Pharmacy Education (2026) 26(1) 13 - 22
https://doi.org/10.46542/pe.2026.261.1322

RESEARCH ARTICLE

Evaluation of a pharmacy student video learning tool utilising humour and negative knowledge errors to teach improved pharmacist-prescriber phone interaction simulations

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Keywords
Communication
Educational video
Humour
Negative knowledge

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Abstract

Background: Negative knowledge is experiential knowledge gained from errors, or "*what not to do*." Humour in teaching is well-received by students and boosts attentiveness and long-term recall. This study evaluated student perceptions of the learning value from a humorous video demonstrating common errors in pharmacist-prescriber phone calls during simulated interactions. **Methods:** In 2024, pharmacy teaching staff in South Australia created a parody video skit highlighting common communication errors among undergraduate students. Second- and fourth-year Pharmacy Practice students were invited to complete a feedback survey after viewing. The impact of the video was evaluated by comparing students' errors during prescriber-interaction assessments before and after watching. Data were summarised using descriptive statistics and reflexive thematic analysis. **Results:** 82 students accessed the video, and 52 survey responses were received. 51 respondents (98%) stated that the video helped in understanding what was required of them in simulated prescriber calls. 47 respondents (91%) wanted more tools like this in their education. Students responded positively to the humour, interprofessional perspective, audio/visual presentation and negative knowledge. The students' performance in assessments was not measurably changed following the use of the learning tool. **Conclusion:** The combined use of humour and negative knowledge in a simulation video demonstration improved self-reported student understanding, although no improvement in assessment performance was observed.

Introduction

Errors in health care are common and have a significant impact on patient outcomes (Jha *et al*., 2013; Makary & Daniel, 2016; Raines, 2000). An error occurs where the result of an action is different from its intention (Reason, 1990). Mistakes are a subset of errors where the error occurs as a result of an inadequate plan (Reason, 1995). Knowledge-based mistakes, resulting from deficits in knowledge or understanding, are particularly relevant for undergraduate health professional education, including simulation-based learning (Reason, 1995). Palominos and colleagues (2019) concluded: "*Optimising learning from mistakes in SBL [simulation-based learning] requires a deliberate and thoughtful approach in which educators plan for and support learners to recognise, acknowledge and respond effectively to errors*." Explicit teaching of common errors has been incorporated into surgical and medical procedural simulation training (Aliaga *et al*., 2024; D'Angelo & Kchir, 2019), but there is little published literature focused on formally teaching errors in pharmacy or interprofessional communication training.

The ability to avoid serious errors is linked to perception of professional expertise (Minsky, 1997); professional capability has been linked in part to "*the availability of explicit knowledge about what not to do*

in certain situations – so called negative knowledge" (Gartmeier *et al*., 2008). This hypothesis has been explored in research with practising nurses, where experienced nurses were more readily able to articulate negative knowledge relevant to practice-based interpersonal interventions than less-experienced colleagues (Gartmeier *et al*., 2011). Negative knowledge increases certainty in professionals' actions, increases the efficiency of problem-solving, and promotes reflection on actions (Gartmeier *et al*., 2008). The explicit incorporation of negative knowledge and common errors should be valuable in skills-based education (Keith, 2011) and, by extension, professional skills assessment.

The use of demonstration video recording in pharmacy education can be an effective tool in improving assessment performance, especially when it is played and discussed in class (Rose, 2018). Audio-visual stimulants have also been shown to improve tertiary student engagement and interaction (Sever *et al*., 2013), and memory (Harrington, 2023), and offer a variety of other advantages over more traditional health professional teaching modalities (Malone, 2019). While video demonstration of skill errors has been shown to be effective in instructing surgical students (Rogers *et al*., 2002), it's not currently known if this benefit extends to pharmacy education or communication skill development.

Humour as a learning tool is established in educational theory as a means of promoting student engagement, satisfaction and learning (Erdoğdu & Çakıroğlu, 2021; Hackworth, 2024; Wang *et al*., 2025; Wanzer *et al*., 2010). Whenever possible, humour in education should relate directly to the learning content and not be disparaging towards others (Chabeli, 2008; Poirier & Wilhelm, 2014; Savage *et al*., 2017; Spooner, 2014). Inappropriate use of humour can be counterproductive in the learning environment, particularly where content is offensive, mocking, excessive or distracting (Bekelja Wanzer *et al*., 2006; Poirier & Wilhelm, 2014; Spooner, 2014), although the definition, overlap and subjectivity of these terms makes application of this rule complex (Bekelja Wanzer *et al*., 2006). Humour and laughter are safe and convenient interventions to reduce anxiety (Check, 1997; Savage *et al*., 2017; Zhao *et al*., 2019), and humour interventions have been used in training nursing students to lessen the negative impact of anxiety in learning (O'Brien, 2013). Savage *et al*. (2017) and Lei *et al*. (2010) encourage the use of humour in education to improve student performance.

