An Exploratory Study of Clickers among Students at a Malaysian Tertiary Institution

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Abstract
The purpose of this study is to provide an initial assessment on the use of clickers for large class instruction as experienced by students at an Australian branch campus in Malaysia. Clickers were used in a 14 weeks civil engineering 1st year course. During the 10th week, students were asked to complete a questionnaire that asked for their views on the use of clickers in the instructional process and how they perceived clickers in assisting their learning. Data from 53 complete questionnaires were analyzed using descriptive statistics of frequencies, means and standard deviations. In addition, independent t-tests were used to look for gender differences. Clickers are fairly easy to use, and provide a fun way to quickly turn traditional classroom lectures into interactive learning experiences. Students overwhelmingly like using clickers and believe that they increase their learning. Findings from this paper can provides lecturers embarking on integrating clickers in their large class lectures with guides and pitfalls to consider in planning their instructions. This paper contributes to the literature on the use of innovative technology such as clickers in large class lectures in the Malaysian higher education context in particular and Asian context in general.


Introduction
In textbook driven learning environment, lecturers often lectures to deliver the main points in the chosen textbook, elaborate on them, and in certain instances, ask students some questions or allow them to ask questions. Cobb (1994) states that the literature argues that lectures are inherently ineffective for promoting learning. In addition, lecturing goes against the constructivist idea that learning involves the use of currently available knowledge to construct new understandings. However, although lecturing is generally perceived as a poor way to assist learning, at times, a lecture is just what students need to organize their knowledge and propel them to a new level of understanding (Schwartz & Bransford, 1998). Furthermore, in large classes, such as in introductory courses in universities, it is often difficult to teach in any other way.

Bransford et al (2000) state that a problem with lectures is that the understandings and representations that students construct may seem fine to them, yet could include assumptions or preconceptions that are problematic but undetected, omit crucial distinctions intended by the lecturer, and fail to specify the conditions under which the knowledge is useful. Lectures often could not make students’ thinking visible to both the students and the instructor.

While the students are allowed to ask questions in large class lecture, often they don’t know that they are misunderstanding, are too confused to know the exact question to ask, or are too shy to ask a point that they think is problematic only to them. Lecturers have trouble estimating how much time to spend on a student’s question as the knowledge state of one who asked the question does not represent the class as a whole. In addition, students who are outgoing may ask frequent questions and over time may unduly influence how class time is spent (Schwartz & Bransford, 1998). In lectures, when the assumptions and thoughts of students are not made visible, it is easy for them to superficially understand, miss the opportunity to confront their preconceptions, and fail to learn the conditions under which new knowledge is applicable.

However, the availability of new technologies has made it possible to transform one-way-transmission classes into interactive sessions enabling students’ thinking to be made more visible. Many lecturers at higher education institutions are beginning to use classroom technology that allows students to respond and interact via small, hand-held, remote keypads called audience response system which enables lecturers to instantaneously collect students’ responses to posted questions (Caldwell, 2007).
responses can be compiled instantaneously and both the instructor and the students can have a visual representation of the knowledge state of the class as a whole. At the present time, most of these systems require students to respond to multiple choice questions. Multiple choice questions, if properly constructed can assist lecturers to assess what students understand (Mestre, 1994). Uses of this technology vary widely such as for spicing up standard lectures with periodic breaks, assessing students’ opinions or understanding related to a lecture, increasing interactivity and managing collaborative learning activities (Caldwell, 2007).

Audience response systems are commonly called "clickers" or "key pads" in the United States, and "handsets" or "zappers" in the United Kingdom (Simpson & Oliver, 2006). The “clickers system” consists of a student with a transmitter (clicker) that looks very much like a small TV remote control (Figure 1). A clicker has a number of buttons, typically labelled 1/A, 2/B, 3/C and so forth. The classroom has one or more wall-mounted receivers that pick up the signals generated when a student pushes one of the buttons, and a computer equipped with software to record each student’s response to a posted question. Results are presented without student names attached, typically as a bar chart that can be projected in front of the class to show the percentage of various answers.

