The “ABC to H” Rules of Teaching Large Classes in Medical Education: what do students think?

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**Abstract**

Increased sources of distraction and reduced student attention in large classes demand more effective pedagogy. "High quality faculty" possess both deep subject knowledge and extensive experience; but additionally they need techniques to transfer that knowledge and experience effectively. Maintaining student attention in class is a teacher's most important duty, one best done by promoting engagement in class. The fundamental component of a learner-centered environment is not content, but student motivation; faculty-student contact is the most important and consistent source of motivation. This paper outlines (especially for new faculty) some ways to implement effective teaching in large classes. Students were surveyed about their perception to different teaching strategies and their opinion is highlighted in this work. I have adopted a simple alphabetically-ordered approach for easy implementation of the guide. Approaching class with a smile, Before class preparation; the C rules include Class greeting, Class-specific objectives, Communicating your expectations, Commending appropriate student responses; and Connecting the dots. The D rules are simple: Do not go over time, Do not be monotonous; Do not cram too much information. Enthusiasm, Engagement of students, Encouragement of thoughtful questions, Exercise, and Exploitation of previously learned materials to teach new concepts are all part of the program. Early Feedback and Gaining students respect are valuable. A class session should always end with a Hasty summary. Actions taken by an instructor during a class session impact students’ lifelong learning: therefore teaching practices should focus on promoting critical thinking and long-term learning. Students feel strongly that precise and concise notes are the most helpful learning tool, followed by an enthusiastic teacher who maintains their attention. Only 5% of the students chose having a knowledgeable professor.

**Keywords:** Active learning, effective teaching, students’ engagement, teaching tips.
Introduction

Teaching large classes either at an introductory level or in a professional program has many challenges. These hurdles to effectiveness include the fact that students’ needs are affected by different individual abilities and interests; limited opportunities for personal interaction with students; difficulty remembering many names in a large group; the noise level typical of large classes; students' fear of peer judgment; difficulty in measuring teaching effectiveness; managing logistics for exam writing, proctoring, and grading; preventing honor code violations; and maintaining students’ attention [Ives 2000; Cooper & Robinson 2002]. Research on the effect that class size has on teaching, learning and retention of material indicates an overall deleterious effect on educational outcome as class size increases [Cuseo 2007; Monks & Schmidt 2010; Kumar 2013]. While there is a large body of research dealing with the negative impact of large classes; some authors [Toth & Montagna 2002] have debated that this negative impact really does not exist per se: rather it is perceived to be the case due to inadequate evidence and/or misinterpretation of results. The challenges inherent in teaching large groups do; however, provide an instructor with opportunities to develop innovative thinking and strategies which can be utilized to improve the quality learning outcomes [Burnett & Krause 2012; Kumar 2013].

The fundamental problem in American higher education is not the availability of content, but rather the level of student motivation to master that content [Lombardi 2013; Chambliss & Takacs 2014]. Students have to be engaged and committed to mastery of materials for effective learning to take place [Brame 2015]. Promoting student engagement in class is the key to effective learning regardless of class size or subject [Bauer & Snizek 1989; Smith 1992; Miller et al. 2013]. Faculty are the most important and consistent source of motivation. Increasing sources of distractions have brought about a decline in levels of student attention, especially in large classes. Learning is not - or at least should not be - a "spectator sport" [Chickering & Gamson 1987]. Students do not "learn by osmosis" (i.e. just by sitting in classes listening to teachers). Quality teachers promote student engagement, albeit even within the same institution there are distinctive ways in which individual teachers may do this. [Layne 2012; Brame 2015].

Objectives

The principal goal of this work is to provide a simple guide for new teaching faculty to develop effective teaching strategies, and simultaneously to remind mid-career or senior faculty of some good practices for large classes. This paper is based on a learner-centered instructor perspective and the results of students’ surveying.

Methods

Two classes at the Virginia-Maryland Regional College of Veterinary Medicine were surveyed about their perception to different teaching practices. Each class was 124 students; 133 students responded to survey. All procedures were approved by the Institutional Review Board.

Results

In general, an instructor should realize that whatever the subject being taught, all teaching practices must be learner-centered, with the main goal of promoting critical thinking and long-term learning. The following practices are
examples of some techniques that have been shown to promote learning and student engagement, based on the responses to the survey.

