

An evaluation of the impact of immediate compared to delayed feedback on the development of counselling skills in pharmacy students

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Abstract

Background: Simulation-based counselling using standardised patients (SPs) provide pharmacy students an authentic approach to training; limited data exists regarding student performance using immediate feedback approaches.

Aims: To compare grades of students receiving immediate feedback verses (vs.) delayed feedback.

Methods: A pre-trial assessment of student perceptions and an unblinded randomised trial comparing immediate and delayed feedback. Third year pharmacy students (n=153) counselled SPs in four clinical “experiences”; student grades were the primary outcome. Student *t*-test and repeated measures were used to compare grades between groups and grades over time.

Results: During pre-trial surveys 50% of students preferred immediate feedback, 22% delayed, and 28% had no preference. There was no significant differences in overall student grades between groups (88.4% immediate vs. 86.6% delayed, $p=0.7$) or in grades over time ($p=0.276$).

Conclusions: Although more students preferred immediate feedback, overall grades did not differ based on method of feedback.

Keywords: *Assessment, Counselling Skills, Standardised Patients*

Introduction

With the increasing role of the pharmacist in the inter-professional setting and spending more time with direct-patient care, communication skills are becoming more and more important in the curriculum of pharmacy schools. Pharmacists need to be able to effectively communicate medication information to patients to reduce patient harm, and improve patient outcomes. As education continues to change to more active learning strategies in pharmacy, innovative ways to both engage and assess students are sought after to provide quality education to prepare pharmacists for a healthcare world that demands stronger communicators. One such way is through simulation-based activities with standardised patients (SPs). Simulation-based activity with SPs is becoming more prevalent in the training of pharmacists (Rickles *et al.*, 2009; Mesquita *et al.*, 2010; Deepti *et al.*, 2012; Gums *et al.*, 2014; Marie *et al.*, 2015; Sarah *et al.*, 2015; Ottis & Gregory, 2016). SPs afford the student a real-world environment to incorporate skill-sets gained from clinical coursework, as well as communication courses. A SP creates a more authentic feel for the student compared to utilising peers; additionally, SPs are trained to interact in a consistent manner across different students to ensure a cohesive experience for all participants. SPs are also being more heavily used in medical education as well. In Bokken and colleagues

review of the medical literature, it was noted that SPs themselves also create as good or better feedback compared to faculty counterparts (Bokken *et al.*, 2009).

Assessment of a SPs simulation can be difficult for faculty graders given the variability of each individual encounter. To help minimise this, all SPs go through intensive training for each exercise with time to review each clinical case prior to training. This provides an opportunity to ask questions during a two-hour training session, as well as opportunities for each SP to practice each case and get feedback from faculty. Also, development of a standardised rubric strengthens the measure by limiting the variability of the assessment. In addition, different styles of feedback to students may have different impacts on both the grader as well as the skills improvement of the student going forward. Thus, different strategies have been implemented for student grading to accommodate time schedules, feedback styles, and other important components of implementing and grading patient simulation in the classroom.

Previous literature in pharmacy education has noted that students in a similar exercise noted benefits of immediate feedback in a patient encounter (Linedecker *et al.*, 2017). It has also been noted that immediate feedback is best-practice to affect behaviour change (Ramani & Krackov, 2012). In contrast, however, written feedback is often

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needed for a formative assessment (Lally, 2013). This is particularly important in many educational settings when documented assessment data is needed not only for student improvement, but also for tracking of programmatic outcomes as well as tracking of student performance throughout a course and throughout the curriculum. This data needs to be specific and formative to suggest changes in behaviour for improvement in future performance.

In written exercise assessments, it has been noted that delayed feedback might actually be better than immediate feedback in students in a college psychology course (Sinha & Glass, 2015). However, it should be noted that this is in a written assessment, compared to a live behaviour-based exercise incorporating different behaviours and communication skills. Interestingly, this is confirmed in further research with Mullet and colleagues who noted that in an upper-level college engineering course, delayed feedback was actually better than immediate feedback (Mullet *et al.*, 2014). However, as before, this is on a written assessment, not a live behaviour activity. In the business literature, one study by Thornock (2016) advocated for a timed-response to feedback, showing that a short delay is better than both no delay and a long delay. This is not seen in all studies analysing immediate feedback for written assessments, however. Epstein and colleagues noted in 2002 that immediate feedback indeed provided improved subsequent performance (Epstein *et al.*, 2002). It should be noted, however, that this study is older than the others and learning styles by today's students are different with regards to technologies and culture.

