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Mobile Audience Response Systems at a Continuing Medical Education Conference

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Abstract. **Background** Mobile audience response systems (mARS) are electronic systems allowing speakers to ask questions and audience members to respond anonymously and immediately on a screen which enables learners to view their peers' responses as well as their own. mARS encourages increased interaction and active learning. **Objectives** This study aims to examine the perceptions of audience members and speakers towards the implementation of mARS at a national medical conference. **Methods** mARS was implemented at the CSO Annual Meeting in Winnipeg 2015. Eleven presenters agreed to participate in the mARS trial. Both audience and presenters received instructions. Five-point Likert questions and short answer questions were emailed to all conference attendees and the data was evaluated. **Results** Twenty-seven participants responded, 23 audience members and 4 instructors. Overall, responders indicated improved attention, involvement, engagement and recognition of audience's understanding of topics with the use of mARS. mARS was perceived as easy to use, with clear instructions, and the majority of respondents expressed an interest in using mARS in more presentations and in future national medical conferences. Most respondents preferred lectures with mARS over lectures without mARS. Some negative feedback on mARS involved dissatisfaction with how some presenters implemented mARS into the workshops. **Conclusion:** Overall mARS was perceived positively with the majority of respondents wanting mARS implemented in more national medical conferences. Future studies should look at how mARS can be used as an educational tool to help improve patient outcomes.

Keywords. audience response system, CME, technology, medical education, conference

1. Introduction

Audience response systems (ARS) or mobile audience response systems (mARS), also known as clickers, are an electronic system that allows learners to answer questions and increase interactivity throughout a lecture. ARS immediately collect responses and can display the answers anonymously on a screen enabling learners to view their peers' responses as well as their own [1]. ARS initially involved the use of physical clicker technology but recently has been modified to use mobile technology such as phones or laptops. Mobile audience response systems are emerging technology used to benefit both the students and the speakers. Students have expressed improved attention,

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engagement and satisfaction of presentations with the use of clickers [2]. Speakers also have demonstrated positive perception of the use of clickers as students are more engaged and instructors can determine the students' understanding of topics in the presentation to recognize where to focus discussion [2]. The anonymous feedback allows more people to participate comfortably in discussion, thus increasing interactivity [2]. Additionally, the use of ARS has exhibited improved knowledge acquisition over traditional didactic, unidirectional lectures [1].

There are some perceived concerns with mARS including cost of ARS systems [3], time spent making and addressing the questions [3], as well as how to implement such technology into lectures.

There have been a number of studies on the perceptions of ARS in undergraduate, classroom settings, yet there are limited studies available on the perceptions of ARS at medical conferences. This study aims to examine the perceptions and attitudes of participants and speakers towards the implementation of ARS at a national medical conference.

2. Methods

A mobile audience response system was implemented at the CSO Annual Meeting in Winnipeg in 2015. The present study uses a mARS called TopHat. Eleven of forty-one presenters agreed to participate in the TopHat implementation trial. Both instructors and audience members were provided a text document and video instructions. Evaluation data was collected using questionnaires which included 5-point Likert questions and open answer questions. These included questions regarding their perceptions on the use of mARS at the conference which they rated as either "strongly disagree", "disagree", "neutral", "agree", "strongly agree". Comments were collected at the end of the survey. Questionnaires were voluntary and were emailed out to all conference attendees.

3. Results

Out of the 27 respondents, 4 used ARS as an instructor while 23 used ARS as an audience member. In this study, we considered responses of "agree" or "strongly agree" as a positive perception of the topic. With the introduction of mARS at the national medical conference, out of the 27 respondents, 67% percent of TopHat users found TopHat easy to use and 82% reported mARS improved audience involvement, attention and engagement. Fifty-nine percent of respondents felt the TopHat instructions were clear and 82% of respondents reported mARS helps to recognize audience's knowledge, opinions and understanding of the discussed topic. Furthermore, forty-four percent perceived mARS as containing a high educational value. See Figure 1. Fifty-two percent of respondents reported seamless integration of TopHat into presentations, 59% percent indicated that TopHat should be used in more presentations and 63% of respondents wanted TopHat to be incorporated into more CSOHNS Annual Meetings in the future. Sixty-seven percent of users indicated they prefer lectures with ARS over lectures without ARS, and 48% are interested in utilizing TopHat in their own lectures. Comments included enjoying the use of mARS, though some respondents

reported technical problems with responding to the mARS questions and dissatisfaction with how some presenters implemented the mARS into the workshops.