**Approach the class with a smile**

Students are quick to perceive when an instructor is bored, irritated, or "going through the motions." They can't be fooled on this point. A positive attitude on the instructor's part will convey the importance and interesting aspects of the material most effectively.

**Before class preparation is indispensable**

Thoughtful preparation of handouts affects learning greatly. Eighty-eight percent of surveyed students thought that providing precise and concise handouts was extremely helpful. Good handouts are those that can easily be understood by students who are--by definition--not experts. Good handouts cover the subject in adequate depth, but not in so much minute detail that students become bored reading them and skim the contents. A handout should be precise, concise, and as brief as is consistent with getting the material across. It should not be bulky, nor a mere copy of textbook material. It should contain enough information, yet enhance critical thinking by driving the motivated student to ask questions and/or to look up material in a more detailed source such as a textbook. Concise notes are especially important in a professional curriculum where student time is precious. The key question that should be answered when preparing anatomy handouts is: what knowledge does the first day health professional need to be competent? It doesn't hurt if some small element of humor is included in the handout: a sly pun or an allusion to some historical aspect of the material becomes a "tag" in a student's memory, something that drives home a point that might otherwise be missed. This can be overdone, and humor, while helpful, can also become an annoyance; it has to be employed judiciously.

There are five "C" rules: Class greeting; Class objectives, Communication of expectations, Commendatory comments, and "Connecting the dots" in the material.

**Class greeting**

A cheery and polite greeting "primes" students to make a good start, by immediately establishing a friendly and welcoming learning environment. It also conveys the instructor's personal interest in the material, and even more importantly, in the students. Seventy-nine percent of surveyed students believed that they felt better when they were greeted at the start of the class. Students who feel they're being "tolerated" by a teacher may become resentful and reluctant to participate beyond a minimum level. The response of that seventy-nine percent of students indicated that the class greeting created a welcoming environment and helped them learn better. A quote from one of the students: "I love class greetings. A simple "how are you" makes me feel so cared for and makes me happier for the rest of the day".

**Class objectives**

Students need to know what they will be taught in class, and more to the point, they need to know why they need to know it. They come to a class with the idea that the material will be logically organized and that they will be asked to follow a linear chain of argument that makes "sense" in the context of the course. Properly written objectives are those that define concisely the ideas and concepts for students to master. Because we do not live in an ideal world, students need strict correlation between objectives and test materials: stated objectives should be emphasized on tests and students need to know that this will be the case, upfront. Students in the survey stated explicitly that well structured notes around specific objectives are the best way for them to grasp and retain important facts. More than
half (59%) believe that defining class objectives is very important in their learning.

**Communicate high expectations**

It is vital to forth your expectations and goals, keeping in mind the principle that higher expectations inevitably result in higher performance. Students in professional or pre-professional programs tend to be competitive individuals who believe it’s important to live up to a teacher’s expectations. If the ultimate goal is to help them grow intellectually, there is the hope that in time, when they move into a career, they will exceed your own level of accomplishment. Challenging them with concepts that are not immediately obvious (yet not so obscure they can’t understand them with a little thought) provides practice in going beyond rote memorization and regurgitation of material yet does so in a "safe" and comfortable setting. Those who don't rise to such a challenge the first time will learn from those who do, and in time will come to grasp the approach needed to deal with the next set of conundrums. More than two thirds of students (72%) stated that knowing that their teacher has high expectations encouraged them to strive and to be more committed to deep learning. However, some students felt that high expectation "intimidate" them in a bad way.

**Commendatory comments**

Commendations, when appropriate, are important: students need to feel that they are doing things "the right way." In this context, such responses to student input as "Excellent point!" or "Good question!" signal approval of effort and engagement. Students often take the absence of such marks of approval as criticism, and thereafter refuse to ask for clarification of obscure points. Worse, they may perceive the instructor's lack of response to their effort as "putting them down," or "making them feel stupid." As unfair as it may be for them to feel this way, nevertheless there are students who do: all their pre-professional lives they have been given "gold stars" or verbal "pats on the head," and when in the environment of a large professional school classroom, they may feel slighted if such "rewards" are not given.