Beckett *et al*. (2016) surveyed U.S. pharmacy students and teaching faculty on the use of humour in education. Students and teaching staff agreed that classroom humour improves attention, enjoyment, interest, accessibility and learning, although they noted it could be overused. They expressed preferences that classroom humour is "*related*" to topic content and is self-depreciating, but could be either pre-planned or spontaneous. Disparaging humour, where the humour "*makes fun*" of someone or a group known to students, was considered inappropriate, but more by faculty than by students. Responses did not significantly vary by student demographics. It is not known whether these findings are generalisable to the Australian pharmacy educational context.

The combination of humour with a negative-knowledge video demonstration of communication skills in tertiary pharmacy education could therefore combine the strengths of each pedagogy. The demonstration of common errors made by students in interprofessional communication assessments might be more engaging and less anxiety-inducing when humour is employed – ideally humour that relates directly to the learning objectives and minimises offence by appearing self-depreciating.

The aims of this study were to: 1) Evaluate student perception of the learning value of a video demonstration of common errors in pharmacist-prescriber phone calls in simulated interactions; 2) Evaluate student perception of the use of humour in this learning tool, and 3) Evaluate whether this demonstration impacted student performance in assessment.

Methods

Pharmacy students at the University of South Australia undertake multiple Pharmacy Practice courses scaffolded across all years of their program. Oral assessment requires identification and resolution of prescription-related problems utilising role play with simulated prescribers and patients to demonstrate competency skills required for pharmacy practice. Roleplays are conducted with pharmacist tutors and lecturers. Students enrolled in the second year of the pharmacy program undertake two minor assessments 8 weeks apart that are identical in format, with formative classes continuing in-between. Each assessment requires the student to role-play a phone call to the prescriber to resolve a drug related problem. The complexity of the assessments increases in sequence through the program, but assessment requirements for communication with role play prescribers remain consistent.

Three academics in pharmacy practice with a combined experience of 32 years designing and implementing role

play assessments were asked to identify the most common types of mistakes made by past students in their simulated prescriber interactions. Using Nominal Group Technique – a structured method for reaching group consensus - 10 common errors were identified (shown in Table I). A script for a short video was drafted and refined following review by the same academics. The script included exaggerated examples of each of the 10 errors, where the same prescriber character consecutively receives phone calls involving suboptimal practice and poor communication from the pharmacist and becomes increasingly exasperated. The academics recorded themselves performing the script using Zoom Version 6 and edited the recording using Panopto Version 15, resulting in a 6-minute video. The video was uploaded to the relevant course pages on the university's Online Learning Management System. Video creation and upload occurred between the two 2nd year assessments, and 2nd year students were further shown the video and discussed it with a tutor for approximately 20 minutes during a workshop session in the two-month interval between these two assessments. Students who were unable to attend the workshop were expected to watch the video online at an alternative time. A 5-question feedback survey (Appendix A) was created using the Feedback application on the university's Learning Management System and posted to the pharmacy practice course pages alongside the video link, and 2nd year students (n=82) were actively encouraged to complete the feedback survey in their workshop session. The video and survey were also made available through the Learning Management System for a related Pharmacy Practice course to 4th year (n=87) students as an optional revision resource. Survey responses were stored in the Learning Management System and de-identified prior to analysis. Quantitative survey data were summarised using descriptive statistics.

Free-text survey responses were coded and thematically analysed according to the principles outlined by Castleberry and Nolen (2018).

During the two assessments within the second-year pharmacy practice course, pharmacist tutors recorded errors made by students during role-play telephone interactions with the prescriber. Errors were categorised using the predefined classifications outlined in Table I. Multiple errors made by the same student were tallied separately, and the data collected were not identifiable. A Poisson regression was conducted to compare error rates between two time points, adjusting for the number of students assessed using IBM SPSS Statistics (Version 30.0.0.0; IBM Corp.).

