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# Working in the Weeds: How do Instructors Sort Engineering Students from Non-Engineering Students in a First-Year Pre-Calculus Course?

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# Working in the Weeds: How do Instructors Sort Engineering Students from Non-Engineering Students in a First Year Pre-Calculus Course?

## 1. Introduction

The calculus sequence is widely recognized by engineering students and faculty and by engineering education researchers as one of the course sequences that "weed out" students who are unlikely to survive the rigors of the engineering curriculum [1, 2, 3]. While this "weeding out" process is often critiqued, it nevertheless has remained prominent in engineering education despite persistent efforts to mitigate its effects. How does "weeding out" remain so central? This research paper reports on a discourse analytic study that aims to address an important aspect of this question through a detailed examination of a meeting of instructors from multiple sections of a pre-calculus course for first year engineering and pre-engineering students.

We argue that "weeding out" is best viewed, not as a simply mechanical or technical process through which students are linked with grades that do or do not allow them to proceed in the curriculum. Instead, we show that it is a highly active process through which instructors are engaged in producing identities for themselves, for other instructors, and for students in response to practical dilemmas that they encounter in the meeting. These dilemmas, and the identities that are produced in response, are aligned with central ideological commitments of their department and discipline. Thus, grading, and "weeding out," is itself an ideological process of identity formation.

The specific institutional and disciplinary commitments that we identify are as follows: 1) demonstrated ability at calculus is a legitimate criterion for entry into the profession of engineering; 2) calculus courses, as structured within the mathematics department, are appropriate venues for students to develop their calculus ability; 3) calculus exams, as structured within the calculus courses, are appropriate measures of students' calculus ability; 4) instructors are fair, neutral, and objective arbiters of who should "pass" and who should not.

The identity work being performed in line with these ideological commitments are as follows: 1) in working to set the final grades for the course, the instructors are constructing themselves and one another as fair and objective; they hold one another accountable to adhering to the particular framework outlined above; 2) when they engage in representing students, instructors construct a model of ideal students (sometimes explicitly, sometimes implicitly), and holding students accountable to that model.

It is important to note that the circumstances of grading are likely specific to the instructional team at this university; for this reason we would not necessarily expect that our findings be directly generalizable to the ways in which "weeding" happens at other institutions. Nevertheless, we believe that the analytic strategy that we adopt— examining practical dilemmas and their resolution—are likely to be generative and powerful in looking at a range of practices through which institutional representatives

position self and others, including the ways in which these positioning processes result in success and failure for students.

## 2. Theoretical framework

In this paper, we adopt a "cultural production of persons" perspective [4, 5, 6, 7, 8] in order to examine aspects of the "weeding out" process. This perspective is part of a broader project in the social sciences over the past several decades, a project that explores how both persons and forms of social organization are constituted through social practice. Among the major aims of this work has been to challenge conceptions of culture as a stable and relatively unproblematic body of knowledge that is transmitted from one generation to the next. Instead, culture is seen as a dynamic process in which human agents create meaning by drawing on cultural forms as they act in social and material contexts; in so doing people produce themselves and others as certain kinds of culturally located persons while at the same time reproducing and transforming the cultural formations in which they act. In this sense, "cultural production" has a double meaning: it is concerned with how persons are produced as cultural beings, and with how this production of persons results in the (re)production of cultural formations.

Recent anthropological approaches to education have been concerned with this process as it relates to learning and schooling. This work has focused on the interplay between social structure and human agency in sites in which "educated persons" are produced. In this view, becoming "educated," as well as becoming "uneducated" or even "uneducable," however these might be locally understood, is an important way in which persons become produced within certain cultural groups, and thereby contributes to the production of the culture.[6]

In other work, we have examined aspects of the cultural production of educated persons in the calculus sequence from the perspective of students, showing that "calculus readiness" is much more than neutral diagnosis of a cognitive state. Rather, it is a human-produced classification that is contingent on both history—including the struggles over the place of math and science in engineering—and contemporary institutional practices such as testing and grading. For students, this value-laden classifying process "twists and torques" [9] their identities and trajectories.

It is also relevant to examine the practices of instructors and the role that they play in this process. Horn et al. [10] have examined, at the K-12 level, how teachers through their interactions socialize one another into sets of identities and perspectives associated with emerging communities of practice. [11] These interactional processes are shaped but not determined by the schools in which they take place, by curricular policies, and the like; in responding to practical dilemmas[12] in student assessment, teachers position themselves and students into identity categories that have implications for their instructional practices and for the futures of their students.