![Figure 1](image1.png)

**Figure 1** A clicker system consisting of transmitter and receiver

A multiple-choice question is usually put in front of the students in the form of PowerPoint, or Microsoft Word and the students' responses can be tabulated as shown in Figure 2.

![Figure 2](image2.png)

**Figure 2** A multiple choice question and students' responses

Most clickers systems are relatively easy to use and only require an intermediate level of computer skills, thus freeing lecturers to consider pedagogical rather than technical concerns in the use of clickers in classrooms (Parsons, 2005).

Clickers can make a class more of an active learning experience. Students can see what others in the class are thinking about the problems presented in the lesson. If a student does not understand the given
question, he or she is aware that there are many other students who are similarly confused. If a student understands but there are many others who didn’t, then he or she could appreciate why the lecturer had to spend time to make things clearer to those who needed help. When other individuals explained the reasoning behind the different answers, it assisted him or her to better appreciate the range of possible ways to think about problems that were posed. Figure 3 shows an example of students discussing and sending their responses using the clickers’ transmitters.

![Figure 3](image)

**Figure 3** Students using the clickers in a large class lecture

The use of clickers enhances the learning environment (Mayer et al., 2009) and makes learning active (Wood, 2004). It is knowledge-centred as incorporating clicker questions into the lecture noticeably helped keep students focused by restarting their attention span with each new question. It is learner centre as the clickers provided an unexpected way to chat with students prior to class.

Caldwell (2007) states that if the initial questions are well crafted it can provide information on students' prior knowledge, intuitive ideas about the physical world and culture background that can promote or hinder the process of learning the new content. Learner centeredness thus requires formative assessment in the learning process (Wood, 2004). Using clickers make the learning environment assessment centered. Using clickers results in making students’ feedback anonymous and helped to reduce fears and increased students’ willingness to participate in questions and answers in class (Jackson & Trees, 2003). Clickers are especially designed for this purpose as it allows the instructor to pose questions and challenges frequently and to see what students understand. In addition, Clickers made the process fast and efficient. It is community centered as effective questions can promote class discussion among students and can results in more questions from students than compared to classes taught without clickers (Caldwell et al, 2006). Students worked collaboratively to help one another to learn.

**Purposes of the study**

Though there are considerable interests on the use of clickers in higher education institutions, few research on the impact of using clickers in these institutions exist (Moreau, 2009). Furthermore, in the Malaysian although there are article that discusses the advantages of using clickers for the new generation of students entering universities (e.g. Mantikayan & Ayu, 2010; Ramlee, 2011), there is a lack of empirical studies in this area. Thus, this study, aimed to explore students views on the use of clickers in a large class instruction at a branch campus of an Australian university in Sarawak, Malaysia. In addition, this study also examined gender differences in the students’ views on the use of clickers.

**Literature Review**

Higher education literature provides examples of successful experiences with clickers (Hoffman & Goodman, 2006). Clickers are used in both large and small educational institutional settings (Caldwell, 2007). Clickers have been used in classes ranging from 15 students (Draper, 2002) to more than 200 students (Cue, 1998). Thus, clicker technology can effectively support both small and large groups teaching. In addition, clickers has been integrated in a courses from different disciplinary fields such as astronomy (Duncan, 2007), nursing (Halloran, 1995), communication (Jackson & Trees, 2003), computer science (Draper, 2002), mathematics (Caldwell et al, 2006), physics (Dufresne et al, 2000), biology (Hatch et al, 2005), medical and dental education (Draper, 2002), psychology (Draper, 2002; Morling, McAuliffe
et al, 2008), business (Beekes, 2006), and economics (Simpson & Oliver, 2006). Nichol and Boyle (2003) also state that clickers have been used in different types of instructional formats such as tutorials, formal standard lectures and collaborative learning.