In our experience, a group of students being provided either delayed and immediate feedback during patient simulation created a perception of differences in the process of grading and feedback in the two different groups. Specifically, some students received grades immediately after their session, as some faculty preferred to grade the student "live," whereas some students received "delayed" written feedback from faculty watching the student on videotape through our learning management system. Some students cited the immediate feedback as a better way to adjust their behaviour as immediate feedback had a stronger correlation to their performance. They also noted that immediate feedback provided time to ask questions and to better learn from feedback given verbally as opposed to in a written form. A study by Pfeiffer and colleagues noted that there was no difference in feedback by SPs that gave immediate feedback, although there was a small difference in assessment of inter-professional communication skills (Pfeiffer *et al.*, 2005). Previous studies, do, however, note the educational benefit of utilising SPs in live clinical exercises. Based on these experiences, we sought to formally evaluate the differences of using delayed and live feedback on both student perspectives as well as student grading from faculty.

The objectives of this study were to evaluate instant vs. delayed feedback methods in improving counselling skills in a third professional year Concepts of Pharmacy

Practice course. Given the importance of communication in the pharmacy profession, we were seeking ways to be able to improve feedback. We hypothesised that students who were graded immediately would have higher grades and would have greater improvement in their grades throughout the progression of the semester, due to the style of feedback being more conducive to the learning process.

Methods

We conducted a two-phase study (pilot testing and intervention study) of student grading via two mechanisms: immediate (in-person) or delayed (via a learning management system) feedback. The initial phase of the study included a pilot study with student survey and feedback. We then conducted an unblinded randomised trial comparing immediate feedback vs. delayed feedback in grading pharmacy students' counselling of SPs. This study was approved by St. John Fisher College's Institutional Review Board.

Subjects and Setting

Study subjects included pharmacy students in their third professional year enrolled in a Concepts of Pharmacy Practice course. Data were collected from two cohorts of students in their Autumn semester (2012 and 2013). At the start of each Autumn semester, students were randomised into one of two groups: immediate feedback or delayed, written feedback.

The course was designed so that each student is tested on their interaction and counselling of patients using SPs. We built communication and clinical exercises utilising SPs for third year pharmacy students to assess their ability to identify prescription errors in a timed setting, and to accurately and articulately communicate information and counselling points to patients. SPs are paid acting professionals from a local medical college, where they are trained extensively on three separate patient cases developed by a faculty expert. The actors are given a role and a script, as well as detailed criteria that the faculty will be using to grade student on for clinical appropriateness and proper communication skills. During the training, the cases are modified based on feedback from the actors to make the most appropriate and realistic setting possible.

Over the course of a semester, students completed five counselling sessions: hypertension and lipids, diabetes utilising injectable medications, diabetes using oral medications and glucometers, anticoagulation, and smoking cessation. Each session's topics were reviewed by two course-coordinators that ensured fairness with respect to difficulty of each case compared to the others. Each session afforded the student five minutes to be able to review a patient chart and brief description of the clinical scenario (picking up a new prescription or refill), and then 15 minutes to be able to counsel the patient and correct any potential errors in the script by "calling" the

prescriber and offering solutions through usage of cue cards. Afterwards, the SP then gave the student a five-minute evaluation that focused on student communication throughout the exercise, and faculty then either remotely graded the students using videotapes or gave immediate feedback after watching the encounter live on the clinical appropriateness of the exercise. Faculty utilised a rubric to evaluate: 1) the student's ability to identify the clinical challenge, and 2) the student's communication skills; this rubric was validated and standardised to be used with each exercise. Furthermore, the SPs also completed a separate rubric that was immediately graded strictly on communication skills. This rubric was not assessed in this study.