Many scholars have recognized that language and discourse play a central role in the processes through which identities are constructed and negotiated. De Fina, Schiffrin, and Bamberg [13] have identified several trends in the study of discourse and identity that

frame the analyses presented here.  One major trend is that discourse perspectives have become closely aligned with a perspective that has been broadly identified as social constructionism, of which the cultural production approach being adopted in this paper is one variant. A second major trend is what De Fina, Schiffrin, and Bamberg term "anti-essentialist visions of the self." Whereas traditional approaches to self and identity have tended to conceive of the self as a "core essence" of the person, discursive perspectives maintain that self and identity are active processes, that they are accomplishments of people acting together with one another and with the cultural materials, including category and classification systems developed in institutions for identification of persons, that are available to them. In this sense, any person both has more than a single identity, and these various identities are shaped in response to specific actional and interactional circumstances and dilemmas in which one finds oneself.

Thus, a major aspect of the interactional work being done by participants involves "contextualizing" the interaction.  Contextualization is understood in this tradition as "an active process of negotiation in which participants reflexively examine the discourse as it is emerging, embedding assessments of its structure and significance in the speech itself" [14, p. 69]. Hanks [15] argues that contextualization is always evaluative and hence to some degree ideological, involving judgments based on implicit or explicit criteria as to the appropriateness of particular contributions to the discourse.

Understanding contextualization processes, and their ideological aspects, is a crucial part of a social and relational approach to identity.  When speaking, participants constitute the interaction as being of a certain sort, while at the same time identifying themselves as persons of a certain sort. The contextualization process, then, is the process by which individuals position or identify one another with regard to the interaction and the broader communities in which they take themselves to be participating.  And, as Bucholtz and Hall [16] argue, this is always an ideological process:

> In identity formation, indexicality relies heavily on ideological structures, for associations between language and identity are rooted in cultural beliefs and values – that is, ideologies – about the sorts of speakers who (can or should) produce particular sorts of language.

For example, instructors involved in grading students in a pre-Calculus course must continually monitor their own and others' contributions according to some understanding of what Calculus is, what role it plays in students' trajectories and in the institution, as well as their role in the course, in the present interaction, and in the institution.

Such a perspective emphasizes the importance of careful and detailed attention to the situated use of language in social practice.  Contextualization processes centrally involve participants' awareness of the range of possibilities for action on particular occasions, possibilities drawn from the multiple systems in which they participate or might participate in the future.  And, as Hanks [15, p. 165] points out, "it is the minute details of linguistic structure that coordinate this awareness and make it known with a delicacy unparalleled by any other mode of expression."  Given the centrality of language in the organization of social relations, including those involved in identity, it is clear that "an

analysis of social relations that is deaf to linguistic practice will be blind to some of the most revealing displays of its object" [15, p. 165].

## 3. Research Questions

Following from this perspective, we aim to address the following questions:

- How do representations of students by instructors function during a meeting in which instructors are working to determine grades for the course? More specifically:
    - How do the instructors position themselves and one another?
    - How do the instructors position students within categories that have consequences for success and lack of success?
    - How do these positionings reflect an instantiate particular ideologies and sets of values regarding calculus and its role in engineering?

## 4. Research Context, Data, and Methods

Our research focuses on a the Access Program, a diversity-promoting program in the engineering school at State U., a flagship state university in the Western United States. The College of Engineering at State U is predominantly composed of white, male, middle- and upper-class students. The Access Program seeks to broaden access to the college by admitting a cohort of approximately thirty (30) "next-tier" students to the college each year. Students in the Access cohorts were initially denied admission to the College of Engineering, but were accepted via the Access program after a second round of admission screening. The Access program has explicit diversity goals, and is composed almost entirely of women, students of color, and first-generation college students. Although these students are admitted directly to the College of Engineering, they are enrolled in a "performance-enhancing year," in which they take courses designed to prepare them for courses in the regular engineering curriculum.

