# ITA Transcripts

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| Title: | Hydraulics Discussion with an emphasis on questioning |
| Focus: | The features of the discourse that stand out to me in this transcript are the deft way in which Fatih both uses and responds to questions, the ways he creates emphasis, and how he makes the structure of his explanations clear to the students, through transitions and linking, and the punctuation of checking questions. |
| Contributed by: | Elizabeth Axelson, University of Michigan |
| Recording Date: | November 3, 1998. |
| Publisher: | TESOL |
| Context: | This class was taped Fatih, a TA in Civil and Environmental Engineering, is Turkish and grew up in Germany. He is leading a discussion section of 12 students in a hydraulics lab discussion section meeting. The class is working on what Fatih describes as an "involved assignment" on "flows and plant lines and vent losses and exit losses and entrance losses and valve losses and this and that". The class has read question 1 of the problem set and a student (S3 in the transcript) has asked the question, "What's the difference between the hydraulic and the energy grade lengths". After a little joking and open discussion, Fatih leads the class to address the question, as we see in the following transcript. |
| Trainer Tips: | He makes dynamic use of his voice and pacing. For this reason, I've included a sound clip and some questions for using it in class. |

**Transcript**

T: oka:y. well. how do you calculate, the hydraulic grade line in an open channel. what's the formula for that. like what's, how do you calculate the water depth. (3) it's P over gamma isn't it? you want me to write all this down for you (4) [*writing on board*] well. um. it says calculate the energy grade line. how would you calculate the energy, in a system at a particular point. at any point. how would you do it. (6)

S5: B-one-squared

SU: [2 syll]

T: B-squared through G plus Z plus P over gamma right? the total energy , equation. [*writing on board*] P over gamma plus Z plus V-squared over P-G. 'kay, in every single point in the system you will know the pressure. you will know the Z: and you will know the velocity, so using thi:s you can calculate the total energy. and the grade line that's that's made up out of thi:s, is the total energy. okay now the.

here is the million dollar question, well how do I pull the hydraulic grade line out of this. (5) what do you think=

S3: =isn't this that you want a, minus E-two over (3) <T: well yeah> change the X or something like that=

T: =right but that's the energy slo:pe. energy one minus energy two divided by the length, through which this energy drop took place that's the energy slope, right? the hydraulic grade line is (5) [*writing on board*] it's P over gamma plus E so Doug that's where this thing comes into play, we have in open channel flow we had a hydrostatic pressure distribution, we had a channel bottom, put those together, we have a hydraulic grade line. so now, in order to find the hydraulic grade line what you do is, you find the energy, subtra:ct, the velocity from it, and velocity [*breathy*] hey you have a discharge right? Q-squared over whatever, and you have the pipe diameter right? that's it. (3) any other questions. (5) no? yeah?

S3: s say you just take [individ] like you'd figure out what is the values of uh E, and then, a hydraulic grade line are [at] like various points on the X-axis /[2 syll]/

T: /at various/points right.

S3: so when it says it's twenty meters <T: uhuh> is that, is that the, is that the, is that horizontal distance or is that the angle, or is that like the length of the pipe.

T: oh that's the length of the pipe.

S3: so would you need to plot it like that or, do you see what I'm saying? you'd plot it (3) you don't take into account the angle that it's at, right?

T: well, do you need to though? like, suppose you have this reservoir here, right? and is a pipe is sticking out of here and it's going this wa:y right? and i it's going into another pipe and here is some expansion going on and some all kinds of stuff and you know how to deal with that by the way? right? okay, so here, at this point, you need to determine what the energy is at this point, right? and you know what the energy drop is going to be across this length of the pipe because you have everything given to you. the pipe dia:meter the le:ngth, you have everything given so you can easily determine what the head loss is going to be through here, so you can come to this point and say okay . this energy, minus all the energies here, is going to be equal to the energy here whatever that may be. and you just, connect the two lines.

S3: oh, that's it?

T: yeah. [*high, squeaky*] <S3: oh> easy huh? [*high, squeaky*] but, I would like you, um (3) well I, you need to be aware that, within this stretch of the pipe like within this point right before the expansion, well you have frictional losses right that's for sure, but what else do you have in here. what other kinds of lo:ss do you have in here that you probably should consider. (4) can you see?

S2: head loss? is there head loss in the pipe?

T: well that's the friction loss right? water's going through the pipe, it's getting exposed to friction, and that causes the head to drop. right? what else is there. what else is there, that causes, the head in the pipe, to drop. (3)

S6: is it the entrance and the exits?

T: exactly. [*breathy*] very good. this thing is in the reservoir, it's entering the pipe, and of course you can see different types of entrance losses exit losses, you need to take that into account. right? well if this is the ca:se, then probably a better

way to represent this energy grade line would be. I need to know what the energy here is. it undergoes some dro:p, and you'll determine what the magnitude of that is because of the entrance, and then you have another point, because of friction, [djoot, you're gonna be] [2 syll]

S4: but we don't, you don't really exs want us to figure out what distance that's over. /or do you./

T: /what distance/ what is over.

S4: where the entrance loss is.

T: this distance here?

S4: yeah.

T: oh no no no <S4: /just/> /I just would/ like you to tell me, well obviously here <S4: /yeah/> /there's/ an energy level, right after it enters the pipe there's a different evergy level because of that loss. that's what I would like to know <S4: /okay/> /and/ no need for the distance or whatever

S4: okay.

T: now let me ask you a question right here then. what is the energy, of the flow, right here. [*hits the board with the chalk*] total energy.

SU: where did you point again?

T: right, inside the reservoir before the flow even enters the pipe.