Ethics approval was obtained from the Human Research Ethics Committee of the University of South Australia, ID 206729.

Results

A total of 82 students viewed the video at least once (view rate 49%). Surveys were received from 52 of these students (n=43 second year, n=9 fourth year), giving a survey response rate of 63%. Student satisfaction with the learning tool in improving their understanding was very positive (98%), and 90% expressed a preference for the creation of similar tools in other areas of their learning. Responses to the multiple-choice questions regarding their perceived improvement in understanding and desire to see more similar learning tools in education are shown in Figures 1 and 2 respectively.

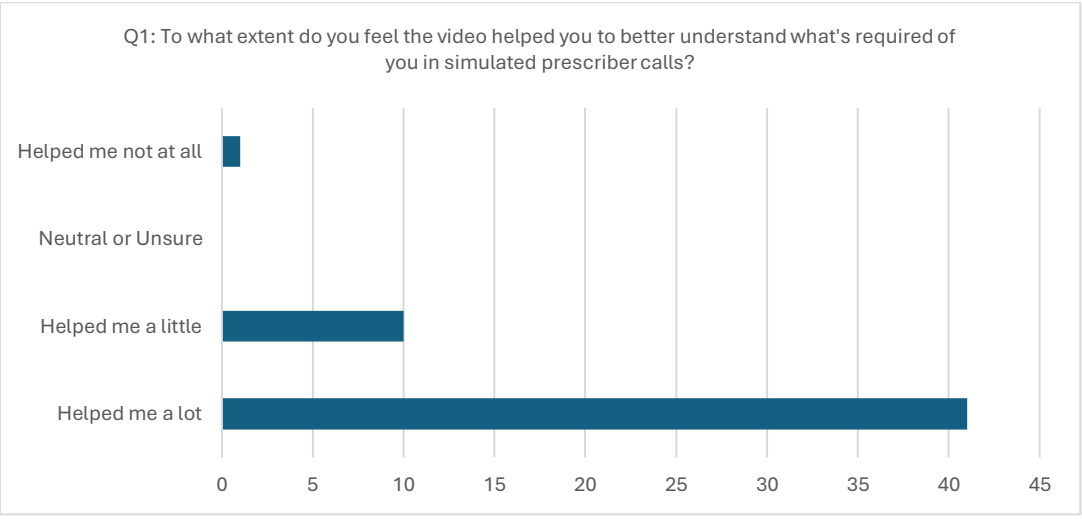

Figure 1: Student survey responses on the value of the learning tool in improving understanding

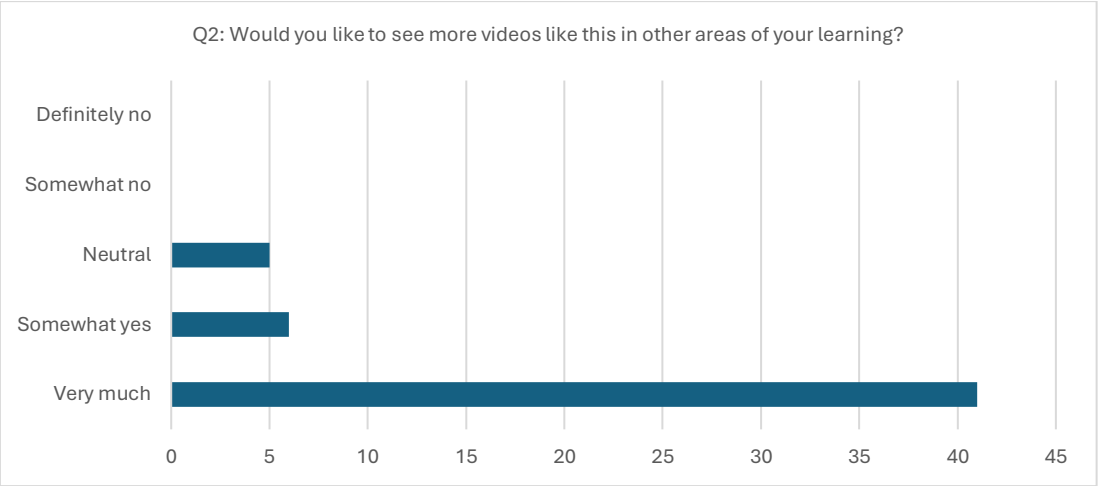

Figure 2: Student survey responses on the expansion of the learning tool modality in education

Thematic analysis

Five key themes were identified in the free-text responses. While most reflected positive perceptions of the learning tool, some themes — such as the use of humour and negative knowledge — also included critical reflections. The video presentation format, use of negative knowledge and incorporation of humour were described as positive elements of the learning tool; a fourth positive theme was the opportunity to view pharmacist communication from the prescriber's perspective. However, some students also raised concerns about use of humour and negative knowledge in isolation without a traditional positive demonstration. Illustrative quotes for each theme are presented below.