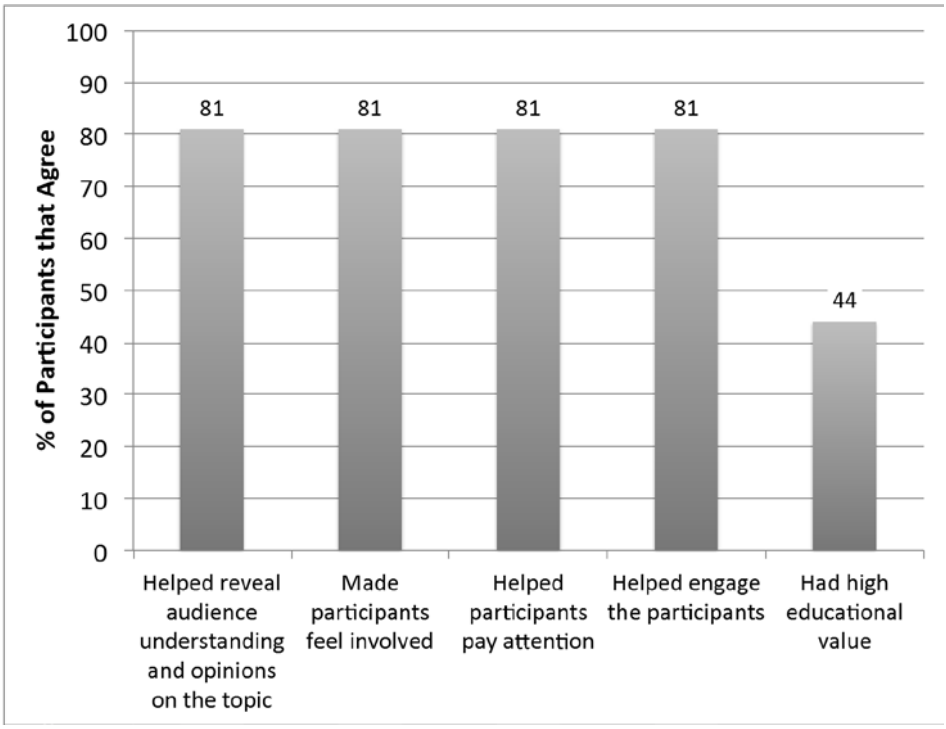

Figure 1. Attitudes towards using mobile Audience Response Systems in Conference Workshops

4. Conclusions

In this study, we assessed the perception of mARS in a national medical conference. The mARS was perceived as easy to use, and encouraged audience participation, engagement and attention during lectures. Respondents found TopHat instructions were clear and TopHat was able to help recognize audience's knowledge and understanding of topics. These findings are consistent with previous studies demonstrating positive perceptions on the use of ARS in learning environments, with reports of increased value and interactions in classrooms [4]. Another study concluded ARS increased attentiveness, enjoyment and engagement of learners [1]. Furthermore, studies report that students enjoyed comparing answers with their peers in an anonymous, immediate, real-time response system that ARS provided [5]. The anonymous component of the responses was beneficial over learners who volunteered answers which may be incorrect [6]. The display of anonymous answers allows students to actively discuss the topic and gives the instructor feedback as to when the students are prepared to move onto the following topic [6]. Similarly, ARS also helps to recognize when students require more learning on particular topics [3]. Instructors were not evaluated separately within this study but in previous studies, tutors reported that ARS helped better recognize students' understanding of topics, helped to focus teaching, increased

attendance, and improved student to student discussion as well as student to instructor discussion [8].

Further perceptions of ARS concluded from this study included 44% of respondents reporting ARS as having a high educational value. Other studies have indicated that ARS improved knowledge over that of traditional didactic lectures both immediately post-lecture as well as six to twelve weeks later [1]. Yet, the knowledge outcomes were the same as that of interactive lectures with integrated questions [1]. It seems the integrated and interactive component of ARS aids in learning outcomes rather than the technology itself. Interestingly, one study explored scores on questions in a first-year medical lecture and noticed significantly increased scores between ARS questions posed during the lecture and ARS questions posed after the lecture but only when similar questions were asked. The non-ARS questions scores, however, did not significantly improve [7]. Furthermore, active learning, such as with ARS, has been shown to increase attention, higher order learning and better examination performances [6]. Comments from the respondents in our study included technical problems with responding to the ARS questions as well as dissatisfaction with how some presenters implemented the mARS into the workshops and only 52% of respondents agreed that TopHat was integrated seamlessly into lectures. Thus, the low perception of learning value could be due to poor implementation of the mARS into the lecture and may not reflect actual educational value.

