

A Survey on using the UB Clicker in MAE 204
David Forliti
Department of Mechanical and Aerospace Engineering

Thermodynamics is a difficult subject for most students. It is one of the first engineering courses that undergraduates take, being different from physics in that the problems have (in my opinion) more detail, quantitative tables and graphs are used at a higher level, and there are a number of abstract concepts that are difficult to grasp. It is therefore a critical course, and is often a point of departure where students switch majors.

During the first few years that I taught thermodynamics, I employed active learning through in-class homework problems (sometimes collected and graded). A couple of years ago when the UB clicker was introduced, I felt that this technology had potential to improve learning through enhancing participation in active learning, particularly in a large classroom setting. It took some time to learn how to use it, but I was further motivated because I already was using powerpoint for covering the material, and integration of the questions was fairly straight forward. I have attached some examples of questions that I use in this class.

I use the clicker questions to get the class thinking at the beginning of class. I'll ask 2-4 quick questions, generally based on what was covered in the previous lecture, or older material that might be related to the upcoming lecture. I will then scatter typically 2-4 more questions during the lecture as appropriate. I'm sure all instructors notice that as students become inactive in class, they start to relax and become distracted (sometimes sleeping). The clicker questions do have the tendency to keep them alert, as do other active learning techniques.

My own philosophy is not to place too much weight on the correctness of the answers. I find it helpful to get the responses, and I will often divert my lectures based on the results of the clicker questions. The real-time feedback is truly useful. I also encourage students to talk to each other as they are thinking about the question.

I do collect the responses and it does get incorporated in the course grade. In a sense, it might seem like I am taking attendance, but that isn't my motivation. Interestingly, many students do feel they need to come to get the points, but in the end, they seem to value or appreciate that they have been nudged to come to class.

Below is a summary of a survey that I gave in class with specific comments on the clicker. There are approximately 170 students in the class, and about 110 responded to the survey. One of the issues that is a problem is the clicker costs approximately \$50. This cost could of course be balanced out by having other courses use the clicker. Unfortunately, there are some instructors in other departments that are using other clickers, whereas the UBclicker is meant to be the university standard. ITS has been made aware of this, and hopefully they can encourage instructors to adopt the university standard clicker. This puts a financial burden on the student, and hopefully will be addressed as it will stifle the proliferation of this technology which appears to improve learning. It appears that eventually certain cell phones and laptops can be used to submit responses, something I haven't been tracking very carefully at this point.

Please feel free to contact me if you have any questions or comments.

Question 1

Essay

Please comment on the UB clicker as it has been used in MAE 204.

Unanswered Responses

8

Given Answers

The clicker has been utilized well in the class. It may help to have questions more regularly interspersed throughout the lecture, rather than a clump of questions at the beginning or end.

This is the absolute best way to use clickers in a class. Having the questions throughout class keeps us attentive and gives both the instructor and us a good idea of how much we understand the material. And because they are mostly graded for effort, they are not resented but just another feature of class and serves as an encouragement to attend class.

I feel that the clicker has been a good tool in MAE 204. It allows for me to know if im doing the problems correctly right away. The clicker also keeps me in class so i dont miss the questions.

Honestly, I am in love with the UB clicker. I thought it was a waste of money at first but then I started to use it in class and it makes me pay attention, I know it sounds kind of nerdy but it is like a highlight of my day cause its exciting sitting there as the clock goes down and asking you self: "did i get it right? should I change it?" Honestly my sucess in this class has somewhat to do with the clicker and I will definately stand by that, Ill even write my name to back it up. It's Chris Kujawinski, ubname: cjk29

The clicker is a way to actively engage the class but as in general the lecture classes are too large to be effective in teaching the clicker will only slightly enhance the experience

I like using the ub clicker in class. It forces you to pay attention during lectures. This way your not drifting off. Also it helps force you go to class. I know personally there were days where i was thinking about skipping class, but because of the clicker questions I didnt want to loose the point. The clicker questions are an easy grade booster. The clicker are very simple to use. I wish there was some way that the students didnt have to purchase them.

I think the clicker questions are helpful when you have enough time to work through a question, and then see if you got the right answer.

Sometimes, when the timer is too short or doesn't function properly, it interferes and I am forced to input a random answer and never finish working or thinking through the problem. I wish the clicker questions were a little more frequent throughout each lecture to help keep students focused, and to check understanding after each topic is covered.

I'm not a huge fan of teh clickers, I really think they are just a shiny new toy that people are getting wowed into buying. I don't feel that they actually enhance the learning experience all that much, especially not to the tune of \$50. Basically they are flashy, over-priced and generally useless.