**Connecting the dots**

Students need to learn to perceive patterns and how to make connections between apparently Isolated pieces of information. Isolated items do not "stick" in human brains. If students have difficulty following the thread of an argument, it will help to make comparisons to previous examples in which similar patterns can be shown. It allows them to see the "patterns behind the patterns" and realize how various levels of organization are inter-related. Ninety-two percent of students stated that "connecting the dots" help them retain information. And even more specifically, 95% of students believe that relating new information to previously learned materials help their learning.

**Care about their learning**

It is important to care about student progress and to show it: students can tell which professors really care about teaching and which are in the classroom solely because it's a non-negotiable part of the job. It's vitally important that the class doesn’t get the impression that you are just trying to get the lecture hour over with, so you can go and do something else. Make sure that they understand what you've said by asking questions. Begin the session by reminding them that interruptions to clarify points are fine; and that they have the ability to tell you to "slow down" if you're outrunning them. Surveyed students pointed out the importance of having some sort of control over question asking because questions sometimes illuminate a new point for the entire class, but sometimes the answer is obvious to everyone but the questioner! Depending on the length of the question and answer, there is a potential for wasting limited class time. Instructors need to develop some wisdom in responding to questions, and how to fend off
a potential loss of time by asking the student to meet after the session is over. Again, this has to be done in such a way as not to give offense or to imply the questioner is incapable of easily grasping the answer. There are potential pitfalls here and the instructor has to walk a fine line between satisfying the individual and not irritating the rest of the group who "get it." Students have different views of what constitutes a "caring" professor; for example, some believe that learning student names is a form of caring while others understand that this can be difficult in a large group. But regardless of their definition of "caring" and "understanding" 89% of surveyed students agreed that a "caring" professor drives their learning.

**Do NOT go over time**

Nobody in the group "hears" much of anything after the official class time is over; so do not waste your time and theirs by continuing to talk. If there are points to be clarified further, there is always "next time." Furthermore, students need a break. Every minute over the allotted time costs them, irritates them, and contributes nothing to their learning. Running over time is also discourteous to the next person scheduled to address the class. It's important to use time wisely but not to "steal" it from the class members or the next lecturer. Some students described going overtime as a "rude" action and they calculated every minute going over time as a 10% reduction of their own time which they really need. Keeping track of class time is a form of mutual respect. Students respected class time by being in class on time; in turn professors should respect their own time during breaks. Seventy percent of students expressed frustration about going over time. Twenty percent chose to ignore anything after the scheduled lecture time and 2% chose to leave class when the time is up.

**Do NOT be monotonous**

Use variable vocal and non-vocal expressions during class: it keeps students awake. A monotonous voice is a quick and a very effective way to put the group to sleep. This also applies to visual presentations: NOTHING will put an audience off faster than reading the text of a PowerPoint flashed on the wall, yet one of the most commonly-committed errors on the part of faculty is doing exactly that. Your students are all literate: they can read the title of the talk and the text on the slide by themselves! Minimize the use of slide text, but maximize visual interest with good pictures, especially in disciplines that are highly visual, such as anatomy or histology. The old adage that "A picture is worth a thousand words," is very true. Words-on-a-wall is an abuse of one of the most effective teaching tools ever devised: PowerPoint is a brilliant program, but its misuse is nearly universal. Sixty-six percent of respondents admitted having hard time stay attentive when an instructor is monotonous and 34% stated that it depended on how tired they are.

**Do NOT cram information**

Cramming too much information into a session is the best way to guarantee students won't learn any of it. It is far better to get most of the points across than to cram into a session more than they can absorb. There will always be another class to "catch up." Seventy percent of students believe that the more presented material, the less learned material in that session.

The five "E" rules are Enthusiasm, Engagement of students, Encouragement of thoughtful questions, Exercise, and Exploitation of previously learned materials

**Show Enthusiasm**

Enthusiasm is contagious. A teacher who truly loves the subject and makes it clear that’s the case will always be more effective in "firing up" the class, as individuals and as a group. Maintaining student attention is one of the most
important duties of a teacher. Eighty-eight percent of respondents admitted that an enthusiastic teacher encourages them to attend class; this in turn helps develop a deep understanding of the material, not just a shallow knowledge of facts. Eighty-four students out of those surveyed felt that having an enthusiastic teacher is desirable, and of those, 66% believe that an enthusiastic teacher helped them learn better.