Pre-intervention Pilot Study: Student Perceptions and Feedback Survey

During the Autumn semester of 2011, students participated in six SP sessions where faculty graded with both immediate or delayed feedback. During the Spring 2012 semester, prior to implementation of the evaluation study, an online survey platform was used to administer a survey to the students who received a pilot test of these two feedback delivery methods. Students were not randomised, and faculty chose to either grade "live" or via videotape at their own discretion. The survey was created and administered using the Qualtrics online survey platform (Qualtrics, Inc, Provo, UT). This survey was designed to rate and comment on the quality of the feedback from faculty, preferences with respect to feedback delivery, and impressions of the experience. Students also provided feedback and commented on perceptions regarding their preference for immediate vs. delayed feedback from members. Questions were rated on a 5-point Likert scale. Questions included "How would you rate the personal value of the feedback experience?" and "How would you rate the quality of the feedback you received from the faculty regarding your SP session?" rated from very dissatisfied to very satisfied. Additionally, students were asked "How helpful was the feedback in improving your communication/counselling skills?" rated from not helpful to very helpful, and "Which method of feedback would you prefer?". All answers to questions from this survey were dichotomised and reported as the proportion responding (*i.e.* Somewhat Satisfied or Very Satisfied). Since each scale measured different outcomes (Satisfied, Helpful, *etc.*) the dichotomy is reported in Table II, to show the proportion of each response.

Intervention Study: Live Feedback vs. Delayed Feedback

In 2012 and 2013, third-year pharmacy students were randomly assigned to two different clinical exercises via a random number generator: immediate feedback by a faculty grader (immediate feedback group) throughout the five sessions or to the standard video-tape delayed

feedback (delayed feedback group) by a faculty grader. There were slightly less students in the immediate feedback group based on availability of faculty to consistently dedicate time throughout the entire semester to evaluate their students in this manner.

For students in the immediate feedback group, a faculty member observed the student at the time of their interaction with the SP, and provided immediate feedback and grading based on their performance. Faculty members observing the students live are seated in the room with the SP and student in an area not visible to either party. Once the observation was completed, the faculty and student met face-to-face for a discussion of their performance and suggestions for possible improvements with their counselling and discussion of the therapeutic challenge of the case.

Students in the delayed feedback group were administered the same exam, with the same SP process, in the same exam rooms; however these exams were video recorded. An assigned faculty member reviewed the recording and graded the students using the same rubric as the immediate feedback student groups. Feedback, and a grade, was then provided to the student via an online learning management system (Blackboard).

Students in both streams completed their exams on the same day, at the same times, and were assessed on the same topics. The clinical cases were identical in both study arms. Since there are multiple exams in each semester, it was important to ensure that feedback from the prior exam was provided to all students prior to their next exams. Due to the nature of the groups, the immediate feedback group had immediate feedback and those in the delayed feedback group, the assessment and feedback was given to the student prior to their next examination. A total of 17 faculty provided assessments of the students. The difficulty of each assessment was controlled through a review of the elements in the rubrics by the course coordinators.

Primary Outcome: Pharmacy Student Grades

We conducted a retrospective review of student grades to assess overall performance, and also obtained student feedback and perspectives of the clinical exercises. All students, in both the immediate feedback and delayed feedback groups, were graded by faculty members using a predetermined, standardised rubric. The rubric evaluated both clinical and communication skills of the students (Table I). Students' pharmacy school grades for the Pharmacy Practice course were assessed using the online learning management software. Information obtained included all exam grades and SP sessions.

Analysis

This study is based on a convenience sample of students enrolled in the 2015-2016 P3 cohorts. Data analyses was performed using IBM SPSS Statistics 22. Descriptive