Most of the time, I get the impression that clickers are used in large classes as a way of taking attendance. In this particular class, I feel that it is used appropriately to forge a connection between concept and application of methods and formulas. This is actually the only class I have taken where the clicker has actually proven to be a useful tool.

The clicker makes it so that everyone can be involved in class. It gives teachers immediate feed back about whether or not the material is understood. Overall, its a great tool.

It has been very useful in learning the concepts. We have real time in class to work on simple problems. the only problem has been logistics with the timer.

The clicker has been used often in MAE 204. There are a decent amount of questions, so that it is okay if you do not get all of them right. Also, it helps keep students awake and paying attention in class. It also keeps attendance mandatory for class.

I think the UB clicker is a very helpful tool in class. It helps to give you direct feedback on whether you know the concept or not. The only problem I can see with them is the cost. But after that initial payment I would be more than happy to use them again.

I like the answers not being worth tons of points

I personally enjoy using the UBClicker in class. The clicker reenforces the materials in class and it helps to understand the material. Personally, if the questions were given after the slide set was done it would help as extra questions in class.

The timer is to fast for some of the questions.

The questions we use help us to pay attention and think about the problems but it sometimes doesnt work. I feel that we don't get enough time to go over the clicker questions, i would just prefer to do examples in class.

I like the clickers a lot. I find them very fun in class. It is sad to admit but I probably pay more attention because of them.

It does a good job of bringing some interactivity into the lecture -- it serves the dual purpose of keeping students awake while reinforcing the concepts taught.

good way to keep students awake

The clicker has been effective in helping students to understand concepts that are reviewed in lecture. I like how the grade is more for participation than correctness. It helps encourage class attendance and keeps students focused on the class rather than getting bored and dozing off.

It used in a good way. It helps force students to apply just learned concepts, as opposed to making them learn on the fly when doing homework.

The only downside I see is the fact that the clickers are arbitrarily expensive, and as a senior it will be the only class I have to use it for. Considering the thermo book itself is \$200 (read: also overpriced), another \$50 asking a bit much.

It's an easy grade so it's good.

I think using the clicker has helped me to learn in the lecture. I feel like I have to memorize every equation and concept in anticipation of the next clicker question.

i like the concept but if the school is going to adopt this clicker program they have to make a decision on a universal clicker so the students who are already struggling to get by money-wise dont have to buy more than one fifty dollar clicker. It helps to pay attention in big lectures

Put to very good use. Clicker questions help reinforce the material covered in class.

Used everyday in class for random questioning and attendance

I think that the clicker questions are a very useful way to keep up with concepts in class. It is definitely a good way to encourage attending and paying attention.

The UB Clicker has been used to record answers to various questions throughout the course of the semester. It has also been used as a method of keeping attendance in the class.

Good idea. Needs to go over solutions to questions even if the majority got it right. Some people guess and most people put whatever the kid next to them put even if they dont know how to do it

themselves.

Challenging and informative

I feel that the clicker is used too much, and many of the questions are not that important.

The UB clicker has been a great asset to MAE 204. It has enhanced the learning ability of the students, and allows them time to discuss among themselves the questions posted. Also it gives the professor instant feedback so that he knows if he needs to discuss the concept in further detail or if majority of the class understands it. Also the UB clicker can be good for the students when they realize they're not the only one who doesn't get it. That can be very comforting. On a side note it also keeps the students awake.

I feel it helps me stay more active in class and pay closer attention.

I do not have a clicker so I think my opinion is not important to this survey

Using the clicker in class helps keep attention and makes us think out problems however it is one more thing that has to be remembered for class and one more thing that I have to make sure that it is not broken while being carried in my backpack.

I love the clicker! It helps me stay awake and when I get a question wrong I star the topic to tell myself that I don't understand that section, and to read it over in the text. It allows interaction between other students. Being lectured for 90 minutes is a lot to sit through and the clicker really helps.

The clicker works fine with out any problems. Other issues that may affect false responses are absent.

It definitely helps you to understand the material better. Instead of just listening to the lectures and taking notes like other classes, you get a chance to participate and think during class.

I think it was a good idea to use it because it helps me stay focused in class and pay attention. long classes can cause you to become sleepy, with the clicker, you stay awake

Clickers perpetuate the detachment between teacher and student--as class sizes increase in there is a weakening relationship between teachers and students. Although they are a great method for teachers to get immediate feedback as to whether or not students have grasped a current topic, if relied on too heavily, it defeats the purpose of sharing a room.

