QA InfoTech
Your Software Testing Partner

Title: Teaching with Audience Response System (ARS)

January: 2015

Introduction:

Technology is becoming omni-present today in all walks of life. Education is one such discipline that is leveraging technology in varied ways, to ensure learning is effective. This paper aims at focusing on a new technology which is revolutionizing the education field. The technology involves the use of a unique type of electronic audience response system. Advances in information technology suggest the possibility of personalized teaching systems where the teachers can implement their own desired instruction for required workflow. But due to the high costs of hardware, software and associated labor for incorporating such type of systems this seems like a tough task for technology seeking teachers. For these reasons the traditional way of teaching is still being used.

But the oldest and most fundamental challenges in teaching revolve around how to engage students in lectures and how to determine if they are effectively grasping what a teacher is teaching. To address these two challenges a wireless 'Audience Response System' (**ARS**) came into picture. ARS is one of those wireless devices that can be used to improve students learning while in classroom, and is also a solution that is cost effective and easy to use.

About the Topic:

An ARS is a system used in any classroom session to perform polling from students and gather their immediate feedback in the form of responses to questions asked by an instructor. A traditional form of polling is one where an instructor asks students to raise their hands to agree or disagree with a given question or to answer a given question.

How ARS(s) can be used:

- Pre-assessment of students knowhow before class commences
- Confront common student misunderstandings
- Transform the way you do a demonstration or lecture
- Increase student's concentration on a teaching session
- More effective grading and valuation than old-fashioned teaching methods
- Simplify testing of conceptual understanding
- Increase class attendance

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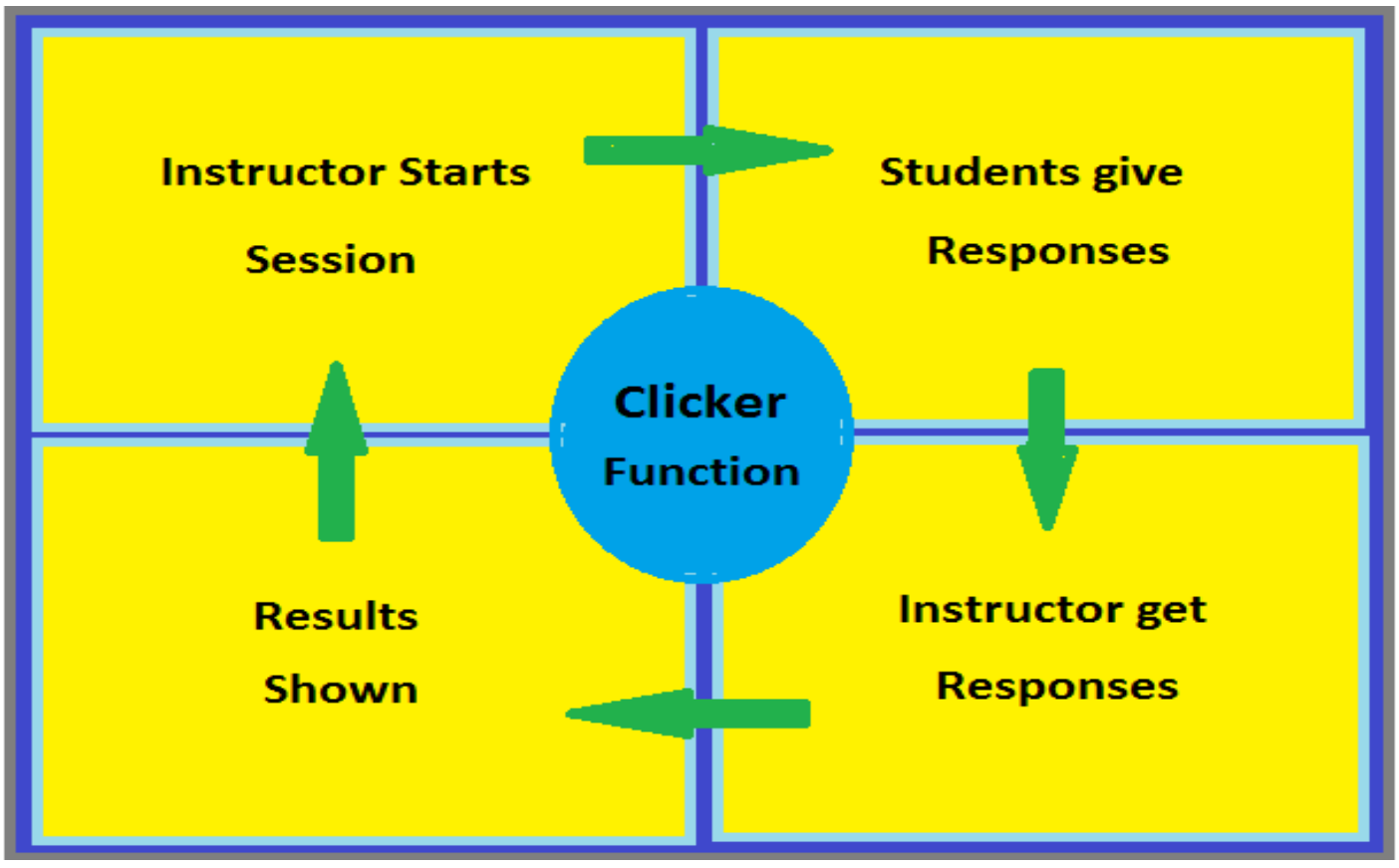
How do ARS(s) work?

