



Audience Response System – Tips for Effective Use

This tip sheet will help you:

- Outline the potential uses for an audience response system in a conference session
- Describe the qualities of effective audience response questions and answers

What is an Audience Response System?

An audience response system (ARS) is a tool that allows participants in a live meeting to respond to questions posed by the presenter. These systems can include a range of low- and high-tech options. Most learners will have used manual audience response – raising hands or cards to vote – in school, and many professional learners have used radio-frequency keypads in conference sessions. Newer systems draw on mobile internet technology to allow users to register their votes using mobile phones, tablets, or other portable computing devices with either data service or wireless internet connectivity. The 2016 Annual Meeting will feature an ARS system that uses mobile internet technology in several sessions.

Why incorporate ARS into my presentation?

ARS, when planned and implemented well, provides an effective means of reinforcing learning among your session participants. Because learners have an opportunity to actively engage with the content you present, they gain a deeper understanding of it. This means that they retain the information longer and have an easier time applying it to their own practices.

ARS questions should be used deliberately at key points in your presentation. Because of the time needed to introduce the question and allow learners time to reflect and enter their votes, you should allow 1-2 minutes for each question. To make the most valuable use of this time, you should plan your questions to serve one of the following purposes:

- *Introduce a new topic:* Asking a question when you begin a new section of your presentation will start your audience thinking about the topic, creating stronger engagement. It also allows you to measure their baseline knowledge so that you can present your content effectively based on what they already know. This will require you to be flexible in your presentation, so that you can adjust the time and level of detail for each section to match the unique needs of your learners.
- *Review content you have just presented:* Asking a question after sharing new content will give learners the opportunity to reflect on what they have heard and practice applying it. Both of these experiences are important parts of the learning cycle and can increase retention and understanding.

How can I best format ARS questions?

Most ARS systems are built to present and collect responses from multiple-choice questions. When you write your questions please keep these points in mind:

- While some simple questions that ask learners to repeat facts can be used, the best questions require learners to engage in higher level thinking by analyzing information or applying concepts
- The stem of the question should be complete enough that it can be understood without reading the responses
- The stem and the responses should be grammatically correct and match each other
- One of the responses should be clearly recognizable as the correct answer

Consider using questions that ask learners to compare or contrast concepts, or to apply information to a hypothetical scenario, to help them actively engage with your content and put it to use.

How and when do I submit my questions?

AAAAI staff will provide you with a template form to use when writing your questions and will notify you when your questions need to be submitted. Because the ARS polls need to be programmed and inserted into your PowerPoint presentation it is important that your questions be completed in advance. When you arrive at the meeting site be sure to allow time in the Speaker Ready Room for your ARS question slides to be added to your presentation if the presentation was not uploaded ahead of time, and for you to review or edit the slides before your session begins.

How do I operate the ARS system during my session?

You will have audio/visual staff in the room during your session to assist with operating the ARS system. They will make sure that your polling questions and the results are displayed onscreen. Try to arrive at the session room a few minutes early to go over this process with the technicians.

When your questions appear onscreen be sure to take time to read the question and the possible responses out loud, then indicate to learners that it is time to respond. A timer will appear onscreen to let your audience know how much time they have. A slide showing the results will then be displayed, which you should take a moment to review with your audience before proceeding.

If you have questions about incorporating ARS into your presentation please contact the AAAAI Education Staff at cme@aaaai.org.

The following is an excerpt from “Clickers in the Large Classroom: Current Research and Best-Practice Tips,” by Jane E. Caldwell. This was published in the American Society for Cell Biology’s CBE Life Sciences Education 2007 Spring; 6(1): 9–20.

WRITING EFFECTIVE [ARS (“CLICKER”)] QUESTIONS

Clickers are a flexible tool, but like most technology are not a panacea in and of themselves. This theme repeats frequently in the clicker literature (Draper *et al.*, 2002; Hake, 2002 ▶; Jackson and Trees, 2003 ▶; Wood, 2004 ▶; Parsons, 2005 ▶; Beatty *et al.*, 2006 ▶; Simpson and Oliver, 2006): ARS questions are “best understood as a tool rather than a teaching approach” (Simpson and Oliver, 2006), and their effectiveness in increasing learning depends heavily on the intent and thought behind their design. One recommendation is that the instructor approach class meetings as learning sessions rather than knowledge-dispensing sessions (Beatty, 2004 ▶).