Video format enhances realism and contextual clarity

The benefits associated with a recorded video demonstration were consistently raised in the feedback. Unlike written or verbal instruction, the video allowed them to observe tone, emotion, and real-time interaction, which many found more engaging and easier to understand. The visual and contextual elements of the demonstration were seen as enhancing clarity and realism, helping students better grasp both effective and ineffective communication practices.

> *"Seeing actual tone and emotion behind how to speak to patients/doctors rather than just reading it as dot points is so helpful." (Student 31)*

> *"How it portrays live situation that is happening and so students are able to recognize what is correct and wrong and remember what to do in such situation. Rather than lecturers explaining verbally where it might be harder to picture or imagine the situation." (Student 3)*

> *"The message from the tutors are clearer when there are real life examples like this being used." (Student 19)*

Negative knowledge supports critical reflection and self-correction

Students found value in the video's use of negative knowledge — demonstrating what not to do — as a means of reinforcing correct communication practices, citing demonstration of "*the way to not speak to a doctor, e.g.: the tone, the format of questions*" (Student 37) and the opportunity to "*spot out things that went wrong with each scenario*" (Student 24) as elements they particularly liked. The negative knowledge approach helped them identify common mistakes and reflect on their own skills.

> *"It makes it much easier to recognise mistakes and how to do it properly." (Student 7)*

> *"Allowed me to identify common errors and reevaluate my own approach." (Student 17)*

Humour increases engagement and retention, but must be used with care

Humour was frequently mentioned as a positive aspect of the video, with students describing it as engaging, entertaining, and helpful for retaining key messages. For many, the comedic tone enhanced attention and made the learning experience more enjoyable.

> *"Engaging, funny video which will help key things of what to do or not to do stick better." (Student 1)*

> *"The video was interesting and engaging through its comedic nature, so it helped retain my attention" (Student 29)*

However, a small number of students expressed discomfort, suggesting that the humour could feel judgmental or distracting, particularly for those who recognised their own past mistakes in the scenarios. Three students made comments that could be interpreted to suggest the disparaging humour was inappropriate:

> *"Might make students a bit insecure" (Student 38)*

> *"Personally feel that this is a bit too judgemental." (Student 35)*

> *"I imagine it feels cringe watching whilst being a student guilty of doing said calls ? not necessarily bad" (Student 46)*

Some students offered more nuanced reflections on the use of humour, noting that while it contributed to engagement, it occasionally detracted from the learning experience. A few found the exaggerated nature of the scenarios distracting or difficult to take seriously, particularly when the humour felt obvious or performative. One student remarked, "*Some of the examples were so obviously bad and kinda annoying to watch because of that haha. but then sometimes its good to have obvious things, so you actually do consider them properly*." (Student 30), highlighting the tension between clarity and subtlety in educational design. Others commented on the comedic delivery itself, with one noting, "*It was hard to take it seriously because it was funny to see our lecturers doing a skit*" (Student 39) and another commenting "*A little overdone? Scenarios with minor/not so obvious mistakes might also help*." (Student 7), pointing to a desire for more subtle, relatable examples.

Notably, in their responses to quantitative survey questions, all six of the students mentioning limitations related to humour responded that the learning tool both helped them learn, and they would like to see more videos like this.

Adopting the prescriber's perspective deepens professional awareness

Students valued the opportunity to view pharmacist communication from the prescriber's point of view, which helped them reflect on their own professionalism. This shift in perspective helped students recognise how communication missteps might be perceived by prescribers, reinforcing the importance of preparation and clarity.

> *"makes people understand in a practical example how unprofessional it looks when you talk to a prescriber without adequate preparation." (Student 28)*

> *"It shows how it could impact the prescriber-pharmacist relationship if the pharmacist isnt thorough with checking and completing all the relevant information before ringing the prescriber." (Student 49)*

Lack of positive examples limits comparative learning

While students found the negative examples instructive, a common criticism of the learning tool was the absence of an appropriate demonstration. The absence of a "*good*" example was seen as a missed opportunity to consolidate learning through comparison. Students suggested that a positive demonstration of effective communication could serve as a reference point to help clarify expectations and reinforce best practices.