One of the characteristics of clickers is its ability to enhance classroom questioning (d’Inverno et al, 2003). In face-to-face settings, it has been noted that the efficacy of questioning and interaction is reduced in proportion to an increase in classroom size. This is attributed to difficulties lecturers faced in effectively managing interactions in large classrooms and the natural tendency of students to feel shy in speaking up publicly for fear of peer disapproval or embarrassment (Caldwell, 2007). Clickers can overcome these constraints as they allow for students responses to questions to be anonymously collated, accurately tallied and quickly displayed. In addition, clickers-supported questioning can help reveal students’ misunderstandings and allow for prompt remediation by lecturers (Wood, 2004). In addition, based on students’ responses to posed questions, lecturers are able to modify subsequent directions of instruction to align them with current levels of student conceptual understanding (Caldwell, 2007). In short, clickers can offer constructive feedback to both students and teachers and enable students to become more active participants rather than be peripheral observers in the classroom (Beekes, 2006).

A number of studies have compared courses that used clickers against those that have used other methods of instructions and according to Knight and Wood (2005) most have reported that the use of clickers either improved or did not harm students’ performance. The improved student performance has been attributed by some researchers to clickers’ enhancement of the formative assessment process (MacArthur, 2010). Poulis et al (1998) based on data from chemistry, physics, and various engineering courses reported that the use of clickers enhanced passing rates. In addition, Hall et al (2005) noted improvement in student grades when clickers were used in a high enrollment general chemistry course. Hall et al. (2005) likewise, attributed the improvement to formative assessment, as in their study, clickers were used as a quiz to measure student preparation at the start of each class. However, there have studies to the contrary, such as Kennedy and Cutts (2005) who were unable to find evidence for increased learning due to formative assessment provided by clickers in a computer science course. Paschal (2002) used an experimental research to compare courses with and without use of clickers. The experimental group was given in-class questions using clickers and quizzes on reading assignments while the control group did not have in-class questions or reading quizzes but completed homework assignments. Paschal (2002) reported no statistically significant difference between the experimental and control group.

Another advantage of clickers is the affordance of interactivity. Some lecturers adopted clickers to compensate for passive, one-way communication inherent in lecturing and also to maintaining students’ concentration in class (Caldwell, 2007). Mazur (1997) reported significant gains for the pre-test to post-test scores for physics students using clicker technology over those who did not. Mazur posited that this gain is due to the interactive pedagogy made possible by clickers. Clickers promote learning interactivity and engagement in clicker-enabled classrooms by providing instantaneous feedback during teaching (Beekes, 2006). Boyle and Nicol (2003) reported that students felt most engaged when they were discussing topics with their peers and when immediate feedback was presented in class. Yourstone et al (2008) based on their design experiment study with 190 undergraduate students found that the immediacy of feedback provided by clickers and discussions based on the feedback helped students who used clickers to outperform their peers who did not use clickers in test scores.

