THE MATHEMATICS OF BEING HUMAN

Excerpt

By Michele Osherow and Manil Suri

Characters: 2 men, 2 women
- Mike Pearson, Professor of Mathematics
- Naomi Kessler, Professor of English
- Burt, freshman humanities student
- Sandra, freshman humanities student

Visual projections to accompany the play may be viewed and downloaded from https://www.dropbox.com/s/261nsghfanx4gqf/JMMSlides2.pptx?dl=0

A poster and publicity slides may be downloaded from
https://www.dropbox.com/sh/61atpwx9qbdxhn6/AAB9S8_9dL6QRF3EmG5Hr6Zla?dl=0

SYNOPSIS: Mike Pearson and Naomi Kessler have been forced to co-teach a seminar on mathematics and literature by their university, as a way to promote interdisciplinarity. The fireworks fly as they struggle to protect their academic turf. Sandra is a very motivated student, while Burt, an underachiever, is the class comic. They are both humanities students who are required to take the course to keep their scholarship.

Scene 7: "King of Nothing"

KESSLER

I bet some of you were surprised to see "King Lear" on our syllabus--

BURT

I figured it was Shakespeare's version of the mad mathematician.

PEARSON

[to audience] What it was, was blackmail, pure and simple. She said she'd only let me include "Pi" if she could put in *Lear*.

KESSLER

Not so much, Burt. Think about it: Max and the other mad mathematicians know *too much*….

SANDRA

Lear knows *too little*.

KESSLER

At least at the start he does. How many of you were already familiar with "The Tragedy of King Lear?"

PEARSON

[to audience] You want a tragedy? Making a mathematician read Shakespeare – that's the tragedy! Took the damned play all the way to Iceland for a conference, and couldn't bring myself to crack it open.

KESSLER

I want to consider how the play's tragedy is due-- in some part-- to the mathematical ideas circulating in this text.

PEARSON

[to audience] OK, I'll admit it. The play was good when I finally got to it. But what a stretch to tie it to math.

KESSLER

Think about it: the play begins with *flawed arithmetic*. A problem of division.

PEARSON

[to audience, rolls his eyes] Oooh - *division*. Could she have found anything more trivial? But hey, I'm cooperating.

KESSLER

Lear begins by dividing his kingdom among his three daughters, but he does not do this equally.

BURT

That ain't right.

KESSLER

 "Now Cordelia" he says to the favorite, "what can you say to draw a third *more opulent* than your sisters?" And Cordelia says…?

BURT

Ha. Trick question--

SANDRA

Nothing. She says nothing.

KESSLER

And Lear doesn't like that. He cautions her with his well-known response:

BURT & SANDRA

Nothing will come of nothing.

KESSLER

Good. Ultimately, the play will have to prove or disprove this statement. *Does* nothing come from nothing?

SANDRA

Well, it's only when Lear *has nothing* that he realizes his mistakes. He has to lose his daughter, his kingdom, his men, and *mind* before he gets that he was this complete egomaniac as a dad and King--

BURT

But he learns it too late to do anything about it. So what's the point?

PEARSON

[to audience] Especially if we don't get to anything mathematically interesting.

SANDRA

There is a point, though. That speech at the end-- wait, I marked it-- when Lear and Cordelia are captured, and he tells her—here!: "We'll live, And pray, and …. tell old

tales, And laugh at gilded butterflies." That's not "nothing" – it's beautiful ….
transcendent.

                                    BURT
I get it! He's gonna teach her about irrational numbers!

                                    PEARSON
Good one, Burt. And taking your cue, let's focus our discussion back to math, by –

                                    KESSLER
"Transcendent!" I like your description, Sandra. Lear indicates that they *will* be free, even
in prison, because of their bond. He asks Cordelia's forgiveness, and this is really
important because --

                                    PEARSON
[deliberately cutting off Kessler] I think Lear learns nothing.

                                    BURT
Yeah, like I said.

                                    PEARSON
By which I mean the number zero. This was the beginning of the seventeenth century,
and the Arabic numerals had just come into common usage in Europe over the last
hundred years. Zero was a new concept--

                                    KESSLER
Just so. *[slight sotto voce]* I was getting to that. *[to class]* As I indicated to Professor
Pearson the word "nothing" occurs 29 times in the play.

                                    BURT
Much ado about nothing.

                                    KESSLER
The fool calls Lear an "O without a figure" –so we see that new mathematical
understanding of zero in action: The remarkable thing is that zero *by itself* is nothing, but
put *[Graphics to assist points made here:]* it to the right of the number 1 and you get ten;
another zero makes 100, another a thousand – endless possibility. Easy enough for us, but
a new concept to Shakespeare's world.

                                    SANDRA
So… maybe like when the evil daughters keep taking away Lear's men they're, sort of,
cutting off the zeros he needs to feel like a king?