> *"Maybe 1 example at the end of a good, well executed phone call - it may further help with direct comparison" (Student 5)*

> *"Maybe add another 'phone call' where the pharmacist well presented and introduced the problem in an appropriate way [as in a good example to use as reference" (Student 2)*

> *"only really showcased negatives" (Student 10)*

Assessment performance

Eighty-one second-year pharmacy students sat each assessment, of which 72 (88.9%) had accessed the online video. The tallies of the errors observed during the assessments are shown in Table I. The rate of errors before the educational intervention was 1.06 times that after the educational intervention, but this difference was not statistically significant (B = 0.057, SE = 0.239, p = .811), indicating no difference in assessment performance after the video resource was made available.

Table I: Number of times an error was observed by assessors during second-year simulated interprofessional communication assessments

Type of error/mistake	Before educational intervention	After educational intervention*
No introduction (e.g. pharmacists' name/role)	6	4
Not confirming correct doctor	8	5
Not describing Situation (e.g. reason for call)	2	0
Not providing the patient's full name	1	1
No clear purpose to call	2	4
No adequate explanation or reasoning for the recommendation	3	4
More than one call required	12	10
Not concise	0	1
Inappropriate terminology or poor pronunciation	2	5
Disrespectful, or risks offense	0	0

* A Poisson regression was conducted to compare error rates between two time points, adjusting for the number of students assessed. The rate of errors before the educational intervention was 1.06 times that after the educational intervention, but this difference was not statistically significant (B = 0.057, SE = 0.239, p = .811).

Discussion

Student opinion of the learning tool as a whole was positive, with a clear preference to see an expansion to other areas of learning. Results of the thematic analysis indicate the drivers behind this satisfaction include the use of video format, negative knowledge, humour, and interprofessional perspective.

Students responded positively to the use of a recorded video demonstration. This is consistent with American pharmacy student survey results (Rose, 2018), where students' feedback on the use of chemical laboratory video demonstration was also positive. Rose (2018) also noted higher engagement with online videos when they were shown and discussed during class; response rates from the 4th year students were much lower than the 2nd year students, who had the video also presented during a workshop. This study builds on other literature finding student satisfaction with video demonstration in teaching (Harrington, 2023; McElnay *et al*., 1989) by confirming application to communication skills education of Australian pharmacy undergraduates.

Students perceived the video demonstration as helpful for understanding mistakes. This supports more general findings from past student surveys that indicate learning from mistakes is considered valuable in health professional undergraduate education: Palominos and colleagues (2019) reviewed responses from medical, nursing and magnetic resonance imaging students, while Helyar and colleagues (2013) found UK nursing students valued learning from errors. The findings presented here suggest that pharmacy students similarly value experience in mistakes in their education. A notable difference is that other studies explored students reflecting on their individual and personal mistakes in simulations, while the learning tool developed for this study was informed by mistakes by past student cohorts; vicarious experience in mistakes through simulation was still considered valuable by students. Future research should explore whether learning from anonymous peers' common mistakes vicariously might be useful in combating the feelings of frustration (Harder, 2012; Young *et al*., 2016), guilt and fear (Helyar *et al*., 2013) experienced by health students making mistakes in simulation-based learning, which these authors described as drawbacks of learning from errors in health education.

Students generally reported a positive perception of the humour element. In prior studies, tertiary students - including pharmacology students and pharmacy students in the USA – have similarly expressed positive perceptions of humour in educational contexts (Eldeeb, 2024; Sharif *et al*., 2024). Previous work suggested students viewed humour as engaging and potentially supportive of attention and self-perceived learning (Torok *et al*., 2004; Beckett *et al*., 2016; Eldeeb, 2024; Sharif *et al*., 2024). This finding is noteworthy as this learning tool employed a form of sarcastic, exaggerated or "*mocking*" humour, which other authors have warned might be inappropriate (Chabeli, 2008; Poirier & Wilhelm, 2014; Spooner, 2014; Savage *et al*., 2017). Care was taken to ensure that the exaggerated nature of the humour was not directed towards any individual, but focused solely on the action and the outcome in the scenario. However, some students did raise drawbacks about the use of humour. Selected survey comments might evidence the theory (Lei *et al*., 2010; Poirier & Wilhelm, 2014) that humour might be

counterproductive in learning when it is excessive or distracting, consistent with past American tertiary student studies (Bekelja Wanzer *et al*., 2006).