I worry that people are losing the ability to publicly interact or make a

stance.

It is convenience for me to respond the questions, and allow me to keep on track of what the professor saying.

The UB clicker has been a useful tool in the classroom. It has been used to show how much of the class has grasped certain concepts and helped the instructor to know what material he should explain again. As a general comment about the clicker system, I feel that it is important to have a universal device that will work for all classes that choose to use them.

I like the clicker its nice to try and answer question and it helps me make sure i go to class

Keeps the class interesting and it adds a "spark" to the class. The allowability to talk to my classmates about t he answers makes it somewhat fun. I would only like other classes to use the clicker only if it's used the same way it's used on this class (MAE 204)

The clicker problems help keep people focused and awake during class. The questions help me understand the material.

The UB clicker is helpful. The in class questions helps keep me paying attention and helps with understanding the material.

I like it. It forces me to come to class and pay attention. It think it has helped me understand the material easier.

I think that the idea of having a clicker in class is excellent. It definitely helps keep me more involved in the lecture. Also, the policy that just pressing an answer in the clicker gives the student 90% of the points is very smart.

Some things that I would change are:

- For Thermo: Give a little bit more time for the questions
- General: make sure that every class using clickers on campus has to use the **UB** Clicker
(this should be enforced)

The UBlicks endeavour has been a relentless one to incorporate the latest technology into teaching and engineering in particular to facilitate tutelage. In MAE 204 this plan I believe has given rise to a teaching method of most difficult comprehensibility. I have attended lectures where I have answered fewer than half of the entire clicker questions because they are assigned right after they are taught or in jeopardy with time limits while the institutional facilities have limited reasoning to trends that have to be calculated with accuracy and precision. The topic does bring up the desire to learn but learning with the clickers I believe is learning that you do not know a lot of material

covered. This I believe if it stands alone as a measure of the entire process will be the only positive aspect to it. I also understand that this counts as a remarkable part of it since most of the grade of the questions are assigned based on answering at all not on the correctness of the answer but as a perfectionist, it seems difficult to comprehend.

the clickers make class more interesting and force you to pay attention

I like the way the clicker is used during this class as a way to keep us involved and check how well we understand the current material.

Although I do feel that since these questions do count towards our grade, that many times we are not given enough time to answer the questions. And I also feel that when a large portion of the class gets the question wrong, you should re-explain the material or try to help us understand it better.

The clicker has proven useful in class to keep students focused and alert.

Forces students to go to class or get a friend to answer for them to get the points Better clicker than iClicker, both should not be used Responseware would be a good alternative. Lets students use laptops, iphone, blackberry

I really enjoy the use of the clicker in thermodynamics. It helps me out because i get points for just coming to class. The ability to talk over the questions with the students sitting around me makes it exciting to see who got the correct answer.

The clicker has been great for helping me come to class, but the university needs to standardize its clicker usage so students aren't wasting money on 3 clickers.

It's used primarily to reinforce the theory behind the lectures. It ranges from simple concept questions to more obscure questions that make the user think.

I like it.

It helps you to feel more involved in the class.

I think that the clicker should be used at the beginning of class as a quick review of the last class. Then it should also be used at the end of class as a see how much you took in review. When used in the middle of class, by the time class ends, i dont remember what we really covered because most of the time you can infer what the answer might be based on the few minutes of lecture right before the question.

It helps me as a student to stay up to date with the material being

taught. however, its not helpful if you are not capable of grasping the logic of the topic on your first try.

I like how it allows the professor to see how many students understand the material, without calling on any students directly, or using a high-value assignment, like a quiz to see how many students do understand the material.

It works quite nicely; the professor uses a timer so the students know how much time they have left to respond to the question.

The UB Clicker has been used in an attempt by the professor to see how well the students understand the material.

I like the UB clicker and how it has been used in Thermodynamics because it engages me and allows me to better grasp the material.

They do help to make class interactive, but are dated technology.

My clicker has not been functioning properly for some time now. You said it would be alright if I wrote down my answers and sent them to you. Even though my clicker is dead, I still actively engage in all of the classes clicker questions.

I really enjoy using the clicker in this class. Since it is such a large class it is sometimes easy to get lost in the crowd but I find that with the clicker, it keeps me on point during lecture as well as helps me gauge my progress in understanding the current material. I also like the idea that most of the credit due to clickers comes from simply submitting any answer as opposed to the correct answer because it emphasizes how important attendance is to understanding the material.

Its not too bad.