The Access program has to date enrolled seven cohorts of students. After two cohorts had performed below expectations in Calculus I, the program arranged for the Mathematics Department to offer a pre-calculus course for Access students as part of their performance-enhancing year. This course, offered by a single instructor to a single class, was viewed as successful overall in its first two years, and the College of Engineering and the Math Department subsequently decided to expand the course beyond the Access Program and to offer it to pre-Engineering students and to directly admitted Engineering students who elected to take pre-Calculus rather than taking Calculus I. In the semester that we are examining in this paper, the course was taught by five (5) instructors to five (5) sections of about thirty-five (35) students each.

Data for the analysis presented here is a single meeting of the five pre-Calculus instructors. The meeting took place at the end of the Autumn semester, after students had taken the final exam for the course. The purpose of the meeting was to convert students' raw numeric scores for exams, homework, and other academic tasks into letter grades.

Prior to the meeting, instructors had been responsible for entering students' raw scores into a spreadsheet on the course's learning management system; a major part of the meeting involved examining these scores in order to find any anomalies and to determine where to set the dividing points between specific letter grades.

This meeting was recorded by one of the research team members, and was subsequently fully transcribed according to modified conventions from interactional sociolinguistics and linguistic anthropology.

The first analytic step was to identify every instance in which the instructors represented a student or students. Major categories of instructor representations of students were: 1) direct references to particular students (e.g., "my guy"; "one kid with a zillion or something"); 2) references to students as a group (e.g., "that's why you see things with people that got 40s and then 90s"); and 3) enactments of students in conversation with the instructors (e.g., an instructor quotes a students as saying, "When I look at my exam, my quiz average in D2L hasn't dropped my lowest").

Once each representation of students had been identified, we conducted a discourse analysis to determine the boundaries of the segment within which those representations took place. These segments were then examined in order to interpret the function of student representation within the segment. In virtually every instance, student representation was occasioned by the instructors' response to some dilemma that had arisen in that segment of discourse. The analysis reported here focuses on several of these segments in order to show how such practical dilemmas provides an occasion for position of self and other into particular identities, and how these identities reflect and construct ideologies.

**5. Analyses**

We present three excerpts in which instructors position self, other, and students within available cultural identities.

Segment 1: The bookkeeping dilemma

The first segment that we present can be characterized as a "bookkeeping" episode: led by Adele, the instructors aim to account for gaps in their spreadsheet of final exam scores. Until they know how to interpret those gaps—for example, are they temporary holes because exam scores have not yet been graded, or do they represent students who missed the final exam?—they cannot calculate final grades.

Although Adele represents this dilemma as a concern about performing grade calculations, Randall takes it up as an opening to account for *why* missing scores exist: That is, to express his interpretation of the students who missed the final exam. Adele (lines 400-402; 404; 406; 410-11) seems to indicate that her purpose is to determine what value to place in the incomplete lines; Randall, however, reorients the conversation

(beginning at line 407) around his confusion over students' failure to attend the final exam.

```
400    ADELE:      Yeah, now the one thing with yours, Randall, is some
                   of the exam scores were missing.  What was the
                   situation there?
       RANDALL:    Exam scores?
       ADELE:      Yeah, I think there was some [blank=
405    RANDALL:                                 [From the final?
       ADELE:      =exam scores [Because I thought I saw
       RANDALL:                 [Well, I know I had one kid with a
                   zillion or something that just gave up, so I know he
                   just didn't go, [I think.
410    ADELE:                      [I would put— put zeros in just so
                   it's clear.
       RANDALL:    And then there's- there's this one kid though, this
                   is weird.  He was very, very good.  He transferred in
                   late, this {Name}.  Doing very well, quiz scores are
415                all very well.  There's no final exam. ((A says, "uh-
                   huh" after each clause))
       YEVA:       Well, there has to be at least a few people who
                   missed your final exam because I had ten leftover
                   exams.
420    RANDALL:    Well I know this- [yeah, uh-
       ADELE:                        [Oh, right.
       YEVA:       And so it was your class and my class, right?  And I
                   counted like, maybe five could've been from mine. So,
                   and I don't know if any of yours were in the special
425                testing room, [but you had to have at least—
       RANDALL:                  [No, no not one.
       YEVA:       So there has to be at least [some (missing)—
       RANDALL:                                [That's what I'm saying,
                   but this one kid was a good student.  He was one of
430                the best.  I don't know what—
       ADELE:      You think he missed it also?
       RANDALL:    I haven't got an email from him.  I don't know.
                   [And then-
       ADELE:      [I'd put a zero in there for now.  it's all we
435                can go on, right?
       YEVA:       [Yeah.
       RANDALL:    [Yeah.
       ADELE:      [What else can you do?
       YEVA:       But anyways, it- a- from what I counted, it would
440                make sense that some of your students [took it in the
                   wrong—
       RANDALL:    [Well, then I had this {Name} kid who just missed it,
                   that I gave yesterday, ((Y: Yeah)) so that's two, or
                   that's three.  I don't know.
```