The ARS functionality is based on three major components, a firmbase(s) connected to the instructor's system, student ARS remotes and application software which installed on a computer system to support any session. Each student is given an ARS remote that looks like any other regular (AC/TV) remote control. It has a number of buttons labelled as A B C D and E. Whenever any question is asked by the instructor, student presses one of the buttons as a response and a computer equipped with an application software records each student's response. Results are presented typically as a bar chart/Column as per the question asked and those can be projected in front of the class to show the percentage of various answers.



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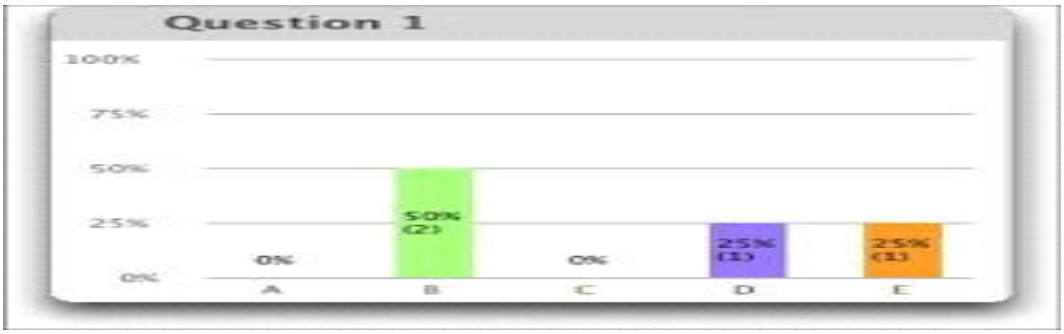

Types of questions that can be asked:

- Multiple choice questions
- Problem solving/numeric
- Opinion related questions
- Description based or subjective type

Advantages of ARS:

- There would be a zero probability of network conjunction while an active session is in progress
- It saves lots of time and thereby cost as instructors can do pre-assessment before starting their lecture started and hence saves time on queries
- Instructors can do post-assessment after the lecture has been completed to check students' understanding of the topic.
- No repeated lectures has to be done as instructor can understand what has been completed, what needs to be done, what the gaps are etc. through graphs

Disadvantages of ARS:

- **Cheating at student's end:**

  Like almost any other technology, ARSs can also be used in fraudulent ways. Swapping remotes is one such simple way in which frauds can be triggered.

- **Failure Issues:**

  ARSs can also have technical problems at any point in time given that it is an electrical product, although it is not expected to be a common occurrence.

Data Collection Process:

To use ARSs as a tool to collect data, the underlined process needs to be defined. Prior to use in the classroom, the instructor has to assign a specific ARS to a student. Through pre-assigned ARS, the student's answers can be collected and evaluated. An instructor has a handheld receiver that records these answers in the classroom.

Lessons Learned:

After undergoing this data collection method with ARS(s) for a school year, various lessons have been learned. ARS(s) allowed for large amount of data collection with least manpower. It's estimated that 25% extra time per instructor is available to invest in direct classroom education by developing this time-saving data management system. The significant time saved is the greatest advantage of this process. Portability requirements were also met and classroom assessment set up was relatively easier. This was due to the choice made to use a handheld receiver rather than a USB receiver that requires a computer as the collection vehicle. In addition, students responded to questions from written tests rather than questions shown on a PowerPoint presentation. This also reduces the set up time required by the instructor in the classroom.

Because internet access in rural public schools is limited, making use of a system not dependent on the internet was important. A stand-alone system was implemented so that data could be uploaded upon the instructor's returned to office, where network connectivity was accessible. Adding such a technology aspect to test, assisted in creating a more engaging tool for today's digital natives.

Limitations of Traditional Lectures:

No matter how good a teacher is, if some-one teaches solely by lecture, one may lose the attention of many of students half way through the lecture. A technology such as ARS can maintain a much higher level of student attention. Teachers strive to be clear and understandable and also motivate and inspire students. One does so at least in part because we expect that it will help the students learn more effectively. Certainly a dull, unclear presentation will discourage students from the class. But it is also true that the lecture format itself imposes limitations on one's ability to teach.

CONCLUSION:

As per the detailed information about ARSs we can conclude that the wireless technology is an effective tool to engage with students and to help them better understand the topic that is being taught. It's relatively reasonable, easy to use, and reliable and the most important feature of ARS is there is no need for internet connectivity to run a classroom session and have student provide responses.

ARSs provide a method to engage students in a learning environment, whether it is through peer instruction or to generate classroom discussions. ARSs are just a native technology and cannot replace any designed lectures, but its effectiveness in the classroom relies on solid teaching practices. Planning ahead is a must when using ARSs, from grabbing the technology to creating thought provoking, discussion generating queries /problems. ARSs can be used to tailor a class, but the teacher needs to be able to regulate his or her teaching so that more time is spent on complex topics and less time on topics readily understood. This is a promising technology and will be exciting to see how this shapes the education industry in the years to come.

About QA InfoTech:

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At QA InfoTech (an ISO 9001:2008, 20000-1:2005, 27001:2005 and CMMI Level III certified company), we specialize in providing independent offshore software testing and, unbiased software quality assurance services to product companies, ranging from the Fortune 500s to start-up companies.

Established in 2003, with less than five testing experts, QA InfoTech has grown leaps and bounds with its QA Centers of Excellence globally; three of which are located in the hub of IT activity in India, Noida, India and the other, our affiliate QA InfoTech Inc. Michigan USA. In 2010 and 2011, QA InfoTech has been ranked in the top 100 places to work for in India. For more details, please refer to our blog on this event.

"We assure the highest degree of Excellence and Accuracy in our engagements. Once you have placed your trust with us, rest assured we guarantee an elated peace of mind"

- **Mukesh Sharma, Founder & Chief Executive Officer**

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