I like the clickers, I wish they were used in more of my classes. It is less intimidating if a part of the class doesn't understand a concept and have the clicker responses show this than to have to speak up and yell across a lecture hall to a professor to go over something. Professors ask all the time, "Any questions?" during their lectures, but that is so general that most people won't say anything in a 150+ class. But if he asks a specific question and it shows that students don't understand he/she can clarify the problem. It also works when the whole classes understands a problem, the professor will not have to spend time on explaining the whole problem and how someone would go about solving it, if the class generally understands. It's a shame to spend \$50 on an over priced remote control, but it wouldn't be so bad if the students used it in more than one class room. In summary, they are great but need to be more widespread

It was difficult at times, but to student benefit. The program showed

and answer or timers didn't work. I like the break in talking to answer questions. It broke down the material into segments.

The clicker overall is a good idea. At times I feel rushed to try and figure out problems and submit a correct answer. I like the fact that it encourages me to come to class by improving my grade.

only reason i go to class so i guess its a good thing. most questions i would like professor to describe solutions more thoroughly.

For use in MAE 204, the clicker has been very helpful. It helps me to realize what topics I need to study more, it helps me realize what I really understand from lecture. I also think the repeated use of the clicker is what really helps students learn the material. However, in less complicated classes the use of the clicker would just be detrimental to the class. Forcing people to come to class when they don't want to just leads to more distraction for the people who come to class willingly.

The use of the clicker in Thermo has been a very positive one. It keeps the students in class and keeps them active.

I like it. It works to refresh my memory from the previous lecture and helps me make sure I get the current materials.

It works excellent at keeping me focused on the lecture. The questions really stimulate thinking that would not be there otherwise and I really appreciate that even if I get a question wrong it's not going to reduce my GPA. I think more classes should use this technology.

I like the clicker because it lets me know whether I am doing a problem correctly or not- but usually the explanation of the correct answer is too quick or not detailed enough for me to understand what I did wrong.

The clicker helps to think about material after we've learned about it, keeps it fresh in my memory at the time, but doesn't really help me do better on course material. It is good for concepts but what I have trouble with is setting up problems. ...I get the big picture, it's just the little steps in problems that I trip up on.

Helps understand what an actualy problem would be like and helps grasps concepts. Understand homework better and more attentive in class compared to classes without clicker questions

The use of the UB clicker was effective and easy.

it is very useful and it forces you to pay attention in class

It helps me pay attention during long lectures

The clicker has helped sway me to go to class every week and helps me concentrate on the topics. It's not as much of a hassle as I guessed it was going to be. My only wish is that administration steps in to make sure that all classes only use one type of clicker. That way students don't have to spend close to 100 dollars on the different clickers for each class.

the clicker is not a bad idea. i think it helps with some problems since we get the answers to it. i personally do not like the timer because i am a slower problem solver

Utilized very well, my only criticism is that for some of the questions where an equation was just introduced, we don't have the equation written down or memorized so we can't do the problem. Also, all classes need to use the SAME clicker, instead of one type per class.

The clicker is a very good idea. And the way that you use it is the best way. By randomly throwing in clicker questions, you force us to pay attention rather than just zone out the entire class. Also, the fact that they are worth a grade makes many people come to class. It also makes what were learning a little more interesting because it's not just you lecturing and us taking notes. Its you teaching, and us testing our level of understanding of what we just learned. Other classes use the clicker as just a quiz taking tool, asking only one question every other lecture. Because there is only one question, most people just leave as soon the answer it. Your method is much better.

it has been helpful in understanding the material

It is really useful system to influence how many stidents do they understand the contents of the class.

The clicker gives me motivation to come to class and forces me to pay attention and try to answer problems that follow the material being learned. They have helped me a lot in my class attendance and my overall understanding of concepts mentioned in class. It also provides me with a good grade that helps my average just by attending class. I recommend using clickers for every class at UB.

The clicker has allowed me to test my basic understanding of the topics covered in class. This has helped me in that if I cannot answer a clicker question, I know which topics I need to re-read in order to be prepared for the homework and exams. I feel that the clicker question difficulty is perfect in that the questions can be answered rather quickly while still testing what was just learned without being too hard or too easy.

I enjoy the use of the clicker, it gives me motivation to attend class as well as it keeps me involved with the material.

The clicker makes students participate and pay attention in class. It is also a good review of the topics covered in lectures. Prevents students from falling asleep, and motivates students to attend class regularly.

The clicker was a great addition to the class. It definitely motivates people to go to class and helps people understand the material.