Engage students in class and foster an active learning environment

Promoting student engagement in class is the key to learning. To learn effectively and efficiently they need to be actively involved in the learning process. If the teacher pauses a moment to ask a question that "connects the dots" between two concepts, and asks the students to answer it—individually or collectively—that will be very effective, especially since some students will be eager to show their mastery of the issue. Individually directed questions should be used with caution. Some students stated that this may cause a student to become anxious about whether or not he/she will know an answer and he/she will be too distracted to learn during the lecture as it occurs. Some students interpret a question directed at a specific individual as a criticism, and as implying they don't know the answer. Students in professional programs, especially, are very quick to take offense even where none is intended; and woe betide the instructor who asks a question to a student who feels this is "picking on" him or her! It is best to ask the question of the class as a whole, and allow individuals to respond if desired. If the response is wrong, correction has to be as gentle and as inoffensively phrased as possible. There will always be students who are offended at being corrected, however politely; but the "incident" will help to fix the true answer in the mind not only of those individuals, but in the class as a group. Asking questions that enhance critical thinking is a tactic that's vitally related to student engagement. The best and most helpful questions are those placed in a structured framework. Such questions guide students' thought processes and teach them to think critically. They also help their long-term memory. Incorporation of specific individual life events whenever possible and appropriate to the topic makes otherwise dry lecture more interesting and more engaging. Students commented that "real-life" application of a principle under discussion helped them recall information after significant periods. One example of class engagement that was specifically noted as having helped with long-term retention is using students themselves to demonstrate concepts. That tactic as part of the learning process kept them "moving" mentally, instead of restricting them to being passive learners. Students also felt that actively engaging students in these ways shows that the teacher cares about the students and wants them to learn. Even if a lecture has an overwhelming amount of information, engaging lectures help students retain more and learn during the lecture. Humor has been mentioned as a learning tool. Some professors use comical quirky stories to make students laugh and engage in a way to help them remember the information. Ninety percent of respondents felt that that "short stories" related to the material learned help their long-term memory. Appropriately employed in the proper context, such "asides" are effective ways to retain attention and encourage participation.

Encouraging thoughtful questions and/or acknowledging good performance

Encouraging thoughtful questions and acknowledging them constitute a very significant tool to engage students and improve learning. Asking a question encourages students to talk to you which means they are actively listening. Respondents stated that they were more attentive, if they were rewarded, at least verbally. A large number of them (84%) also felt that student engagement in the form of give-and-take with instructor questions helped them retain information.

Exploit previously learned materials to teach new concepts

New concepts and questions based on them have to be based on previously learned material. This is an obvious and important thing to do. It reinforces what they already know and connects it to what they will soon know.
Exercise

It's been shown that "exercise" promotes brain function even during class: A periodic "Stand up and stretch!" for 30 seconds alleviates tension and breaks the cycle of boredom. However, in this era of computers students were concerned about the physical constraints of getting up and stretching while using computers that might be on their laps: there was some degree of fear of dropping or somehow damaging laptops. Only 30% of students liked the idea of simple exercise during classes, saying that they thought it helped them stay awake, while 26% hated the idea, and 44% thought that in class exercise does not make a difference to them.

Feedback should be prompt

Ask for feedback early in the course. This shows students individually and as a group that their opinions count and that the teacher will use their input to improve. Feedback should be also taken seriously with no offense as long as it is appropriate. Sixty-four percent of students felt more comfortable when allowed to give an early feedback. In the context of student feedback to the instructor, be aware that it is impossible to satisfy everyone. Some students will state that the instructor isn't "doing enough to help" and others will complain that the same instructor is "babying us" by providing too much in the way of "hand-holding." There is an old saying that only two groups of students give feedback: the ones who think an instructor walks on water, and the ones who think she/he eats her young. Keep in mind that You can’t win them all.