In this exchange, Randall is accomplishing a good deal more than simply accounting for missing numbers: When requested to describe "the situation," he offers his interpretation of the calculus-readiness—the skill level—of the students who missed the final exam.

Randall identifies three students who missed his final exam. One of the three has completed a makeup exam, which Randall has not yet graded (discussed in lines 442-444). In this case, since the score is only temporarily missing, it receives no further explanation. Randall characterizes the other two as students who *could have* passed the final exam: One student had "a zillion or something" points; the other was "very, very good."

In these narratives, Randall reinforces two pathways for success, which could be identified as "effort" and "ability". The first student has accumulated a sufficient number of points to be presumed to be calculus-ready. The second student, despite beginning at a disadvantage ("he transferred in late"), is "very, very good."

Here, Randall aligns himself with dominant cultural assumptions about legitimate pathways to academic success. It is an alignment that privileges rationalist, individualistic, and masculinist perspectives on learning and teaching [12]. These dominant assumptions presume that personal experience and individual experience are largely irrelevant variables. This, perhaps, accounts for Randall's confusion over why two apparently calculus-ready students would fail to attend the final exam. His accounting for the missing scores continues to work in support of the two established pathways. The first student "gave up," and therefore failed to continue down the "effort" path toward success. He expresses confusion over the absence of the second, "very, very good" student. The ability pathway has been constructed, and continues to be constructed by Randall, as a clear and straightforward trajectory to success. If one is innately "good" at pre-Calculus, then motivation and effort are irrelevant and these cannot be drawn on to account for a student's failure to attend the final exam. Other factors, such as personal experiences, emotional or mental health concerns, or identity-based tensions, are never introduced by Randall or considered by the instructor group.

There is, of course, no way to know how these factors would have been received by the instructors; the point is that they did not have an opportunity to receive them in the first place. The work of these instructors socializing each other into this community of practice is, in large part, about how students, instructors, pre-Calculus, and education are constructed—and about what concerns come into play as these concepts are enacted. By offering an accounting for Adele's bookkeeping concern that focuses on the effort/ability dynamic, Randall reinforces for the group a commitment to dominant epistemological assumptions—a commitment that is left unchallenged by the instructors.

In juxtaposing an "effort" narrative with an "ability" narrative, Randall is accomplishing a key agenda item: Establishing that test scores can serve as a stand-in for students' calculus readiness. If attitude really did matter as much as Randall claims, then it might never matter whether a student is "very, very good" at pre-calculus. It might also make sense to extend compassion and the benefit of the doubt to students who are lacking innate skill but work very hard. To do so would be to discount the inviolability of the numbers, however; to do so would require a very different assessment system from the one that Randall and his colleagues have embraced. It would also require a rejection of the national calculus-readiness averages, since assessments that account for attitude

might very well lead to a situation in which all students emerge from pre-calculus as "calculus ready." By presenting the stories of these two students who missed the final exam, Randall supports a different system, one in which numbers alone indicate calculus readiness.