Table I: Standardised Grading Rubric

FACULTY RUBRIC Criteria (s)	Completed	Partially Completed	Did Not Complete		Comments
1) Medication Reconciliation and Allergy Checking: Full credit must include a review of ALL medications on profile (name, dose, frequency) and if patient has any allergies to drugs or food	All elements completed in a clear, poised, confident manner (2)	Asked about allergies but did not verify reaction or did not assess all medication (1)	Did not meet minimum requirements (0)	2	
2) Screened for ETOH, tobacco, caffeine and herbal and OTC use. (for full credit you must cover all elements)	All completed in a natural, comfortable and appropriate manner. (1)	(0.5)	Did not meet minimum requirements (0)	1	
3) Provides name of medication/ device and provides: Indication for use Route Amount Frequency Duration Special instructions (ex: w/ food)	Provided all information (2)	Provided portions of these required elements (1)	Did not provide all required elements (0)	2	
4) Discusses missed dose instructions	Discussed all (1)	(0.5)	Did not discuss (0)	1	Full credit if discussed as a PRN
5) Discussed: clinically significant ADRs clinically significant drug-drug and/or drug/food interactions Warnings (pregnancy risk, photosensitivity, etc.)	Reviewed all the significant or relevant side effects, interactions and warnings (2)	Discussed req. components but reviewed insignif. material or did not cover all material (1)	Did not discuss all required components comprehensively and thoroughly (0)	2	
6) Device demonstrated & patient instructed correctly.	All info provided was accurate. (4)	Info contained some inaccuracies (2-3)	Not Accurate (0-1)	4	
7) Used open ended questions: "What" did your doctor tell you? Or "Is this consistent with his instructions?" "How" did he tell you to take it? "What" concerns do you have?	Used open ended questions effectively (4)	Used some open ended questions (2)	Used closed end questions (0)	4	
8) Assessed patient's current understanding of each medication and/or disease as appropriate. Before providing education, asks patient understanding of medication, or administration Expectations of therapeutic Benefits	Consistently asked probing questions to identify patient understanding (4)	Didn't consistently ask probing questions to assess understanding. (3-2)	Did not ask probing question to assess patient understanding (0-1)	4	
9) For New Medications: Expectations or Benefits discussed Clearly explains: Time to expected benefit (if applicable) Signs of efficacy Monitoring parameters If a Refill, discusses patients experience with medication	No omissions, errors, or delivery issues in the provision of outstanding patient care (2)	Minor error, moderate omission, or major delivery issue that requires correction post-encounter but would not likely cause patient harm if not corrected (1)	Major omission, error or delivery issue that would likely cause patient harm (0)	2	
10) Identified therapeutic challenge/situation	Complete (6)	Partial (2-5)	No (0-1)	6	
11) Information was provided in an organised & logical manner Succinct and to the point Conversation smooth without hesitation. Maintains control & direction of session.	All information provided was logical, succinct and to the point and well communicated (2)	Some info was presented out of a natural sequence/ conversation with the patient was less than natural (1)	Information provided was unorganised, conversation was stilted or unnatural (0)	2	
12) Effective Verbal communication with terms understandable to lay public. Non-verbal communication had good eye contact. Confident & comfortable body language	All information provided was at an appropriate level with patient understanding and comfort evident (2)	Discussion was at appropriate level with some technical terms used. Patient likely understood (1)	Discussion level too high for patient comprehension. Didn't see patient cues to ID lack of understand (0)	2	Student demonstrated: Good eye contact Comfortable body language Effective verbal communication
13) Summarised key points and provided opportunity for follow-up.	All performed and achieved (2)	Some performed (1)	Elements were not performed (0)	2	
14) Used teach back to verify patient understanding	Used appropriately with feedback (2)	Used but did not verify (1)	Did not use (0)	2	
Automatic Failure for unsafe information to the patient (May not apply in all cases)	Major omission, error or delivery issue that would likely cause significant patient harm if not corrected <input type="checkbox"/> Wrong adverse effect (AE) <input type="checkbox"/> Wrong safety monitoring plan (what or when) <input type="checkbox"/> Omits safety monitoring plan (what or when) <input type="checkbox"/> Wrong AE minimising strategy <input type="checkbox"/> Wrong when to seek help for adverse effect <input type="checkbox"/> Omits discussion of dangerous AE when critical <input type="checkbox"/> Omits when to seek help for AE				
Total Points achievable for this case					36

statistics were used to illustrate frequencies of demographics and student grades and responses from student feedback survey; they were also used to summarise findings from the student perceptions and feedback questionnaire. Student *t*-test analyses were used to compare grades between groups; each of the five sessions (hypertension and lipids, diabetes utilising injectable medications, diabetes using oral medications and glucometers, anticoagulation, and smoking cessation) was assessed independently for differences in grades between the immediate feedback and delayed feedback groups. Students grades were then analysed in both groups independently for change in performance over time (over the course of the five sessions) using repeated measures analyses.