In addition, many lecturers adopted clickers to supplement linear teaching and surface-passive learning dominant in traditional lectures (Caldwell, 2007). Some institutions also adopted clickers hoping to stem high attrition rates in sciences courses by making lessons more interactive and less impersonal (Burnstein & Lederman, 2001). Morin et al (2009) reported that clickers increased students’ class participation. Kay and LeSage (2009) reported that some of the benefits of using clickers included positive student attitudes towards clickers, increased student attention, higher interest and engagement levels during classes (Kay & LeSage, 2007). Using clickers to emphasize key concepts at the beginning of the class is useful for checking understanding and enabling students to focus and settle down at the beginning of the class (Elliot, 2003). Clickers can be helpful in sustaining attention and breaking up contiguous content.
Beatty et al. (2006) conclude that students who have used clickers are generally positive and enthusiastic about their effects on the classrooms environments and can contribute to students learning. Beekes (2006), Fitch (2004) and Laxman (2011) reported that students like using clickers and overall they are good active learning tools. Students perceived value in clickers use in classrooms (Martyn, 2002). Students found clickers easy to use (Morin et al., 2009) and the use of clickers are enjoyable, helpful, and should be used in class (Beekes, 2006; Jackson & Trees, 2003; Simpson & Oliver, 2006). Clickers were reported as helping in learning and enhance concentration (Elliot, 2003; Beekes, 2006) and making lecturers more aware of students’ needs and problems (Knight & Wood, 2005). The use of clickers also made students more accountable for pre-class preparation (Knight & Wood, 2005). Students prefer the anonymity in answering questions provided by clickers and enable them to learn collaboratively (Caldwell et al, 2006). Generally, the students believed the use of clickers have more positive advantages than disadvantages. Some of the disadvantages voiced by students include technical and software glitches, lecturers' lack of experiences, time consuming especially at the initial stages, preference for competitive rather than collaborative learning and monitoring of students presence in class (Halloran, 1995; Knight & Wood, 2005; Simpson & Oliver, 2006).

Nonetheless, although clickers are a boon because of the ease with which clickers can engage students in frequent formative assessments (Roschelle et al, 2004), lecturers should focus students attention on the reasoning involved rather than the correct answer per se (Dufresne et al, 2000). In addition, lecturers need to prepare good questions for the clickers classes (Draper, 2002).

While the integration of clickers creates opportunity for all students to be actively involved in large lecture classes, there is no guarantee that all students will take advantage of the affordance provided by the technology (King & Joshi, 2008). Some students will be more comfortable using the technology than others. King and Joshi (2008) state that many factors could contribute towards students’ decisions to use technology such as types of course, gender, age, learning styles, and personality. Some studies have suggested that females have lower comfort level with technology and attributed the difference to males usually spending more time with technology (Enoch & Soker, 2006; Koohang, 2004). Nonetheless, there are studies that observed no significant gender difference in technology use (e.g. Davis & Davis, 2007).

In terms of integrating clickers in higher education, Rie and Binz (2006) stated that perceptions on the use of clickers may be influenced by students’ demographics such as gender age, and experience with large class lectures (Rie & Binz, 2006). For example, MacGeorge et al (2008a) studies three large lecture classes and concluded that female students like using clickers and viewed the use of clickers more positively than male students. Lorenzo, Crouch and Mazur (2006) posited that female students prefer active learning, interactivity and frequent feedback as compared to male students, all of which are characteristics of clickers. King and Joshi (2008) further observed that female students were more likely to use clickers. However, MacGeorge et al (2008b) also reported no significant gender differences in perceptions of clickers use.

Research Methodology
A cross-sectional survey research was carried out to answer the research questions. Questionnaires were administered to 97 students registered for a civil engineering course in an Australian branch campus in Malaysia. However, only 53 complete questionnaires were used for the analysis. The course on ‘sustainable design’ studies the global carbon crisis and the incorporation of sustainable development and initiatives in various areas. Therefore, the use of clickers were considered appropriate to enhance students’ participation, to obtain their feedback on recent development, to determine their standing on sustainable and environmental issues, to assess their understanding on the important concepts in the unit and to create an active learning environment. The clickers were used once a week during the 14 weeks of lecture. A survey questionnaire consisting of closed-ended items were developed by the researchers based on research instruments use in past studies overseas (e.g. Duncan, 2007; Martyn, 2007; Morling et al, 2008; Morin et al, 2009; MacGeorge et al, 2008a, 2008b) to obtain students' views on the use of clickers in the classroom (nine items) and how it effects their learning (eleven items). The questionnaires were administered to the students at the end of week 10 of classes. Data were analyzed using descriptive statistics of frequencies, means and standard deviations. In addition, independent t-tests were used to look for gender differences.
Results

The Cronbach Alpha values computed for the survey questionnaire indicated as shown in Table 1 indicated that the questionnaire was sufficiently reliable as they were above the recommended 0.7 (Nunnally & Bernstein, 1994).