Segment 2: The numbers dilemma

Another dilemma arose as the instructors discussed the effect of adding four percentage points to each student's grade, in order to make the class average 75%. Sara determined that, using this scheme, 78% of students would pass. She described this as "a lot," and "a high percentage." Notice the comparison implicit in the adjectives, "a lot" and "high." A number can only be "a lot" or "high" relative to some normative state. The normative pass rate remains implicit for a few turns until Yeva asked, "what's supposed to happen?"

```
1630  YEVA:       What's supposed to happen?
      RANDALL:    Um-
                  ((Laughter))
      RANDALL:    Nat- National averages for Calc I is about 35 to 40
                  percent fail.  So that's Calc I. ((Y: Okay)) So
1635              figure— [I think it would actually be higher-
      JOE:              [I think this is supposed to happen ((Draws a
                  vertically-oriented distribution to the left of the
                  grade ranges on the board))
      RANDALL:    I think it would actually be higher=
1640  ADELE:      [It gets pregnant? ((Referring to the similarity of
                  the shape of the curve to a pregnant woman's belly))
      JOE:        [A normal distribution around C
      RANDALL:    =but it's lower, right? So you failed 35 percent of
                  Calc I students, I'm thinking here it would be five-
1645              ten percent higher.
      YEVA:       I would think it would be higher, too=
      RANDALL:    I would think it would be higher
      YEVA:       =because you're really [not supposed to move
      ADELE:                             [For this population
1650  YEVA: Yeah
      RANDALL:    Yeah
      ADELE:      Right, so
      RANDALL:    But, I mean, the numbers are what they are, I mean, I
                  don't know.
```

In response to Yeva's question, Randall invokes national failure rates for Calculus I, and there is broad agreement among the instructors that the failure rate for their course should be higher. Empirically, however, the failure rate is lower. This occasions a dilemma: *not enough students are failing*.

In line 1653-54, Randall offers a tentative resolution to the dilemma, which is to trust the veracity of the empirical numbers over what is "supposed" to happen. However, by sprinkling the resolution the particle "I mean" and ending with a face protecting, "I don't know," he signals that this resolution should be understood as tentative.

Why is Randall tentative here? From a technocratic perspective, Randall's solution is perfectly acceptable. From this perspective, actually, there is no dilemma. The numbers literally "are what they are." The dilemma only occurs because the technocratic solution conflicts with the particular historical location of the instructors—that is, a location in which, historically, a particular failure rate is realized. This history matters to the instructors, otherwise Sara's claims about the pass rate being "high" and Yeva's question about what is "supposed" to happen would not be sensible. Each would have had to account for discursive moves that invoke history. Neither did, and thus we can surmise that the historical precedent matters to the instructors.

If we couple this understanding of the historical location of the instructors with a perspective that the instructors are concerned with "making sense," then Randall's hedging is sensible. His purely technocratic solution still leaves a question of *why* these numbers are behaving badly—viz. ahistorically. In the next turn, Joe introduces a means of interpreting the behavior of the numbers, by constructing students in a particular way.

```
1655   JOE:       There's a lot of people who, um, I mean most
                  everybody in this class is, basically reviewing
                  everything, right?
       SARA:      Yeah.
       ADELE:     [Yes
```

Although students have been invoked in this meeting, this particular characteristic of the students—that most of them are "reviewing"—has not been invoked yet. It was always there, of course (see the immediate agreement and from Sara and Adele, with no questions or contradictions from the others), but its salience has changed due to the emergence of the "not enough failing" dilemma. In constructing students with this characteristic highlighted, Joe offers a way to make sense of the numbers, which Randall takes up:

```
1660   RANDALL:   [Well, that's why you see things with people that got
                  40s and then 90s, you know=
       YEVA:      [Yeah.
       ADELE:     [Yeah.
       RANDALL:   =Cuz they just decided to care [for that exam.
1665   YEVA:                                     [um-hmm, exactly
       ADELE:     It took 'em two exams to figure that out.
       RANDALL:   Yeah, and that's why we can't say things, "well this
                  person could go on, ((Y: yeah)) or this person
                  deserves" because it's not about aptitude.  It's
1670              about their attitude.
       YEVA:      Yeah, [exactly.  Exactly.
       SARA:            [Right.
       ADELE:           [Oh yes.
       RANDALL:   We have to just—whatever the number are, we just
1675              gotta roll with them.
       ADELE:     Yeah, I think so.
```

In a sequence of turns, with overlapping agreement turns interwoven, Randall produces an account for the behavior of the numbers. Essentially, because students are all

reviewing, the numbers represent a student's *attitude*, rather than their *aptitude*. And students' attitudes vary from exam to exam. Producing a high score on an exam is "just" a function of "decid[ing] to care" about "*that* exam" (italics added). Because of this variability, the instructors shouldn't expect the numbers to be consistent across time. The sequence ends with Randall offering the same resolution that he had offered earlier, only this time the resolution is stated as an imperative. They "have to" go with the numbers. Adele's uptake, in turn 26, signals that no further accounting is necessary. She agrees with the account, and then uses the marker "so" to indicate that the remainder of the turn is contingent on the acceptance of Randall's resolution. Subsequent turns build on Adele's turn and thus tacitly accept Randall's resolution.

