Ed. program at St. Thomas University, it appears that the feedback provided through these assessment practices can have substantial impact on students' understanding of their strengths and areas of need.

If we, as educators, can open our minds to the value and legitimacy of including self and peer-evaluation to our assessment toolkits, we will be doing our students a great service by expanding the means in which they can demonstrate their knowledge and understanding. My hopes are that the days of providing student-written and teacher-assessed assignments and tests as the only means of evaluating student learning are soon to be a pedagogical relic of our past.

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