Table 1  Reliability coefficients of the questionnaire.

<table>
<thead>
<tr>
<th>Survey on students’ views on the use of clickers</th>
<th>Cronbach Alpha Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey on students’ views on the impact of clickers on their learning</td>
<td>0.890</td>
</tr>
<tr>
<td></td>
<td>0.910</td>
</tr>
</tbody>
</table>

Referring to Table 2, in general, the students held positive views on the use of clickers in their classroom (mean = 3.04, standard deviation = 0.694). They found that clickers have made their class more enjoyable and easy to use. In addition, they found that lecture times were better with the use of clickers compared with traditional lecture. They reported that the classroom session with clickers were well organized and would like to see more use of clickers in their classes. Furthermore, the students believed that the use of clickers has helped them to learn key principles in the class, keep their attention in the class, and make their large class experience more like that of a smaller class. However, the students did not feel that the use of clickers will help improve their grades.

Table 2  Students’ views on the use of clickers.

<table>
<thead>
<tr>
<th>Overall for nine items</th>
<th>Responses</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SD</td>
<td>D</td>
<td>A</td>
</tr>
<tr>
<td>1. The use of clickers has helped me to learn key principles in the class.</td>
<td>1 (1.9) 7 (13.2) 39 (73.6) 6 (11.3)</td>
<td>2.94</td>
<td>0.569</td>
</tr>
<tr>
<td>2. The use of clickers has helped keep my attention in the class.</td>
<td>3 (5.7) 6 (11.3) 34 (64.2) 10 (18.9)</td>
<td>2.96</td>
<td>0.733</td>
</tr>
<tr>
<td>3. The use of clickers has made this class enjoyable.</td>
<td>2 (3.8) 0 (0.0) 33 (62.3) 18 (34.0)</td>
<td>3.26</td>
<td>0.655</td>
</tr>
<tr>
<td>4. Clickers are easy to use in the class.</td>
<td>1 (1.9) 3 (5.7) 19 (35.8) 30 (56.6)</td>
<td>3.47</td>
<td>0.696</td>
</tr>
<tr>
<td>5. Clickers used for the class would help to improve my overall final grade.</td>
<td>5 (9.4) 26 (49.1) 18 (34.0) 4 (7.5)</td>
<td>2.40</td>
<td>0.768</td>
</tr>
<tr>
<td>6. I would like to see the use of clickers in more of my classes.</td>
<td>2 (3.8) 1 (1.9) 35 (66.0) 15 (28.3)</td>
<td>3.19</td>
<td>0.652</td>
</tr>
<tr>
<td>7. I feel that the lecture time would have been better with the use of clickers compared with traditional lecture.</td>
<td>2 (3.8) 2 (3.8) 31 (58.5) 18 (34.0)</td>
<td>3.23</td>
<td>0.697</td>
</tr>
<tr>
<td>8. The session with clickers was well organized in the class.</td>
<td>2 (3.8) 6 (11.3) 32 (60.4) 13 (24.5)</td>
<td>3.06</td>
<td>0.718</td>
</tr>
<tr>
<td>9. The use of clickers helped my experience in this class to be more like that of a smaller class.</td>
<td>1 (1.9) 16 (30.2) 25 (47.2) 11 (20.8)</td>
<td>2.87</td>
<td>0.761</td>
</tr>
</tbody>
</table>

Note: 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), and 4 = Strongly Agree (SA)

As shown in Table 3, in general the students felt that the use of clickers have a positive impact on their learning (mean = 2.86, standard deviation = 0.741). They enjoyed their clickers based classes and found that it helped them stay focused and motivated to learn, increased their involvement in lectures and provided feedback during the lecture. In addition, using clickers helped them to verify understanding of certain concepts, assisted in validating learning, enhanced their learning, and increased interactions with
other friends. However, they were not convinced the use of clickers helped them in preparing for examinations or motivated them to attend classes.

