

Tech Tools

Tips for the Effective Use of an Audience Response System (ARS)

Kevin Pierce, MAT, Instructional Designer

Debra L. Gist, MPH, FACEHP, Senior Director

Elaine Hamarstrom, PhD, Manager, American Academy of Dermatology

An Audience Response System (ARS) can be an effective tool to breathe life into didactic, faculty-led presentations. Audiences like presentations with ARSs because they are able to interact with a presentation while dramatically

increasing their engagement and enhancing their retention of information. Faculty like ARSs because they allow them to identify and address persistent learning gaps as well as assess the value of their presentations *on the fly*.^{1,2}

An ARS includes hand-held devices (often called “clickers”) for audience members to submit responses and software for faculty to collect, analyze and display responses.¹

Identify Professional Practice Gaps

When used effectively, an ARS can help identify and narrow persistent audience learning gaps in knowledge and competence. A professional practice gap is defined as the difference between what is and what could be, given the evidence. A knowledge gap occurs when a learner is not aware of the information (the facts; for example: prevalence of a disease, side effects of a class of drugs, etc.). A competence gap occurs when a learner retains facts but does not apply the knowledge or strategies to their decision making (for example: their index of suspicion is not raised based on the prevalence of a disease in a certain sub population).^{1,3}

Measuring changes in competence as a result of an educational intervention typically requires a baseline assessment (such as a pre-test), followed by exposure to the information and strategies for practice and then a post-test. Knowledge is simple to assess, usually through one-best-answer multiple-choice questions. Competence in an educational setting can be assessed through case-based scenarios that test, for example, whether the learner chooses the correct next step in the scenario. However, if a clinician improves their “competence” in the educational setting, this does not automatically mean that they are clinically competent. It only means they improved their competence in the classroom. Identifying changes in competence can also be assessed to a much lesser degree by gauging the learner’s self-reported commitment to integrate the new knowledge, care strategy, etc. into their clinical practice.^{3,4}

Developing ARS Questions

Start with the Learning Objectives

Once an educational planner has identified the professional practice gaps and analyzed the educational needs underlying those gaps (in terms of knowledge, competence, performance or patient outcomes), then the learning objectives and desired results are developed. The educational planner then selects appropriate faculty and provides them with the educational needs, learning objectives and desired

outcomes. Learning objectives describe what the learners need to be able to do after the presentation. Faculty, working closely with the educational planner, should develop ARS questions from the learning objectives. When ARS questions are grounded in the learning objectives (and desired outcomes), it helps increase the perceived relevance which in turn helps increase audience engagement.^{3,5}

Write Clear and Concise Questions

Clarity improves readability, which improves response time and answer validity (since audience members aren’t forced to guess). Faculty should be clear in what they ask and should provide only the pertinent information that the learners need in order to select the best answer. As much as possible, faculty should minimize the complexity of a question’s stem and the answer choices.^{3,5} Faculty should also use appropriate distractors for their questions; a litmus test might be that if your mother can select the best answer, then the question might need work (assuming your mother isn’t a clinician, of course).

Question Types

There are six basic types of ARS questions, each with a specific application. Exercising the brain is like exercising the body. Faculty should start with an easy warm up (such as knowledge recall questions) before moving onto more strenuous work (such as case-based questions).^{4,6} To keep audience members engaged, faculty should avoid asking unrelated trivia questions, even as icebreakers (at this point, we think everyone knows who is buried in Grant’s tomb).

1. **Knowledge Recall Questions** require the audience to recall facts. Since they provide the lowest level of engagement, they are best used as “icebreakers” and for pre- and post-test knowledge benchmarking. When a practice gap exists because of a knowledge deficit, knowledge recall questions can be very useful in closing the gap.^{4,6}

Knowledge Recall Question Example:

According to the Moore et al (2009) framework for planning and assessing CME activities, which of the following best describes a Level 5 outcome?

- A) Improved physician participation
- B) Improved physician competence
- C) Improved physician performance
- D) Improved patient health status
- E) Improved population health status

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2. **Case-Based Questions** require the audience to apply knowledge or strategies to make decisions in the educational setting. The stem of the question describes the scenario, which provides pertinent information, followed by questions asking the learners for a diagnosis or next step(s) to the case scenario. Based on audience responses, these questions can help faculty identify which pieces of information and/or strategies they need to focus on for the remainder of their presentations. ^{4,6}

Case-Based Question Example:

Data from self-assessments, expert analysis, and literature research all indicate that there is a gap in physician performance with regards to providing treats to patients who received an injection. You are tasked with designing a CME activity to address this gap. Which of the following activities would be most appropriate?