Gain student respect by respecting students

Students need respect, especially from those who demand that they be respectful. Much of what has been discussed so far is centered around the concept that mutual respect is the rule that makes a class run smoothly and effectively. Treat them the way you like to be treated and set a professional example. Students need to believe that the teacher is as well-prepared as he/she can be for lectures and labs, making it an obligation and expectation that students will be too. Small actions taken by teachers may have remarkable results on students’ learning. Fifty-one percent of students believed that lack of mutual respect hinders learning and 31% had mixed feelings about lack of respect. You can say "I do not know" if you do not. Do not ever attempt to provide uncertain information to students. They need to trust you. They will catch you in an evasion or a mistake, and their trust in you will be eroded. Most students (89%) admitted that they do not trust any instructor that denies mistakes on purpose or to "save face." The teacher may be the embodiment of authority, but all the same when appropriate she or he needs to make it clear that his or her knowledge isn’t universal.

Hasty Summary of contents at end

Summarize the information quickly at the end of the session. There is an old guide for lecturers: "Tell them what you’re going to tell them; then tell them what you have to tell them; and then tell them what you just told them." At the end of the class remind them of what they needed to learn; and what they did learn. Repetition enhances understanding. Ninety-eight percent of students liked having a short summary at the end of lecture.

Conclusion

The focus of learner-centered large classes must be increasing student comprehension especially in medical education. Actions taken by the instructor before and during class will impact students’ lifelong learning. Sometimes we as teachers forget that teaching is not about us; it is about students. We are employed because somebody needs to learn what we know as content experts. Our teaching methodology must therefore be learner-centered rather than
We must focus our efforts on finding ways to keep students motivated and interested; and to assist them to improve their own learning process and skills. An instructor’s passion and enthusiasm for a subject is always obvious to them. A true and deep commitment to a discipline is, as the saying goes, "contagious". It will help the teacher greatly to remember the time when he or she was a student; what we needed to learn; and how we taught ourselves to succeed.

The key to effective instruction, regardless of class size or subject, is engaging students in active learning [Wulff et al. 1987; Bauer & Snizek 1989; Smith 1992; Brame 2015]. Active learning promotes students’ higher-order thinking skills and improves memory function. Student involvement in a class also helps in managing or preventing classroom disruption. The instructor is the most important factor making the students "want" or "do not want" to come to class: leave your students looking forward to the next class. Everything from how you dress and how you manage the class affects learning. Students learn best from compassionate/understanding professors who are entertaining in class and provide concise yet thorough notes.

While many individual tips exist for effectively engaging students in large classes, Hamilton [2014], other authors [Stanley & Porter 2002; Barkely 2009] have presented a synthesized approach and conception of what effective engagement means and how one might achieve it. But the process of learning is not simple: effective teaching cannot be achieved by a simple "to do" and "not to do" list, including the ideas presented here. It is helpful to learn "how students learn" and "what best teachers do". Ken Bain in his two books [Bain 2004 and Bain 2012] and Doyle & Zakrajsek [2013] in their book address those questions. Most importantly, remember that there is no "best way" to teach any class. You must personally develop whatever approach works best for you based on your teaching style, the characteristics of your students, and the goals and objectives of your lessons and curriculum. While there are some ideas that work well for many people—some of which have been presented here—there is no single consensus among the survey respondents about any specific teaching practice that is "best" for any human population. The closest to this "ideal" was that the vast majority of students (98%) agreed that the end of lecture summary helps their learning. When students were asked to choose the single most effective tool that improved their learning and retention of information, 58% stated that having precise and concise notes was the most helpful tool. The second most common (18%) choice was having an enthusiastic teacher who maintains students’ attention (Fig. 1).

Interestingly, it would appear that content knowledge is—in the view of students—is a minor component. Only 5% of respondents chose having a knowledgeable professor as the most helpful learning tool. This emphasizes the notion
that the problem of the medical education is not content, but motivation. The great majority demanded well
organized notes, despite the ready availability of course content from multiple sources. In fact, the amount of readily
available information can be so overwhelming that students felt they need a professor to sort priorities.

**Take Home Messages**

- It is not about you; It is about students’ learning
- Prepare for class
- Engage students in class
- Promote critical thinking and long-term learning.
- Leave your students looking forward to the next class.

**Notes On Contributors**

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Appendices

Declarations

The author has declared that there are no conflicts of interest.

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