                                    KESSLER
Very like.

BURT

Huh. Didn't realize zero had so much oomph.

                           PEARSON

Oh, but zero can do much deeper stuff! You can build all the numbers from zero. Or
rather from the empty set.

                           SANDRA

The empty…?

                           PEARSON

[Graphics] Just think of a collection of objects that don't exist – for instance, the set of
all mad kings in this classroom. Now here's the mathemagical trick – identify this empty
set with the number zero –

                           KESSLER

Math-e-*magical*?

                           PEARSON

- and then consider the set containing this empty set. This is no longer empty, is it?
Because it contains *something* – it contains the number zero we've just constructed.

                           SANDRA

I think I get it.

                            BURT

I kinda do….

                           PEARSON

So you call this the number *one*. And then you create a set containing the numbers zero
and one and call it two. And so on. It's a chain reaction – you'll end up with all the
counting numbers.

                           SANDRA

So *everything* comes from nothing?

                            BURT

Hold on –I don't see any 'set theory' in the play. I still say Lear had it right –nothing
comes from nothing because, like, EVERYONE'S DEAD at the end. They're "nothing,"
literally. They *are* the empty set.

                           KESSLER

Except Shakespeare told us that "nothing" is a mark of being solitary, isolated— that "O
without a figure." *[power point image]* And Lear is *not* alone at the end of the play. He
and Cordelia have reunited. They are each others' "Os and figures," so to speak.

PEARSON

Not sure what you're trying to say.

KESSLER

Think of "I," the individual, as the number one. An individual's value shifts depending upon each zero or figure we put next to it. So the cast of *Lear*—like all knowledge, right? –can be represented by strings of zeroes and ones.

PEARSON

The binary system, yes – where two digits, 0 and 1, represent anything. But let me stop Professor Kessler before she crowns Shakespeare the original computer scientist –

KESSLER

You can be so funny, Professor Pearson. What I'm saying is that it's not just new ideas about zero woven into the fabric of the play, but also new ideas about one, the individual, the "I." Have you heard the term "renaissance self-fashioning?"

PEARSON

No, but I can't wait to impress my colleagues by bandying it about in the math lounge.

KESSLER

Take Edmund—"Now, gods, stand up for bastards!" He refuses to be a zero—

PEARSON

I think you're carrying this one and zero business way too far –

BURT

Oh, oh – and the evil sisters – could they be, like, Edmund's zeroes? He doesn't care which one he ends up with as long as he marries someone who can make him the "#1 guy?"

PEARSON

Enough already with –

KESSLER

The point is, we see characters-- one after another— caught up in the calculation of human worth—

SANDRA

Especially Cordelia! When Lear calls her "nothing" but the King of France says no, "*She is herself a dowry.*" Or at the beginning, when she says, "I love your majesty / According to my bond; not *more* nor *less*" –

PEARSON

Well, in that case, why don't we just pronounce Cordelia to be the mathematician of the play--

KESSLER

[sarcastically] The heroine, a *mathematician?*—now why didn't I think of that?

PEARSON

And declare the duality in *Lear* to be science versus the humanities?!

KESSLER

How 'bout we *not* reduce Shakespeare's greatest tragedy to a "*duality--*"

PEARSON

I mean, if you want to read *insupportable meanings* into *everything* –

KESSLER

[incredulous] Excuse me? There is a "world of right" in terms of literary readings but you most certainly *do* need to support your theories with close textual–

PEARSON

Textual! Yes! Have a ball with your *textual* theories! Just leave numbers out of them, will you? This prole as "zero" and "one" as hero. It's fantastic!

KESSLER

No more fantastic than your "empty set." Didn't you tell me there were "*logical difficulties*" in defining it?

PEARSON

Something we *both* agreed would be too complicated to bring up –

KESSLER

We also agreed to find common ground. It's hardly my custom to pick up Shakespeare and say, "Gee, how can I make this about *math*?" The whole idea is to find resonances, interesting analogies. What exactly are you contributing today?

BURT

[whispering] Nothing. She wants you to say "nothing."

PEARSON

Enough, Burton. *[choosing words carefully]* I'm trying to protect the *integrity* of math from the *distortion* of analogies. But I see I've been accused of shirking my duty. So here's the perfect math assignment to go with this play. *[Audible groans/sighs from students, over which he continues]* Suppose we represent Lear's kingdom as this wedge *[shows image on PowerPoint],* and suppose he decides to divide it *equally* among his three daughters. Can you show him how to trisect it, using only straight edge and compass?

BURT

Are we allowed to use a… pencil?

<div align="center">PEARSON</div>

[Bursts out] Yes, Burton. Really, is that even a question? You just can't use a protractor or anything fancy. Turn in your solutions on Monday.