In this segment, students got constructed in a particular way to resolve a practical dilemma. In doing so, the instructors accomplish the ideology that numbers are fair and accurate representations of students. In the beginning of the segment, this ideology was under threat, because based on the numbers, not enough students were failing. By constructing students as "reviewers" whose "attitudes" vary wildly from exam to exam, Randall and Joe were able to sensibly account for the threat, thus resolving the dilemma while maintaining the ideology. In addition, Randall constructs an identity for the instructors as objective, neutral, and fair arbiters, people who "roll with" the numbers without questioning them.

Segment 3: Dilemmas of cheating, time, and objectivity

In this final segment, we examine a stretch of discourse that is different in several ways from those analyzed above. First, this segment takes place after the grading tasks have been completed; at this point in the meeting, Yeva has left for her office, and Adele, Joe, Sara, and Randall remain in the room. Second, this segment involves an *enactment* of students, rather than simply reference to students; that is, the instructors are playing out an (imagined) scenario in which they are interacting with students as part of a "game show."

Just prior to the start of this segment, the instructors have engaged in a lengthy conversation about "cheating," an activity that they take to clearly threaten the fairness of the grading process. Adele, beginning in line 2591, expresses a wish that the instructors could eliminate cheating on exams by administering individual oral exams:

```
2591   ADELE:      Hmm. [I wish we had time=
       JOE:              [They (inaudible)
       ADELE:      =to do oral exams for the finals, but we don't have
                   time, ((R: go ahead)) even next semester.  We ha- If
2595               we have 60 students, the three of us, there wouldn't
                   be time.
       SARA:       That might be too subjective.
       RANDALL:    [Umm, maybe
       ADELE:      [Yeah, unless we did it together, the three of us.
2600   SARA:       Ohhh, yeah.
```

Adele's suggested solution to the dilemma posed by student cheating, however, presents a different dilemma—that is, the instructors don't have sufficient time to individually examine the number of students that they will be responsible for grading. Sara, in line 2597, adds a further dilemma, one in line with the ideology of objectivity, when she suggests that such a procedure "might be too subjective," indicating perhaps that individual instructors might grade their students differently, as opposed to the present grading procedures, in which each of the instructors is responsible for scoring certain questions from all students across sections. Adele counters this "subjectivity" claim in line 2599 with a suggestion that all three instructors could be involved in the oral examinations.

Randall goes on to take this conversation in a different direction, suggesting that such a format, with a "panel of judges" could be made into a reality show:

```
         RANDALL:    A panel?  [A panel of judges=
         ADELE:                [15 minutes
         RANDALL:    =You could make it into a reality show.
                     ((Laughter))
2605  ADELE:         I like it.  On the spot.
```

