Additional responses to comments on the warmup

There were many great questions asked in the comment box! I probably will address many of them during the session, but I did not want to miss any, so I prepared this as a backup. Many of the questions were similar, so I have not answered each one individually, but I think I have covered most of the topics.

This does not normally happen during the semester (maybe once on average), so I rarely need to do something like this for my students. Occasionally, it happens that there is a lot of confusion or misunderstanding, though, and a "handout" like this is one option.

1. I'm curious how you handle low-level or non-responses and straight plagiarism from web-sources or the textbook.
   Low level or non-responses lose points. They have to be pretty bad, though! My strategy is to first give all responses full credit, then visually scan for really short ones, and take credit away from those that are really poor. Plagiarism gets a stern warning/threat. "This is completely unacceptable… A second offense will be treated as a violation of the student code, possible F in the course…" Repeat offenders are prosecuted.

2. How do you get students to buy into the advantage to this approach?
   I explain, on the first day of class, that everything I do is intended to make them better, more successful scientists, engineers, etc. I point out that I do this based on extensive experience, and I promise a detailed explanation if anyone every doubts the value of a particular assignment, exam, etc. I let them know up front that the class is going to be hard, that it is going to take time, and that they are going to "strain their brains"…and I let them know that I am there to help.

3. How do I deal with a high spread in proficiency levels?
   As often as possible (on exams, problem sets, even in lecture…), I try to give a few easy items, a few more difficult one, and one or two that really stretch even the best students. I also have (this is a campus thing) an "honors option" that students can sign up for. This involves a term long project, and gives an honors notation on the transcript.

4. I would argue that advanced undergrad physics requires actual problem sets, which for some students can be time-intensive. What's the JiTT answer to their role?
   Intro or advanced, I have not reduced the length or difficulty of my problem sets. One thing I have done at the intro level is to split the weekly problem set into two shorter ones (due T, R).

5. What I've found difficult is the lack of responsiveness of undergrads at 9am. I have not found a single strategy that reliably works to get at least some response…
   9AM is tough on students, no doubt. No miracles available. All you can do is be as lively as possible yourself, and provide a few opportunities for the students to spend 1 minute talking to their neighbors about questions (Peer instruction).

6. For a larger class (say 25+), how much time is really required to read students' free responses in enough depth to gauge their knowledge?
   I have 80 to 100 students. One of my colleagues who uses JiTT in math has >300! It takes no more than 15 seconds per response. See the answer to #1, above, for a strategy. Also note, you do not need to review all of them before class. I "sample" before class, to get the sense of what adjustments need to be made, and to select quotes I will use in class. Grading can be done later.

7. Have you developed any special techniques to get students into the habit of doing the assignments?
   It is critical that students know when assignments are coming. I have warmups due M, W and problem sets due T, R. Always at the same time of day. I strongly recommend against assignments that come and go at random.

8. What about bright students or students with strong science backgrounds?
   Good warmup questions are open-ended, and provoke thinking. My best students often find them more interesting than the problem sets.

9. It would have been nice to know the context of why we are thinking about JiTT in particular and not some other teaching method.
   JiTT is not the only way to improve a class! You will learn about many other methods at the workshop. JiTT just happenens to be the one that is most focused on pre-class preparation, and I believe I should "practice what I preach."

10. I teach at 8 am and 10 am (with up to 40 students in each), and need to set up all the demos etc.
    If I had this schedule, I would make the warmups due the previous evening. JiTT is very flexible, and issues like timing are up to you. Make whatever choices you think are best based on your needs and those of your students.

11. I'd like to know what has been the experience so far for the people that are already using JiTT. What has been the reaction from the students?
    Most faculty like JiTT, though there is an adjustment period needed to adopt any method you did not experience as a student. Students, too, generally like JiTT, but they do require an explanation (see #2).

12. The aspect of this method that is most unclear to me is how, specifically, one can plan for a class with enough flexibility to change things around at the last minute.
    I usually do not change much, just the amount of time I spend on one topic vs. another. I might drop an example in one section, and add an example in another. Or, I might decide to give a Peer Instruction or other collaborative exercise in one part of the class. This does require that you give up on fixed notes which you must "cover." It requires you to think on your feet a bit more. This can be uncomfortable, but it is worth it in imporved learning.

13. I can envision this strategy as incredibly time consuming,…

There are many resources you can "borrow" to get you started on writing questions, and if you can use blackboard or another course management system to structure things for you, you do not need to write any HTML. For reviewing answers, see #1, #6.

14. What is the best way to structure a JiTT method (particularly regarding instructor review and response to warm-up exercises) in a class of several hundred with no TAs?
    For review of WUs, see #1, #6. In class, I bring up the WU responses occasionally throughout the class period. I DO NOT "go over them" for a few minutes, then move on to other things. That would take up time, and seem artificial. Rather, I use the WU responses as "talking points" during the class. The idea is to substitute student responses for your own comments, particularly when new topics are introduced. This way, the class is about getting the students from "thinking like students" to "thinking like physicists." It is much more effective than pretending that the starting point is "not thinking." That is a fallacy!