Question 2 Multiple Choice

The UB clicker is used in this class to improve the educational experience through active learning. In your opinion, how effective has the clicker been in enhancing learning?

Answers	Percent Answered
very effective	50%
moderately effective	46.078%
not effective	3.922%
<i>Unanswered</i>	0%

Question 3 True/False

I would like other large classes at UB to adopt the UB clicker.

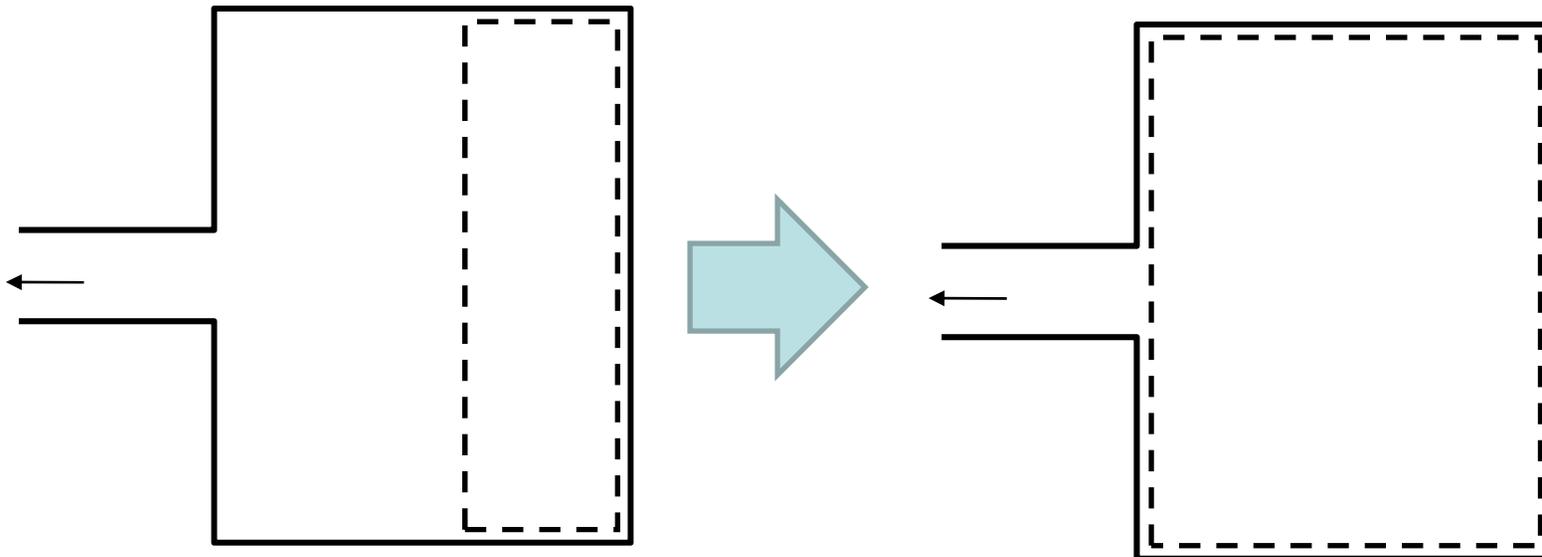
Answers	Percent Answered
True	77.451%
False	22.549%
<i>Unanswered</i>	0%

Consider the closed system described below. If the draining process is adiabatic, and the fluid is an ideal gas, what happens to the temperature of the gas that remains in the tank as the tank drains?

33% 1. It increases

33% ★ 2. It decreases

33% 3. Its stays the same (isothermal)



The volume flow rate of saturated vapor water at 300 kPa is $2 \text{ m}^3/\text{min}$. What is the mass flow rate in kg/s?

20% 1. 0.020 kg/s

20% 2. 1.21 kg/s

20% ✓ 3. 0.055 kg/s

20% 4. 3.30 kg/s

20% 5. 198 kg/s

What is the internal energy of air at 700 K?

20% ✓ 1. 512.33 kJ/kg

20% 2. 713.27 kJ/kg

20% 3. 28.80 kJ/kg

20% 4. 69.76 kJ/kg

20% 5. 2.57277 kJ/kg

What can be said about the net change in thermodynamic properties for a complete cycle?

- 0% 1. It is a positive value
- 0% 2. It is a negative value
- 0% 3. It is related to the work done
- 0% 😊 4. It is zero
- 0% 5. It can be any value

$$\oint dV$$

When a process is reversible, which of the following is always true?

2%

1. Adiabatic

7%

2. Isentropic

52%



3. Zero generated entropy

29%

4. Isothermal

10%

5. Polytropic process