Table II: Pre-Intervention pilot survey of students receiving both live and delayed feedback

	Live Feedback N(%)	Delayed/ Written Feedback N (%)
How would you rate the personal value of the feedback experience <i>Somewhat Satisfied or Very Satisfied</i>	29 (80.6)	27 (75.0)
How would you rate the quality of the feedback from faculty <i>Somewhat Satisfied or Very Satisfied</i>	29 (80.6)	31 (86.1)
How helpful was the feedback in improving your communication skills <i>Somewhat Helpful or Very Helpful</i>	31 (86.1)	26 (72.2)
How helpful was the feedback in improving your organisational skills <i>Somewhat Improved or Very Improved</i>	21 (58.3)	22 (61.1)
Feedback Method: <i>Which method feedback would you preferred</i>	18 (50.0)	8 (22.2)
<i>Chose neither delayed or immediate as preferred method</i>	10 (27.8)	

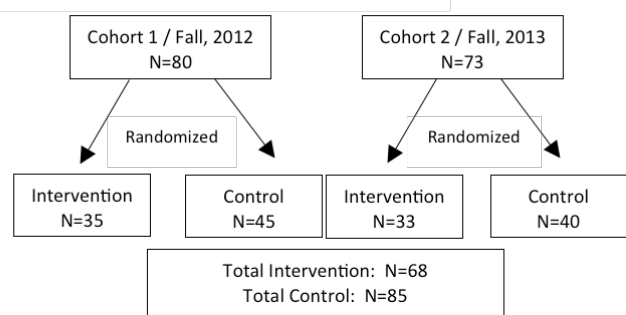
Results

Prior to implementation of the randomised trial, data from the pilot survey were reviewed to gain preliminary insight about the both methods of feedback experienced by the students (pilot study). Table II summaries the overall responses from students in the pilot programme who experienced both immediate and delayed methods of feedback. Over three quarters of students were either somewhat satisfied or very satisfied with both the value and quality of the feedback received (value: immediate 80.6% and delayed 75.0%; Quality: immediate 80.6% and delayed 86.1%). Additionally, over three-quarters rated their feedback as somewhat helpful or very helpful in improving their communication skills (immediate 86.1% and delayed 72.2%). When students were asked how helpful these methods were in improving organisational skills, ratings were not as high, however

over half of the students agreed that they were somewhat or very improved (immediate 58.3% and delayed 61.1%). Finally, when students were asked which method of feedback they preferred, half (50%), preferred immediate feedback, eight (22.2%) preferred delayed, and ten (27.8%) had no preference between either immediate or delayed feedback.

The randomised trial included 153 students enrolled over the course of the two semesters; 68 were randomised to receive immediate feedback and 85 were randomised to receive delayed, written feedback. Data for all students are included in the analyses. Figure 1 illustrates the flow of students for both cohorts in the study; cohort 1 included 80 students (35 immediate and 45 delayed) and cohort 2 included 73 students (33 immediate, 40 delayed).

Figure 1: Enrolment and Randomisation Flow Diagram



The mean grade among all students in both groups, for all four clinical experiences (HTN, Glucose oral, DMPen, and AntiCoag) was 87.4 (SD 6.1, Range 64.5 - 100.0). The mean grade in the immediate feedback group was 88.4 (SD 5.8, Range 73.5 - 100.0) and 86.6 (SD 6.2, Range 64.5 - 97.2) in the control group. With the exception of one experience (diabetes using oral medications and glucometers), there was no difference in the grading between the two groups. In addition, there was no trend for improvement in the grades of the students in the immediate feedback group compared to the delayed feedback group.

Table III illustrates the findings for the trial. Overall, there was no difference in grades between the immediate feedback and the delayed feedback groups (88.4 vs. 86.6, *p*=0.077). For the glucometer/oral DM clinical assessment, students in the immediate feedback group had higher scores compared to those in the delayed group (91.4 vs. 86.3, *p*=0.001). In the HTN/Lipids, Diabetes, and Anticoagulation groups, there was no difference between the immediate feedback and the delayed feedback groups. Repeated measures analyses, to assess change over each time period (each clinical evaluation) to the next, was conducted; there was no significant difference in grading over time (*p*=.276).