S3: it's not [what] a Z is it?

T: huh?

S3: whatever the Z on this

T: well how about the P-over-gamma and the v-square over two-G, that we emphasized. [*hits the board with the chalk twice*] da-du:m, that's it. everybody see that? (2) /you see it?/

S7: /so you're saying/ at the surface.

T: at the surface right. right here because right here you need to have some sort of energy. well okay, if the energy right there is equal to the Z whatever that may be, so what do you think Bradley, what is the hydraulic grade line over there. (6) how about anybody wanting to help him?

SU2: same thing.

T: same thing. right? you all see that. (2) okay, you got the important concept. so now. at this point the energy and the hydraulic grade lines coincide and after that it won't of, of course because the velocity changes and this and that, but you already calculated that right? (2) right? (2) okay. so any other questions then.

*approximately 7 minutes*

**Some Possible Questions for Materials:**

**Asking Questions**

**1.** How does this TA ask questions? Consider the following passages in the transcript--lines 9-15, 47-51, 75-76, and 87-89. What steps does Fatih take to prepare students for the question?

**2.** How does the Fatih actually state his questions? Check out lines 4-6, line 26, and lines 50-51. What strategy is he using in these examples?

**3.** What does Fatih's use of *right?* and *okay?* contribute to the interaction? Are these a mere habit or meaningless gesture, or do they make a positive contribution to the talk? If so, what do they add? Take a look at lines 35-39 and 93-94.

**Handling Student Contributions (questions and responses)**

**4.** How does Fatih handle the things that students say in his class? Look at lines 27-35, 64-70, and 91-92, for examples to discuss.

**5.** Sometimes students' answers to his questions are incomplete or not correct. How does he respond to these less than ideal answers? See lines 7-10, 14-20, 50-54, and 79-86. What techniques does he employ is these cases?

**6.** Fatih encourages and rewards students for their contributions. For example, earlier in this class he has this exchange with a student, when she answers his question:

SU: /viscosity/

T: /visc/ . you got it. Ann you are right on the dot. exactly.

In our transcript, lines 44-47 and 55-57, we also see examples of encouragement and reward for participation. What does Fatih do to make students feel good about participating?

**Use of Voice Quality and Pace**

**7.** Listen to the longer sound bite, lines 33-48. First, let's just consider Fatih's use of pace and pausing. Fatih seems to be a pretty fast speaker, but with a lot of variety in the pace. We will be interested to see how he compensates, if he does, for the fact that he talks fast, and how he uses the speed to contribute to the meaning. As you listen the first time, underline sections in which the pace of his talking speeds up. Where does he go faster and why? What is the effect of this speeding up? Next pay attention to the pauses, drawing short vertical lines to show where there are significant pauses in the text. Do any other characteristics tend to accompany them? (Think of vocabulary and intonation). What is the result or effect of these pauses? What do they make you notice? Now, at a basic pace that is comfortable for you, read the transcript to your neighbor, speeding up where Fatih does and pausing where he does. Does this feel like your normal way of presenting material while teaching? If not, how is it different?

**8.** Now let's consider volume (loudness) and lengthening of sounds within a word. Just for lines 39-45, circle the words that are louder and draw an arrow over those that are longer than usual. These longer words might have a straight intonation or a swoopy sounding, dipping and rising intonation. For the swoopy ones, you can draw your arrow with a wiggly shaft. Here are some examples:

and you know the pipe diameter the length through here

What is the effect of the loudness and lengthening? What does it make you notice? Read this part of the text, with loudness and lengthening as marked, for your neighbor. How does it feel? Is this how you usually speak?

**9.** Now let's think about voice quality. In line 47, Fatih uses a high squeaky voice when he responds to the students question, "That's it?" Why do you think he does this? What effect does it have?

**10.** Listen to the first sound bite accompanying this transcript, lines 20-26, in which Fatih explains how to find the hydraulic grade line, for an additional example of the use of a special voice quality. We will focus on Fatih's delivery of the word *velocity* (line 25) in a breathy voice. Why do you think he does this? What effect

does it have? (You can see, but not hear, another example of it in line 57, *exactly*.)

**11.** Fatih also uses sound effects, in line 63, when he says something that sounds like *djoot*, (maybe a noise like a vehicle moving very fast?), and in line83 when he says *da-du:m* and hits the chalk board twice with the same rhythm. Consider the whole package of sound effects--pace, pausing, intonation, loudness, lengthening, voice quality and the use of special noises like these. Overall, what do these contribute to Fatih's teaching style?

**Expressions**

**12.** In line 20-21, Fatih says, "So Doug that's where this thing comes into play". What does the expression *comes into play* mean?

**13.** In line 46, the student says, "oh, that's it?" What does she mean?

**14.** In line 49, Fatih says, "that's for sure". What does he mean?

**15.** Sometimes Fatih is elaborating, but he doesn't want to give all the unimportant details. He uses a variety of expressions to indicate these unmentioned details, such as:

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| line 25 | Q-squared over whatever |
| line 37 | here is some expansion ... and some all kinds of stuff |
| line 87-88 | is equal to the Z whatever that may be |
| line 93 | because the velocity changes and this and that |

What other expressions can you use to express the same idea? List a few here.

**Materials Using This Transcript, Winter 2000**

In my class for prospective ITAs, I use a portion of this transcript, contrasting it with the third transcript I've put on the website, that of Ana's econ recitation. For a description of these materials, please look at the file on Economics Recitation transcript.

I'm interested in any experiences you have with this transcript and with the sound bites, which are an innovation for us. I hope you will try out these resources and let me know what happens!

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