- A) Didactic learning module
- B) Self-assessment questionnaire
- C) Live demonstration
- D) Performance improvement module

3. **Prediction Questions** require the learners to predict the result of an experiment or procedure. They are ideal for introducing case-based questions. ^{4,6}

Prediction Question Example:

A CME activity included pre-test and post-test, and an average improvement of 45% was demonstrated when comparing the post-test results with the pre-test results. To assess long-term improvement, the questions will be asked again 12 months after the completion of the activity. What average percent improvement do you predict will be seen?

- A) 0% to 19%
- B) 20% to 39%
- C) 40% to 59%
- D) 60% to 79%
- E) 80% to 100%

4. **Confidence Level Questions** require the audience to rate their level of confidence (low to high) along with their answer choices. They often work best when following prediction questions. To further boost engagement, learners can be divided into small groups with confidence level questions and points leader boards used to foster friendly competition. ^{4,6}

Confidence Level Question Example:

How confident are you regarding your answer to the previous question?

- A) Very confident
- B) Somewhat confident
- C) Confident
- D) Not confident at all
- E) I was just guessing

5. **Perspective Questions** require the learners to relate to the content presented on a personal level. There are no correct answers. For example, faculty might ask for the learners' opinions on the efficacy of a procedure. Faculty should typically add an "other" option in case audience members have answers other than what faculty anticipated. If someone chooses "other," it can be explored with audience members who are willing to share, if time allows. ^{4,6}

Perspective Question Example:

Which of the following best describes your preferred method of learning?

- A) Live meetings
- B) Synchronous online activities
- C) Asynchronous online activities
- D) Self-directed reading

6. **Misconception Questions** highlight common audience misconceptions and are perfect for introducing key concepts. Faculty should keep it simple, though, asking the learners to simply agree or disagree with a diagnosis or procedure. ^{4,6}

Misconception Question Example:

Live CME activities are not cost-effective continuing education solutions due to the costs associated with venue rental and providing copious amounts of coffee.

- A) True
- B) False

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Delivering ARS Presentations

Faculty should familiarize themselves with ARS best practices before delivering a presentation utilizing this technology. It can mean the difference between simply asking questions and truly and adequately meeting learners' educational needs.

Demonstrate the Basics

Faculty should set the stage by demonstrating the ARS system and how they intend to use it. They should tell and show their audience how they will ask questions, how much time they will allow for each question, how they expect the audience to answer, and how results will be shown to the learners.^{3,5,7}

Act on Audience Responses

When faculty asks learners a question and receive results, then they must act on the answers. They should also provide feedback to the learners regarding why an answer is correct and why the incorrect answers are not appropriate. The ARS will not promote deep learning without faculty's help. At the end of each question, faculty should analyze the responses and relate them to topics in the presentation. A good approach is for faculty to pause their presentations and use responses to fuel discussion. Another recommended approach is for faculty to use responses to tailor their presentations to audience needs on the spot, branching off to slides and ARS question sets that they hold in reserve. However, if a presentation is peer-reviewed, then the accredited CME/CE provider needs to ensure that the reserve slides are prospectively peer-reviewed as well.^{3,5,7}

Consider Question Frequency and Timing

How many ARS questions faculty asks during a presentation depends on whether faculty's primary goal is to assess the learners' current knowledge base or to impart new material or affect both. For assessment, faculty might ask 10 to 15 questions per hour. To cover new material, faculty might ask only 3 to 5 questions per hour. Faculty should distribute the questions evenly, since audiences lose interest after only 10 minutes of non-participation. Additionally, faculty should consider the time it takes to ask the questions, analyze the results and discuss why the best answer is the correct answer and why the distractors are incorrect. Typically, it takes an audience 30 to 60 seconds to read and respond to one ARS question. Once the time runs out, a few seconds are needed to process the data by the ARS program. When audience members see that they didn't get a question correct, they may be more likely to pay attention.^{3,5,7}

Points for Practice:

- Demonstrate the Basics: show how the system works and how questions will be asked, answered and reviewed.
- Act on Audience Responses: use responses to relate to other parts of the presentation, fuel discussion, or to branch out to slides held in reserve
- Consider Question Frequency and Timing: ask more questions for assessment and less to cover new material. Distribute questions evenly to maintain audience interest.

Summary

When used effectively, an Audience Response System (ARS) can increase audience engagement and help faculty identify and address persistent learning gaps. When developing an ARS presentation, the accredited CME/CE provider should employ a very methodical approach: identifying professional practice gaps and determining the desired results so that in working with faculty, ARS questions can be developed that address the learning objectives and desired results. Delivering an effective ARS presentation requires faculty to model how they will use the system and adopt an interactive, evenly-paced presentation style which allows for appropriate feedback to the learners.

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