

ITA Transcripts

Title:	Theoretical and Applied Mechanics 150/152, Introduction to Statics
Focus:	The transcript illustrates the problem of getting a class to respond. This TA gives his silent class hints and more time. Finally a student gives an answer, but it is incorrect. The TA explains why the answer is wrong and gives the student credit for his thought process. The transcript might be a good starting point to talk about responding to wrong answers. ITAs could discuss whether or not they think it is important to give students some sort of positive feedback even when their answers are incorrect.
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Context:	The TA has been working problems with the students. He has a drawing on the board of a sagging cable fixed at the same level at both ends. He has drawn x and y axes originating at the midpoint of the cable. He has just led the class in deriving several equations, which are written on the board.

1 T: so these formulas that we just derived here
2 they are certainly fairly general, right?
3 We can use them for many different cases.
4 so then what I would like you to knOW
5 is to use it for this particular case.
6 so we can do the homework.
7 (6.0) ((TA draws a vertical line to separate
8 off the blank part of the chalkboard. T
9 looks down at book))
10 T: so what is the first thing that you need.
11 (1.0)
12 I'm sorry I- let me derive one more.
13 what if I give you (nine - one)
14 ((TA writes on board: T_{min} , T_{max}))
15 'cause s- so I- I'm not done with this yet,
16 right? ((TA gestures toward the list of
17 equations on the board))
18 what if I tell you I want the values of T,
19 the minimum T and the maximum T.
20 ((adds T so board now reads: T, T_{min} , T_{max}))
21 how could we find them.
22 (1.0)

23 again notice that we have these three
24 equations.
25 so find T.
26 (1.0)
27 and then see i- if from your expression of
28 T you can get a T maximum and a T minimum.
29 (3.0)
30 how would you take- how- could you find T
31 from here. ((gestures toward equations))
32 just an equation with only T.
33 (9.0)
34 S1: you know what- you know the minimum would
35 be zero because cosine earth, () like
36 cosine: you:r uh x. the way you set up
37 your coordinate plane?
38 T: unhn
39 S1: zero is the lowest.
40 or you- you set it up so everything (would
41 be) positive,
42 T: but T- T is referring here to an internal
43 load.
44 I mean the load that you would need to
45 apply: if you just cut through the member,
46 right?
47 so if I cut through here ((points to middle
48 of cable in drawing))
49 I would certainly not- not expect
50 things to be in equilibrium.
51 this thing would just start moving.
52 ((motions to indicate how cable would swing
53 out if cut in the middle))
54 (1.5)
55 so actually thIs T is referring to the total
56 tension.
57 it is true- it's a- that's a very good point
58 that hEre the tension does something kindof
59 funny.
60 and e- w- w- we will see what it does.
61 once you- you find T.
62 but it's no- it's not zero.
63 it is not zero.
64 anyway from- l- look at the mathematics.
65 from these two equations how do you-
66 how do you get T.
67 (2.8)
68 we will look at the physics once we have

69 the equations but-
 70 how do you rearrange.
 71 you know when you have sine- sine cosine
 72 it's a good idea is to square everything
 73 right?
 74 (0.8)
 75 if we square these two equations and add
 76 them up, then what do we get.
 77 ((TA begins to write on the board))
 78 T squared sine squared theta plus cosine
 79 squared theta is equal to T H squared,
 80 right?
 81 ((on board: $T^2 (\sin^2 \theta + \cos^2 \theta) =$
 82 $T_H^2 + q^2 x^2$))
 83 so then now I have this very nice
 84 relationship.
 85 T squared is equal to T H squared plus
 86 q x.
 87 ((on board: $T^2 = T_H^2 + q^2 x^2$))
 88 which is another equation that you can
 89 use for this problem.
 90 and it's another equation that you are
 91 given in the book.
 92 so maybe now things are not making
 93 much sense but when you go home and
 94 you look at those equations that you
 95 were given you will see that they are
 96 all of these ones that we are deriving
 97 now.

Discussion questions

Possible responses are in italics

1. Looking at the entire transcript, what do you think the TA does well? What could he do better?

What he does well: He gives hints when students don't seem to understand. He gives them more time to work out the answer. He breaks the problem up into smaller parts. He uses a wrong answer as a teaching opportunity.

Could do better: The students might need more hints and explanation or more time.

2. Look at the silences in lines 22, 26, 29, and 33. Why do these silences occur? How does the TA interpret and handle the silences? Why do you think the silence in line 33 is so much longer than the others?

In each case, the TA has asked a question and is waiting for the students to answer. After lines 22, 26 and 29, the TA gives the students another hint or further explanation of the problem. At line 33, however the TA gives the students a longer silence to work on the problem.

3. What are the different types of hints the TA gives? Look at lines 10, 18-21, 23-25, 27-28, 30-32, and 64-66.

narrows the questions, rephrases the question, draws attention to useful information

4. Write down a question that a TA might ask during a basic course in your field.

Rephrase the question.

Narrow the question.

Give a hint.

5. Look at lines 34-66. A student gives a wrong answer in lines 34-41. The TA's response to the student's answer can be broken down into four parts. What is the TA doing in lines 42-56? lines 57-61? lines 62-63? lines 64-66? Do you think his method of handling a wrong answer is effective? Why or why not?

42-56: explaining why the answer is wrong.

57-61: showing that there is something right about the answer.

62-63: repeating that the answer is wrong.

64-66: repeating the original question.

6. Finish the following dialog by writing your response to the student's wrong answer.

TA: So why do we call the line that runs through Greenwich, England the "prime meridian?"

S: Because the latitude is zero there.

(correct answer: the longitude is zero)

TA:

7. Using the question that you wrote for number 4, write down a wrong answer a student might give. Write your response to the wrong answer.

8. How would you handle a situation where a class seems unwilling or unable to answer your questions?

Give hints.

Break down the question into parts.

Give more time.

Narrow the question.

Rephrase the question.

Call on an individual student.

Possible follow-up assignment

Each ITA brings a fairly simple problem or set of questions from her/his field and works through it with the class.

After each ITA's presentation, the class could discuss:

Did the TA give enough time for students to think about the problem or question?

Were hints helpful?

How did the TA handle wrong answers?

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