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Title: An Innovative Approach to Enhancing Continuing Education Activities for Practicing Pharmacists Using Clicker Technology

Running Head: Enhancing Continuing Education Using Clickers

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Abstract

Objective: To evaluate the use of an Audience Response System (i.e. clickers) as an engaging tool for learning and examine its potential for enhancing CE activities.

Methods: Attendees at a symposium were invited to utilise and evaluate the use of clickers. Electronic data relating to participant demographics and feedback were collected using clickers during the symposium.

Results: The 60 attendees who used the clickers were mostly pharmacists (76%) who worked in hospital pharmacy practice (86%). Attendees strongly agreed or agreed that clickers were easy to use (94%), enhanced interaction (98%), allowed comparison of knowledge with that of their peers (78%), brought to attention their knowledge deficits (64%) and should be used again (94%).

Conclusion: The innovative use of clickers at the symposium was very well received by all attendees and offered a number of benefits, including the ability to provide a more engaging and interactive CE activity.

Key Words: Audience response system, clickers, continuing education

Introduction

Significant potential exists in using Audience Response Systems (referred to herein as clickers) to enhance the provision of continuing education (CE) material for practicing healthcare professionals, including pharmacists.

Clickers are an electronic tool, known as keypads, which enable participants to answer questions electronically during a presentation.^[1] Responses are tallied instantaneously and are displayed on screen, allowing participants to anonymously assess the accuracy of their answer and compare their performance with that of the group.

The use of clickers supports key learning principles by promoting learner interactivity, enjoyment, application of knowledge, commitment to an answer, prompt formative feedback and opportunities for reflection on knowledge.^[2-4] These aspects have been shown to increase information retention and promote 'deeper' approaches to learning.^[4] While using clickers has been demonstrated to offer numerous benefits above traditional didactic lectures in the setting of undergraduate education^[1], few studies have investigated their use amongst practicing healthcare professionals^[5-10], with none specifically involving practicing pharmacists. Studies involving practicing healthcare professionals have predominantly involved the evaluation of CE activities for medical residents, with all studies demonstrating clear benefits in relation to enhanced learner^[5-10] and/or speaker^[5] satisfaction. Effects on immediate and long-term knowledge retention are less consistent,^[5, 6, 8, 10] with 3 out of 4 studies demonstrating improvements in immediate^[5, 8, 10] and long-term knowledge retention^[6, 10] with the use of clickers compared to traditional didactic lectures.

Based on available evidence, well-designed CE activities incorporating clickers have the potential to increase interactivity, learning motivation, cognitive involvement, attendance and enjoyment and improve retention of knowledge.^[1] Therefore, the aim of this study was to evaluate the use of clickers as an engaging tool for learning and examine its potential for enhancing CE activities.

Method

Study participants consisted of attendees (N=60) at the Society of Hospital Pharmacists of Australia (SHPA), South Australian and Northern Territory Branch Committee's, 2012 Autumn Symposium. SHPA is a professional body which represents around 3,000 pharmacists, pharmacy technicians and associates practising in all parts of the Australian health system (www.shpa.org.au). All attendees (N=60) at the 2012 Autumn Symposium were invited to utilise and evaluate the use of clickers (TurningPoint Audience Response System; Turning Technologies, LLC, Youngstown, Ohio) which were incorporated within presentations.

Electronic data relating to participant demographics and feedback were collected using clickers during the symposium. Following the symposium, attendees were provided an email record of their participation in the CE activity which included each of the multiple choice questions asked during each presentation, their own answer, suggested answers and justification as determined by the presenter and a peer performance comparison.

As this study was undertaken for the purpose of internal quality assurance of the routine provision of CE activities under the auspices of SHPA, this study was exempt from formal ethics approval. However, written informed consent was obtained from each participant to approve the use of their de-identified data for publication.