Table 3  Students’ views on the impact of clickers on their learning.

<table>
<thead>
<tr>
<th>Responses</th>
<th>SD</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall for eleven items</td>
<td></td>
<td>2.86</td>
<td>0.741</td>
</tr>
<tr>
<td>1. Clickers helped me stay focused and motivated to learn.</td>
<td>2  (3.8)</td>
<td>5 (9.4)</td>
<td>37 (69.8)</td>
</tr>
<tr>
<td>2. Using the clickers helped me to verify my understanding of certain concepts.</td>
<td>1 (1.9)</td>
<td>16 (30.2)</td>
<td>26 (49.1)</td>
</tr>
<tr>
<td>3. Participating with clickers enhance my learning.</td>
<td>1 (1.9)</td>
<td>12 (22.6)</td>
<td>28 (52.8)</td>
</tr>
<tr>
<td>4. Participating with clickers increased my involvement in the lecture.</td>
<td>2 (3.8)</td>
<td>5 (9.4)</td>
<td>32 (60.4)</td>
</tr>
<tr>
<td>5. Participation with clickers increased my interaction with my other friends.</td>
<td>3 (5.7)</td>
<td>14 (26.4)</td>
<td>23 (43.4)</td>
</tr>
<tr>
<td>6. The use of clickers helped in my preparation for exams.</td>
<td>5 (9.4)</td>
<td>30 (56.6)</td>
<td>14 (26.4)</td>
</tr>
<tr>
<td>7. The use of clickers aided my own independent learning.</td>
<td>1 (1.9)</td>
<td>21 (39.6)</td>
<td>23 (43.4)</td>
</tr>
<tr>
<td>8. The clickers helped me to validate my own learning.</td>
<td>1 (1.9)</td>
<td>15 (28.3)</td>
<td>31 (58.5)</td>
</tr>
<tr>
<td>9. I enjoyed using the clickers in the class.</td>
<td>2 (3.8)</td>
<td>1 (1.9)</td>
<td>28 (52.8)</td>
</tr>
<tr>
<td>10. The use of clickers helped in giving me feedback during the lecture.</td>
<td>2 (3.8)</td>
<td>10 (18.9)</td>
<td>27 (50.9)</td>
</tr>
<tr>
<td>11. The use clickers motivate me to come to class.</td>
<td>5 (9.4)</td>
<td>21 (39.6)</td>
<td>22 (41.5)</td>
</tr>
</tbody>
</table>

Although it has been postulated that females tend to be better suited for technology use, the findings shown in Table 4 indicated no significant gender differences in students’ views on the use of clickers and its impact on their learning.

Table 4  Gender differences in students’ perceptions.

<table>
<thead>
<tr>
<th>Views on use of clickers</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>t</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>38</td>
<td>2.956</td>
<td>0.521</td>
<td></td>
<td>-2.012</td>
<td>51</td>
<td>0.052</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>3.259</td>
<td>0.415</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Views on effects of Clickers on learning</td>
<td>Male</td>
<td>38</td>
<td>2.770</td>
<td>0.529</td>
<td>-1.935</td>
<td>51</td>
<td>0.061</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>3.078</td>
<td>0.513</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The findings show that students viewed the use of clickers in their classroom in a positive light concurring with past studies such as Beatty et al. (2006), Beekes (2006), Fitch (2004), Morin et al (2009), Simpson and Oliver (2006) and Laxman (2011). The findings also indicated that the use of clickers was perceived as having a positive impact on learning. The clickers were easy to use and made learning enjoyable. The students would like to use clickers in class and they believed that it assisted their learning of important principles. These findings augmented similar findings reported by Beekes (2006), Jackson and Trees
The use of clickers also made them more attentive in class and provided a small class atmosphere. Kay and LeSage (2009) reported similar findings stating that the use of clickers increased student attention and resulted in higher interest and engagement levels in class. More importantly, the students enjoyed their clickers based lessons and it helped them stay focused and motivated to learn (Elliot, 2003). The use of clickers in the class focused students' attention on the lessons and provided the push for students to be involved in the large class lessons.