15. What if, say, 70% of the class gets everything exactly correct in warm-ups? Is the entire course then structured around the bottom 30%?
    Not it my class! Dealing with a range of abilities is tough with ANY method. JiTT doesn't solve this problem (or exacerbate it). It does give you a better sense of what the range is. In fact, if 70% got everything right I would a) move faster than I intended during that class, and try to go into the subject at greater depth than I otherwise would have, and b) adjust the warmup to be more challenging next time.

16. Our Office of Disability Services requires all class material to be submitted to certain students 24 hours in advance.
    I would work with that office. Tell them your plans, and ask for their help in structuring this for the students who need those service.

17. How to convince the students that JiTT is a good teaching method…
    See #2, above. This is for ANY method. Students "favorite" would be for you to tell them what will be on the test, follow through, then give all A's. Unless you plan to do that, you will get some degree of pushback. The further from that "ideal" you stray, the more pushback you will get. Of course, you also need them to learn physics! I find that most students will respect an effort to help them learn. Even if the class is hard, and the grading tough. As long as it is "fair." The most important messages are "I know this course is hard, college is supposed to be." "I know this course is hard, so I am working hard to provide the resources you need." "I know this course is hard, you will be more successful in your other courses, and your career, as a result" and "I know this course is hard, it is hard for everyone."

18. How do you choose your questions? How do you plan your class around student responses? How do you grade this particular component of the class?
    My favorite warmup questions are those that are open-ended. The ones that generate student responses which are thoughtful, and can be used as "conversation starters. They are NOT appropriate exam problems, or even problem set problems.

19. How to motivate the students to think conceptually and basically enjoy taking a physics course
    This may be the "$64,000 question." I have no simple prescription for it. I can say a few things, though. First, getting students to enjoy a class is a bit different from getting them to respect it. The former requires that you be funny and personable, that the text be easy to read, that the work not be too difficult, and that they are able to do it on their own time, preferably with their friends. That will not earn their respect, though, and they probably will not learn much. Getting them to respect the class requires that you give them good reasons to do things that are difficult, that you work as hard as they do, and that you are honest and fair. I usually shoot for respect, but I do try to be personable, and funny when possible. As far as thinking conceptually goes, students take their cues as to what is important from the things you spend time on, and the way you assign points. If you want conceptual understanding, ask conceptual questions, in class, on homework, and on exams.

20. I think the main challenge is to not overdo the WarmUp exercise, so that the students do not get bored during the lecture (since they have worked on the material on their own). I would appreciate more time spent on explaining how to keep the balance and to always have something up one's sleeve to keep the audience attention.
    I agree. Never spend too much time on things that the students have done (this includes going over homework, whether a TA dos it or a professor). I would add that I don't "go over" the warmups at all. I use them as part of the presentation, as jumping off points for Peer instruction, as seques between topics, etc.

21. During the talk, it would be helpful to discuss the logistics overhead of implementing JiTT.
    Some faculty use warmups at every lecture, others do it less often, but I think once/week is the minimum. I personally do it twice per week, whether I have a course tht meets twice or three times. (In that case, I do a puzzle the third day).

22. What do you do if only a small number of students complete the JiTT?
    This never happens to me. I get about 80% responses to any given warmup assignment, with about 90% of the students doing them most of the time. To make this happen, I suggest being fairly liberal with the grading (I grade on "an honest effort" rather than completely correct physics). I also suggest making the assignments regular, mine due are every MW at 10.

23. Has JiTT been implemented successfully in introductory physics labs?
    I use "prelabs" that are similar to warmups. Students are asked to read the lab handouts before coming to lab, and to answer some questions. The questions usually focus on the apparatus, or one the analysis, though sometimes they focus on physics concepts as they do in lecture.

24. If the assignment is due shortly before the lecture, how can you incorporate unexpected responses into your lecture in a meaningful manner? I think it would take time for me to

come up with a strategy that can impact on student misconceptions.
This does take time! If you do it for a few semesters, you will begin to see the patterns. Students misconceptions are varied, but not infinitely so. Also, your first strategy may not work, and may need revision, but I assure you it will be better than ignoring the misconception altogether.

25. How is homework conducted in a JiTT environment. Are the JiTT assignments counted as the homework, or is homework a separate effort?
I think of the warmups (and puzzles, if used) as "additional homework" of "homework type II." I also assign traditional "problem sets" (though they are also done online).

26. Our program is moving toward a studio model for introductory physics instricution. Are there any special issues that have come up in implementing JiTT or PI in that model?
I am not aware of special issues, though I have not taught in that mode myself. JiTT is quite adaptable, though. As I often say, "JiTT requires feedback between work at home and work in class, for the purpose of improving the class time; everything else is details." I would be interested to hear your experience!

27. In addition to applying JiTT in large enrollment classes, I would be interested in the differences with smaller classes. Are there any other points one should pay attention to that might not seem obvious?
This depends somewhat on why the class is small. If it is an upper level class, I tend to give fewer warmup questions, with more depth to each. In some cases, I will just ask one question: "What part of the reading do you think we should discuss in class." However, some of my colleagues go the other way… they give warmups that walk a student through a moderately difficult problem, in preparation for even more advanced work in class.