From this point, all four instructors begin to play out a scenario in which they and the students are part of a reality show or game show:

```
         RANDALL:    [You know what, the students would probably love-
         JOE:        [Oh oh, and like, "lock in your answers!"   [No
                     that's brilliant.
         RANDALL:    [It'll be-
2610  JOE:           [They'll do their work=
         SARA:       [It's like a game.
         JOE:        =They'll do their work on like an iPad that will like
                     project it, so we can see the work on the page, and
                     we'll just grade based off of what we see on the
2615                 page.  We'll lock in our [answer=
         ADELE:      [We won't even know!
         JOE:        [=And then, they'll come in!
         ADELE:      It'll be like [The Voice, ((R: Yeah, yeah)) right?
                     "Turn around!" ((Laughs))
2620  JOE:                         [Yeah yeah! ((laughs)) And then they'll
                     be like, "So, I thought that was a good problem.  I'm
                     from Michigan."
                     ((Laughter))
         RANDALL:    Why not- Hey, whatever incentivizes, who cares?
2625  ADELE:         Oh, no, whatever makes our job easier. ((Laughs))
         RANDALL:    Yeah, no, that's really it, yeah.
         JOE:        And then we show 'em their grade right then and
                     there.
         ADELE:      Yeah, right.
2630  RANDALL:       ["Your grade is-"
         JOE:        [We reveal!
         ADELE:      [And then [there's the tears=
         JOE:                  [Reveal!
         ADELE:      =and then they go=
```

```
2635  JOE:        "Eight!"
      ADELE:      ="But I'm so grateful for the experience."=
      JOE:        "Seven point five."
      ADELE:      ="I'll go on to be a better person."
      JOE:        ["Pass."
2640  RANDALL:    ["Go sit with the other failing students!" ((laughs))
      JOE:        Oh yeah, maybe it'll just be a pass or fail.
      ADELE:      [The pit!
      JOE:        [We'll walk in, pass or fail.
      RANDALL:    Yeah, there you go.
2645  JOE:        We'll uncover it
      ADELE:      Yeah, oh, crap!  I gotta go!  I got another meeting.
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Throughout this segment, the instructors build up this scenario, drawing on practices that are found in such shows as "Who Wants to Be a Millionaire," as when Joe in line 2607 tells a student to "lock in your answers," and "The Voice," explicitly mentioned by Adele in line 2618, and then drawn on in line 2619 when Adele says, "Turn around," referencing the practice of judges in The Voice first being unable to see contestants, and then turning around to view them.

For our purposes, several aspects of this segment are noteworthy. First, likening exam grading to game show judging normalizes the competitive and high stakes nature of examinations in determining whether or not a student will pass the course or not. Adele references this in lines 2602 and 2605 when she says, "15 minutes," and "I like it. On the spot." Second, the game show format foregrounds a view that only some students/contestants can be permitted to, or ought to, be judged as worthy to pass, or to continue in the competition. Third, for one of only very few times in this meeting, there is some indication of the humanity of students, as when Joe provides a fictional background for a student contestant in lines 2621-22 ("I'm from Michigan") and Adele in line 2632 recognizes that there are strong emotions associated with losing the competition ("And then there's the tears"). Fourth, Randall's instruction to a competition loser in line 2640 ("Go sit with the other failing students") indicates that they are aware that there are consequences for those who are judged as failing, that they become located with "other failing students," out of or at least in a different place ("the pit," Adele calls it) in the competition.

Overall, this segment involves the playful construction of a scenario in which students are separated into winners and losers by neutral, fair, objective judges who are concerned only with the performance of contestants, and who take steps to make sure that they are not biased in their high stakes judgments by students' backgrounds, emotions, or any other criteria that ought not to influence their evaluations.

## 6. Discussion

We have presented several segments of discourse in which an instructional team constructs identity positions for students in the course of a meeting intended to translate raw numeric scores into course grades, thus determining who is "calculus ready" and who is not. We have shown that this is not simply a straightforward technical process, but

rather involves the construction of identities for both instructors and students. A major focus of our analysis has been on the recognition and resolution of practical dilemmas in the work of the instructors. These dilemmas often involve two different ways of viewing students. On one hand, it is necessary given the institutional demands of their work that they engage in an objective, fair, and neutral process for assigning grades to students, thus assuring that only those students who "deserve" to pass are in fact the ones who pass the course. On the other hand, there are indications that students are not just numbers on a spreadsheet, but *people* with their own backgrounds, characteristics, interests, problems, and futures. These differing ways of viewing students are, in the course of the meeting, often constructed as incompatible, thus requiring instructors to choose between them. In resolving this dilemma, the instructors construct themselves as fair, objective, and neutral arbiters of who deserves to pass, and in so doing, they often construct the students as having important personal, even moral, failings. Unsuccessful students are not simply given low grades, but they are also held personally responsible for these grades.

Our analysis suggests that, while there are multiple possible ways of viewing students, they are viewed here primarily in terms of what Cech[17] has called an "ideology of meritocracy," that is, a belief "that inequalities are the result of a properly-functioning social system that rewards the most talented and hard-working." This ideology, Cech argues, "legitimates social injustices and undermines the motivation to rectify such inequalities." [17, p. 67]

We want to acknowledge a limitation of our analysis. We recognize that such group grade-setting meetings are very likely not the norm for courses in the calculus sequence, in other courses that serve as pre-requisites for engineering, or in engineering courses. In this sense, we would not expect our findings to generalize to the specific ways in which students are "weeded out" at other institutions. At the same time, we believe that our strategy of analyzing practical dilemmas of grading and sorting, whether this work is carried out individually or in groups, is a potentially productive one in understanding ideological aspects of success and failure.

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