Results

The use of clickers was evaluated by 60 event attendees, with participant demographics presented in **Table 1**. The majority of respondents strongly agreed or agreed that the use of clickers was easy (94%), enhanced interaction (98%), enabled them to compare knowledge with that of their peers (78%), brought attention to their knowledge deficits (64%), and that they would like to use it again in the future (94%) (**Table 2**).

Discussion

The innovative use of clickers at the symposium was very well received by all attendees and offered a number of benefits, including the ability to provide a more engaging and interactive CE activity and provide participants with real-time feedback.

Additional benefits of clickers include the systematic manner in which responses are collected during presentations. Presenters are able to utilise these responses to evaluate the participant's knowledge of the topic being presented and therefore modulate their presentation to suit the needs of their audience. For example, if many respondents answer a question incorrectly, the presenter is able to provide further clarification until they are satisfied that the concept is understood. Additional benefits included the ability to accurately record participant responses and email participants a copy of the questions, their responses, desired responses with justification and a collation of responses from their peers. This not only assists them in recording their CE activities, but it also maximizes learning outcomes by providing further opportunities for reflection.

There are a number of challenges associated with the use of clickers. Presenters must be familiar with the system and be willing and able to incorporate questions during their presentations and the development of high quality questions can prove challenging. Furthermore, despite increased interactivity and ease of use, participants still need to be willing and able to participate during presentations. Lastly, technical difficulties can arise (i.e. flat batteries, receiver error) that interfere with the ability to record participant responses.

A limitation of this study was that it was not designed to evaluate the use of clickers in improving knowledge outcomes. Previous studies undertaken amongst practising healthcare professionals have demonstrated positive effects on knowledge outcomes,^[5-10] although whether improved learning outcomes relate to the use of clickers themselves or the interactiveness they provide/promote is not yet clear.^[10] This will only be able to be addressed through an appropriately designed RCT. A further limitation of this study is that it evaluated the use of clickers amongst a group of predominantly hospital pharmacists. Therefore, these results may not be generalisable across the entire pharmacy profession. In addition, it is possible that participants reflected a group of more engaged members of the profession as they consisted of attendees who had registered for a CE activity. Of further interest is whether the use of clickers enhances learner engagement and subsequent willingness to participate in CE activities.

Conclusion

While feedback regarding the use of clickers is overwhelmingly positive, future research should address whether their use results in improved learning outcomes amongst

practicing healthcare professionals. These results suggest the use of clickers may be an innovative and creative educational tool that could help practicing pharmacists not only become more efficient, effective and engaged learners but also better educators.

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Table 1 **Participant Demographics**

	Number (%) ^a
Total Number of Participants	60 (100)
Years in Pharmacy Practice, years	
0-4	18 (31)
5-10	11 (19)
11-20	12 (20)
≥ 21	18 (31)
<i>Missing</i>	1
Current Role	
Pharmacy Technician	8 (14)
Pharmacy Student	2 (4)
Intern Pharmacist	4 (7)
Pharmacist	44 (76)

<i>Missing</i>	2
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Current Place of Employment

Hospital Pharmacy	51 (87)
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Community Pharmacy	2 (3)
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Other	6 (10)
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<i>Missing</i>	1
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Previously Used an Audience Response

Device

Yes	38 (70)
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No	16 (30)
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<i>Missing</i>	6
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^a Percentages may not add up to 100 due to rounding

Table 2 Responses to Questions Evaluating the Use of Clickers at the Symposium					
	Number (%) [‡]				
Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Using clickers was easy	46 (94)	3 (6)	0	0	0
Using clickers enhanced interreaction	28 (61)	17 (37)	1 (2)	0	0
Using clickers enabled me to compare my knowledge with that of my peers	16 (33)	22 (45)	7 (14)	3 (6)	1 (2)
Using clickers brought to my attention my knowledge deficits	5 (12)	22 (52)	11 (26)	3 (7)	1 (2)
I would like to use clickers again in the future	35 (74)	9 (19)	3 (6)	0	0
[‡] Percentages are calculated from non-missing data					

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