The majority of respondents felt TopHat should be used in more presentations and in the national medical conference in future years. Respondents also preferred lectures with mARS over lectures without mARS. Yet, only 48% were interested in utilizing TopHat in their own lectures. The lack of interest in implementing such technology may be due to a number of reasons. Previous studies explained underuse of ARS may be due to lack of knowledge behind the technology as well as concerns about the cost to implement the system [9]. Some respondents may be concerned about the lack of time and information/instruction available to create active learning materials and to implement it into the classroom as well as some have a high level of comfort with original didactic presentations [10], [9]. Similarly, one study discussed how 50% of tutors found it difficult to write the ARS questions in proper format [8]. Additional limitations for utilizing ARS include costs for the system, repairs, the time to train instructors on the use of ARS and the additional 3-5 minutes allocated in lecture per question leading to increased time required when using ARS. Additional time must be spent setting up and taking down the equipment as well as to create the questions [3]. These limitations can hinder the use of ARS in lectures and conferences.

Next, studies have postulated reasons which audience participants might perceive ARS negatively. These include the possibility for participants to lose motivation if they repeatedly answer the questions wrong and treating the program as fun instead of as a learning tool. It is important for instructors to ensure the purpose of ARS is acknowledged by students and the format, timing, and content of the questions are utilized to improve active learning [3].

Possible limitations to implementing mARS at conferences consists of acquiring internet access by audience members and faculty such as a cellphone or a computer which is required for mARS. Internet accessing devices, however, are becoming more and more prevalent amongst students and the general population [11].

Future ARS studies may involve larger sample sizes, and examining the ability to utilize ARS in a clinical setting and how it can be used as an educational tool to help improve patient outcomes [1].

To conclude, mARS has been overall perceived positively by the instructors and audience members attending the annual national medical conference. Respondents reported improved interaction, engagement and attention using mARS. mARS helped recognize audience understanding and opinions on various topics. Yet, mARS also garnered some negative feedback. The implement of the technology was not seamless, and effective implementation requires preparation of equipment and instructors, and changing of teaching strategies.

References

[1] L. E. Grzeskowiak, A. E. Thomas, J. To, A. J. Phillips, and E. Reeve, "Enhancing Education Activities for Health Care Trainees and Professionals Using Audience Response Systems : A Systematic Review," *JCEHP* **35** (2015), 261–269.

[2] M. Miller and S. Q. Hartung, "Evidence-Based Clicker Use : Audience Response Systems for Rehabilitation Nurses," *Rehabil. Nurs.* **37** (2012), 151–159.

[3] H. Thampy and Z. Ahmad, "How to...Use audience response systems," *Educ. Prim. Care* **25** (2014), 294–6.

[4] S. Zafar, S. Safdar, and A. N. Zafar, "Evaluation of use of e-Learning in undergraduate radiology education : A review," *Eur. J. Radiol.* **83** (2014), 2277–2287.

[5] L. E. Grzeskowiak, A. E. Thomas, J. To, E. Reeve, and A. Phillips, "Enhancing Continuing Education Activities Using Audience Response Systems : A Single-Blind Controlled Trial," *J. Contin. Educ. Health Prof.* **35** (2015), 38–45.

[6] P. H. Lenz, J. W. Mccallister, A. M. Luks, T. T. Le, and H. E. Fessler, "Practical Strategies for Effective Lectures," *Semin. Educ.* **12** (2015), 561–566.

[7] T. E. Mains, J. C. Jr, S. M. Milner, N. G. Shah, and H. Goldberg, "Do questions help ? The impact of audience response systems on medical student learning : a randomised controlled trial," *BMJ* **91** (2015), 361–367.

[8] K. R. Wait, B. A. Cloud, L. A. Forster, T. M. Jones, J. J. Nokleby, C. R. Wolfe, and J. W. Youdas, "Use of an Audience Response System During Peer Teaching Among Physical Therapy Students in Human Gross Anatomy : Perceptions of Peer Teachers and Students," *Anat. Sci. Educ.* **293** (2009), 286–293.

[9] C. P. Leung, A. P. Klausner, J. R. Habibi, A. B. King, and A. S. Feldman, "Audience response system: a new learning tool for urologic conferences," *Can. J. Urol.* **20** (2013), 7042–7045.

[10] C. J. Miller and M. J. Metz, "A comparison of professional-level faculty and student perceptions of active learning: its current use, effectiveness, and barriers," *Am. Physiol. Soc.* **38** (2014), 246–252.

[11] F. Kuhbeck, S. Engelhardt, and A. Sarikas, "OnlineTED . com − a novel web-based audience response system for higher education . A pilot study to evaluate user acceptance," *GMS Z. Med. Ausbild.* **31** (2014), 1–13.