Table III: Comparison of student grades in the Live Feedback and Delayed Feedback Groups

Topic/Assignment	Live Feedback/ Intervention Group	Delayed Feedback/ Control Group	p-value
	Grade (mean, SD)		
Hypertension / Lipids	86.0 (10.5)	85.3 (9.0)	0.645
Diabetes (Insulin Pens)	87.8 (7.5)	87.4 (7.2)	0.687
Glucometers/Oral Diabetes	91.4 (6.7)	86.3 (10.7)	0.001
Anticoagulation	88.2 (8.5)	87.7 (9.5)	0.719
Overall Grade	88.4 (5.8)	86.6 (6.2)	0.077

Discussion

Overall, this study found no difference in the grading between the immediate feedback and the delayed feedback groups on nearly all measures (differences were found on in only one experience (diabetes using oral medications and glucometers). There was also no difference in changes in performance measure across the semester. This mirrors the results of Pfeiffer and colleagues showing no difference in giving immediate feedback (Pfeiffer *et al.*, 2005). One reason may be that the faculty in the delayed group had the option to rewind the tape to view errors in demonstration techniques, whereas those grading live have the benefit of the doubt if they potentially missed a point. In addition, there was no trend for improvement in the grades of the students between groups. Although there was a perceived difference by the students between immediate and delayed feedback in how they were graded, this study confirmed that faculty grading was not affected by the style of feedback. We believe that the consistency of the grading is due to the use of our standardised rubric and faculty training on its use.

Our results are in contrast to Gums and colleagues who found an improvement in skills of pharmacy students who had immediate feedback (Gums *et al.*, 2014). However, they observed students who were repeating an exercise in the same disease state, compared to our study which studied students improvement across multiple disease state scenarios. In addition, they did not compare to a group that did not have a immediate feedback method. Shrader and colleagues and Davies and colleagues noticed an improvement in grades throughout their assessment of their communication exercises focusing on inter-professional and patient communication, however they did not compare to a group that had a different form of feedback (Marie *et al.*, 2015; Sarah *et al.*, 2015)

Our results do align with Linedecker and colleagues that noted a positive response from pharmacy students who valued the immediate, live feedback in a patient care exercise (Linedecker *et al.*, 2017). As previously noted, it is difficult to compare our results with most other studies that note no difference, as they were based on assessment of a written assignment (Sinha & Glass, 2015; Thornock,

2016). Our study is different in that it shows no difference in immediate vs delayed feedback in a live, behaviour-based exercise.

In comparing our findings to studies that are outside the pharmacy literature, there is consensus that immediate feedback does not necessarily make a large difference in the performance of students in subsequent exercises.

Implications

The time commitment for faculty is an ever-present concern for faculty members in schools of pharmacy. Therefore, it can be beneficial to find more efficient and effective ways to utilise time without sacrificing quality of assessment for students. Since there was no change in grades over time among the students who were randomised to the immediate feedback versus the delayed feedback group and there was also no appreciable difference in grading of each individual session between the two groups, both faculty and students may benefit from using either method of grading. Although students prefer immediate feedback over delayed feedback findings, from this study provide a foundation for faculty to continue using both methods of assessment without putting students at a disadvantage.

Strengths and Limitations

Limitations of this study included randomisation without blinding and generalisability of results. Due to the nature of the assessment, we were unable to blind students or faculty to assigned groups; students were aware of the two different grading methods and also of the group they were assigned to be in for evaluation. Faculty grading the students were also aware of the student's assigned groups during the grading. Also students' experiences, along with the knowledge or perception of other assessment methods, likely played a role in their self-reported perceptions of assessment methods. Furthermore, although extensive training went into the training of graders and standardised patients, there is always some degree of variability. Additionally, students and faculty in this course have had multiple years within this institution, and as such, culture, training, and grading practices may be different at other institutions. Therefore results may not be generalisable to other students or populations. Finally, since this study was based on a convenience sample of students, and a full sample size was not assessed prior to enrolment, we may have lacked power; further studies with larger samples, and other schools, with different cultural and educational backgrounds are important.

Strengths of this study include the randomisation of students to different groups, as well as the use of multiple cohorts. Although students were not blinded to their group assignment, randomisation provided fewer opportunity for biases based on the random distribution of students to the intervention and control groups. Additionally, the use of two cohorts provided the opportunity to assess results across student cohorts, over

two years, allowing investigators to determine robustness of findings. It also allowed investigators to have an additional year implementing both grading systems in order to streamline grading processes.

Conclusion

Live feedback of SP sessions in the pharmacy curriculum may be desired by students, but there is no current evidence from our study or the literature pointing to a clear benefit. More studies need to be done comparing immediate and delayed feedback models, including in exercises that do not require a "clinical challenge" and at varying levels of schooling.

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