Pharmacy students valuing learning from interprofessional feedback has been previously observed in the U.S. (van Schaik *et al*., 2016), although little other literature exists in this area. The prescriber's perspective in the learning tool emerged as a benefit of the comedic setup. By portraying the prescriber as the calm, rational figure responding to the pharmacist's exaggerated mistakes, the video presented how such errors might be perceived in real clinical interactions. Student positivity about the communication recipient's perspective complicates the analysis of the other features of the learning tool, because it's difficult to know how much of the students' overall satisfaction reflects this feature. Further research to investigate the relevance of this finding in pharmacy undergraduate education is appropriate.

Constructive criticism from the students surrounding the demonstration of errors without a classic 'positive' skill demonstration is supported by findings in other interventional education studies. After providing examples of common errors in mathematics to 6th grade school students, Heemsoth and Heinze (2014) concluded that "…*learners benefit more from reflecting on incorrect examples if some correct examples were also presented*." Rogers *et al*. (2002) found improvement in test medical surgery performance only when error training was combined with "*correct*"-skill demonstration, and Riolo (1997) also found no improvement in surgical skill performance after error demonstration in isolation.

This might partly explain why no improvement was observed in the students' assessment performance after viewing the learning tool, despite students' perceived self-benefits. An inconsistency between self-belief and tutor assessment of performance in communication was previously observed in American pharmacy students, suggesting that pharmacy students might overestimate their communication abilities (Austin & Gregory, 2007). It's additionally possible that addressing knowledge-based mistakes through negative knowledge education and teaching procedural "*rules*" (e.g. "*Don't call the prescriber without a clear purpose*") simply leads to an increase in the number of rule-based mistakes, so the total number of mistakes remains similar despite the receipt of new knowledge; the study did not attempt to measure this distinction, and future studies might aim to investigate this.

Limitations

The study only explored short-term assessment performance; further study should aim to evaluate possible long-term impact of the learning tool in improving interprofessional communication. The lack of an identifiable control group limits the ability to draw causal inferences about the intervention's effectiveness. The variable nature of assessments (e.g. differences in difficulty of drug name pronunciation), the reliance on subjective tutor categorisation of errors, and the small data set are other noted limitations of this part of the analysis.

Other limitations of the study include the inability to apportion the students' positivity for the learning tool to each of the incorporated elements – i.e. to what extent was the humour or the negative knowledge focus valuable to students? The survey did not collect demographic information for a more specific analysis, although Beckett and colleagues (2016) did not observe a difference in pharmacy student survey responses about humour in teaching in their demographic analysis. The 4th year student responses were too few, and their assessment performance was not investigated, preventing exploration of the past finding that students with high prior knowledge might benefit more from examples of errors than students with low prior knowledge (Heemsoth & Heinze, 2014). Each of these limitations could be addressed by future research.

Conclusion

Australian pharmacy students value humour, negative knowledge and video technology in their education, including when used in combination. In this study, the simulation video–presented from the perspective of a prescriber communicating with a pharmacist–improved self-reported student understanding and engagement. Although improved assessment performance was not measured, students expressed a desire to see similar learning tools used more in their undergraduate learning. These findings may inform future educational approaches.

Acknowledgement

The authors would like to thank the student participants for volunteering their time in the evaluation.

Conflict of interest

The authors declare no conflict of interest.

Source of funding

The authors did not receive any funding.

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Appendix A: Evaluation survey questions

Poor Prescriber Calls - Feedback and Opinion

After watching the Poor Prescriber Calls video, please answer this short survey.

The data will be de-identified, but used to better understand whether this type of exercise is valuable (or not)

1*. To what extent do you feel the video helped you to better understand what's required of you in simulated prescriber calls?

[ ] Helped me a lot
[ ] Helped me a little
[ ] Neutral or unsure
[ ] Helped me not at all

2*. Would you like to see more videos like this in other areas of your learning?

[ ] Very much
[ ] Somewhat yes
[ ] Neutral
[ ] Somewhat no
[ ] Definitely no

3*. What did you like about the video as a learning tool?

4*. What did you not like about the video as a learning tool?

5. Do you have any other comments?

*Required

Completion message: Thank you for submitting!