Furthermore, the students in this study reported being more involved in lectures and received feedback during the lecture. These findings augmented past studies such as Mazur (1997) and Yourstone et al (2008). Clickers increased opportunities for interactions among students and between students and lecturers during lecture times which traditionally are passive and lecturer-directed (Caldwell, 2007). In addition, clickers provide opportunities for lecturer to encourage the shy students and those at back of the class to voice their ideas and questions. These are usually students who will otherwise not contribute to class discussions and prefer to conform to popular opinions (Dangel & Wang, 2008). In addition, clickers engender peer learning and peer instructions have been found to be less threatening and enable learners (Wood, 2004). Clickers offer opportunity for implementing active interactive pedagogy during class time and encourage students to enjoy and participate in the lessons. Beekes (2006) suggests that integrating clickers into large class lectures can result in constructive and immediate feedback making students being active participants in the lessons. Nevertheless, lecturers need to note that other than being prompt, feedback needs to be directive and specific to be useful to students learning (Benson, Mattson & Adler, 1995). Beekes (2006) however, conclude that interactivity is an important characteristic of clickers based lesson. Clickers use enhanced learning, and increased interactions (Morin et al, 2009).

The findings of the study also indicated that the use of clickers motivated students to attend classes and helped them to validate their learning. Hansen (2007) observed that students expressed a positive view of clickers in terms of enhancing motivation. Yourstone et al (2008) and Elliot (2003) also reported similar findings that the use of clickers helped students to verify understanding of certain concepts and validate learning in their studies.

Yet, students in this study did feel that the use of clickers will improve their performance or assist in their examination preparation. Clickers in itself may not influence the quality of interactions as it is the quality of teaching that mattered. This finding is in consensus with what has been reported in the clickers literature which states that clickers like most other technology is not a panacea in itself in solving pedagogical conundrums (Wood, 2004; Parsons, 2005). In fact, there are few (if any) collections of good clicker questions available for most fields of educational studies (Jackson & Trees, 2003). Furthermore, the literature has noted that there is sometimes that clickers may not enhance examinations’ grades it generally does not harm students’ performances (Kennedy & Cuts, 2005; Knight & Wood, 2005). Some possible reasons include the quality of questions posed and lecturers' questioning skills; and how lecturers' focused students' attention on the reasoning rather than correctness of answers (Dufresne et al, 2000).

However, a positive finding from this study indicated that there were no gender differences in students' perceptions on the use of clickers. This finding contradicted several past studies such as King and Joshi (2008), Lorenzo et al (2006) and MacGeorge et al (2008a) which indicated that females tend to view the use of clickers more positively. However, due to the small sample size used in this study, the finding is not conclusive and more replications are required.

Conclusions
Although, the findings from the study showed positive perceptions on the use of clickers in large class lectures in the Malaysian higher education setting, more studies of similar nature should be conducted to validate these findings. In particular studies which are or the experimental research design investigating its impact on learning outcomes and also studies that elicit more qualitative data are of value. Nonetheless, the use of innovative technology such as clickers to support students learning in higher education should be encouraged.
However, it is important for educators to be aware that the benefits of clickers in enhancing the quality of teaching doesn’t happen automatically or overnight with the introduction of clickers within classroom contexts. Any type of technology is not of itself the magical bullet to solve educational problems. The success of the learning processes depends on the pedagogical ways in which technologies are embedded in the processes. Training on designing good clickers questions and applying effective questioning/facilitation strategies are important areas of training that need to be offered for lecturers development to promote more effective use of clickers in teaching and learning. More importantly, educators need to properly define and develop their instructional goals and carefully plan for clicker questions in class discussions to attain those goals (Dangel & Wang, 2008).

References