There is overall a consensus that it takes some time and practice to develop good questions and that they must be carefully designed and “woven” into lecture (Burnstein and Lederman, 2001 ▶; Elliot, 2003 ▶; Beatty *et al.*, 2006 ▶; Simpson and Oliver, 2006). In general, there are few (if any) collections of good clicker questions available for most fields (Jackson and Trees, 2003 ▶; Beatty *et al.*, 2006 ▶) beyond collections for physics (Mazur, 1997 ▶), although some concept tests for specific biological topics have been published in recent years (Anderson *et al.*, 2002 ▶; Udovic *et al.*, 2002 ▶).

If properly designed, clicker questions may enable courses to be more attuned to the way human learning and memory works than simple lecture. Traditional lectures may produce poor results because they fail to account for the “chunking” of information into categories, linking of new information with familiar concepts or creation of new categories, and the use of examples and practice to learn new concepts (Middendorf and Kalish, 1996 ▶). If the way we learn is kept in mind, however, it is possible to design clicker questions that favor learning. By this criterion, examples of good questions include presenting a new concept and asking which ideas (or categories) it is most closely related to, showing an example of a new concept, or applying a mastered concept to a new situation.

There is general agreement that a good clicker question is different from a good exam question, but exam questions can be modified for this use (Beatty *et al.*, 2006 ▶). Some detailed treatments of question design are available in the literature (e.g., Beatty *et al.*, 2006 ▶). Generally speaking, qualitative questions (that avoid calculations, memorization, or facts) are favored because they guide the student to focus on the concept without becoming distracted by details (Beatty, 2004 ▶; Beatty *et al.*, 2006 ▶). Some useful goals for question design can be culled from the literature:

1. Good clicker questions should address a specific learning goal, content goal, skill, or reinforce a specific belief about learning (Beatty *et al.*, 2006 ▶).
2. Questions can (Beatty, 2004 ▶):
 - assess students' background, knowledge, or beliefs
 - make students aware of others' views or of their own
 - locate misconceptions and confusion
 - distinguish between related ideas
 - show parallels or connections between ideas
 - explore or apply ideas in a new context.

Some examples of questions recommended by the literature include (Dufresne *et al.*, 2000; Wit, 2003 ▶):

- given a term or concept, identify the correct definition from a list, and vice versa
- given a graph, match it with the best description or interpretation, and vice versa
- match a method of analysis with an appropriate data set, and vice versa
- questions that link the general to the specific
- questions that share a familiar situation or example with several other questions
- questions that students cannot answer, to motivate discussion and curiosity before introducing a new topic
- questions that require ideas or steps to be sorted into order
- questions that list steps and ask “which one is wrong?”
- questions that apply a familiar idea to a new context.

Several researchers assert that it is useful, and even important, to design questions that produce a wide set of responses or on which some portion of the class makes mistakes (Dufresne *et al.*, 2000; Hake, 2002 ▶; Wit, 2003 ▶; Beatty, 2004 ▶; Brewer, 2004 ▶; Johnson and McLeod, 2004 ▶; Wilson *et al.*, 2006 ▶). Others seem to agree, asserting that exploring those misconceptions can be an important part of steering students toward deeper understanding, not just factual knowledge (Tanner and Allen, 2005 ▶). To construct such questions, it is helpful to:

- identify student misconceptions and include them as answers, plausibly phrased
- “shut up and listen” to students to find out how they think, and pay particular attention to wrong answers
- include answers that contain common errors.

A variety of questions is usually deemed useful. While instructors are learning to write questions, often most of their questions consist of factual recall (Brewer, 2004 ▶). One set of researchers reports that asking instructors to identify the type of question they are writing can help increase the diversity of questions (Brewer, 2004 ▶).

Practical suggestions include (Wit, 2003 ▶; Beekes, 2006 ▶):

- limit the number of answers to five or less, so that question is easy to read and consider
- assess knowledge of jargon separately from concepts to ensure that each is addressed clearly and effectively
- create wrong answers (distractors) that seem logical or plausible to prevent “strategizing” students from easily eliminating wrong answers
- include “I don't know” as an answer choice to prevent guessing
- plan to ask some questions twice to allow peer learning and build emotional investment. (Allow students to answer individually, but do not display the correct answer; then direct students to discuss the question with their peers and answer again.) This approach is advocated by many instructors who have used clickers, including Wilson *et al.* (2006) and Knight and Wood (2005).

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