"I'M NOT DOING IT AGAIN, I DON'T WANT TO": REVEALING STORYLINES IN CARA'S LESSON PLAY

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Some years ago, we were responsible for a module in which a small group of prospective primary teachers undertook a final-year project in mathematics teaching and learning. This project required them to identify an issue that arose in a mathematics lesson they taught during their teaching practicum and to write a revised lesson plan based on their reflection on this issue. As part of this, they also engaged in Lesson Play in which they scripted an imagined classroom interaction related to the revised lesson plan. The following extract is taken from a script written by one of the prospective teachers, Cara. In it she presents an imagined encounter between a teacher and three eleven-year-old children following her explanation of a procedure:

Brendan	This is stupid, I still got it wrong and I don't know why!
Teacher	There's no need to stress about it, we can learn it together, what way did you do the sum?
Brendan	I'm not doing it again, I don't want to.

In her background to the script, Cara described the children as disaffected with mathematics—yet we were surprised by the level of impoliteness of this imagined interaction. Brendan was adamant that he was "not doing it [the procedure] again" despite the teacher's efforts to support him and to tease out his ideas. While we were concerned that Cara might be drawing on what for her must have been a demanding situation, it also seemed to us that she understood the complex nature of interactions in mathematics lessons. We sought a means of understanding this further, and thus began our analysis by examining the script from the perspective of politeness theory. This examination revealed her awareness—perhaps implicit—of the ways disaffected students might use language to manage their face needs and also of the multiple positions and storylines that can be at play even in a short interaction between a teacher and students. Because the interaction stemmed from a real situation, we were challenged to question the extent to which the mathematics education modules undertaken by Cara supported her to overcome difficulties she encountered in mathematics lessons.

Cara's Lesson Play

Lesson Play has been proposed by Zazkis and colleagues (Zazkis, Liljedhal & Sinclair, 2009; Zazkis, Sinclair & Liljedahl, 2013) as a productive means of preparing prospective teachers to teach mathematics. It is concerned with an imagined interaction between a teacher and their student(s) related to a difficulty with mathematics. Lesson Play typically includes a prompt concerned with a learner's erroneous idea—prospective teachers are asked to describe an imagined setting in which the error might have occurred and to script a conversation with a student in which the issue is addressed. The Lesson Play that is the focus of this paper differed from the model proposed by Zazkis, Liljedhal and Sinclair (2009), in the following sense: it was not instigated by a prompt but on a lesson devised by prospective teachers to address a question that arose for them in their mathematics teaching. It seemed that in some cases, including Cara's, this led to a script that, while missing the usual hallmarks of conversation such as overlapping speech, was reflective of actual experience.

Cara's lesson included the following details: In the initial part of the lesson the teacher would use a protractor tool on the interactive whiteboard (IWB) to measure the angles in two different triangle types, right-angled and isosceles, and ask the children to calculate orally the sum of the angles. They would then engage in a similar activity with a print-out of triangles, an activity which the teacher anticipated would facilitate the establishment of a general rule about the sum of angles. Following this, it was planned that the children would cut angles from a paper triangle and place them together to form a straight line (180°). The next part of the lesson plan involved demonstration on the IWB by the teacher of the use of the *rule* to identify an angle in a triangle where two were known. The class would then complete a similar worksheet exercise with an example on IWB as a guide. Children who self-identified as experiencing difficulty with this exercise would receive support from the teacher. In this instance, triangles with angle measures in multiples of 5 or 10 would be used as it was Cara's view that such numbers would render the exercises more manageable. The script she composed was based on this small group work and involved three fictitious children attempting to solve a missing angle where the two known angles were 90° and 50°. She describes one child (Owen) as refusing to engage; Brendan as tending to be frustrated when he does not get the correct answer; and Cormac as embarrassed by his lack of understanding and falling behind due to a low level of confidence. We present Cara's script [1] subdivided into two episodes, for analysis purposes.

Episode 1

1	*[Group has just gone through their initial example of solving the missing angle in a triangle, the other two being 90° and 50°, to solve the remaining angle for 40°.]*
2 *Teacher*	Okay, so can everyone see what we have done with this problem?
3 *Brendan*	Yeah but I don't know where the 40° comes from!
4 *Teacher*	Is anyone else confused by where we got 40° from? Owen?
5 *Owen*	I don't get it.
6 *Teacher*	No problem, can you tell me where you're starting to get confused?
7 *Owen*	All of it. I […] yeah, I don't know Miss.
8 *Brendan*	Like, I got such a different answer and I don't know why, it makes no sense!
9 *Teacher*	Okay boys, let's look back at the example here. We learned that all of the 3 angles in any triangle add up to 180°. Because we know what two of the angles are, we can add them up and take it away from 180° to find the last one. Let's do it together again, and stop me when you get lost.
10	*[Example solved as a group]*
11 *Brendan*	This is stupid, I still got it wrong and I don't know why!
12 *Teacher*	There's no need to stress about it, we can learn it together, what way did you do the sum?
13 *Brendan*	I'm not doing it again, I don't want to.
14 *Owen*	It doesn't matter anyway.

The episode begins with the group working through the example of solving the missing angle of 40°. We assume that this *working through* involves a teacher explanation similar to that seen in Turn 9. As such the teacher's inclusion of the pronoun 'we' instead of 'I' in Turn 2 is interesting, although certainly not unusual in mathematics lessons. Rowland (1999) suggests that a consequence of the use of 'we' in this manner is to "discourage and devalue any sense the child may make of [a] situation, and to urge acquisition of the proper way of doing […] 'sums'" (p. 98). Moreover, her use of a closed question denies the opportunity for flexible thinking about the procedure. In Turn 3, Brendan is blatant in the manner in which he states his lack of understanding of the exercise, doing little to save his face. For Goffman (1967), whose work heavily influenced politeness theory, face consists of a public self-image with two wants:

> Positive face: a desire to be appreciated and valued by others, a desire for approval;
>
> Negative face: concern for freedom of action, a desire to be unimpeded.

We can see then that Brendan is indifferent to his own positive face needs [2]. In a whole-class situation, it is often too risky for children to lose face in this manner, especially if others appear comfortable with the topic in question. In such instances they might employ hesitancy or vagueness (*e.g.,* "Eh, I am not completely sure where the 40° comes from") to mitigate the threat to their face (Rowland, 2000). However, perhaps due to the small size of the group here, Brendan is more confident about taking this risk. Immediately afterwards, the teacher suggests that his confusion might be shared by his peers, endeavouring through her sympathetic approach to save his face. Such a move by her is not unusual. In any conversation, individuals generally endeavour to avoid face-threatening acts (FTAs) such as a critical comment, or at least try to minimise the effect of an FTA. Indeed, Brown and Levinson (1987) present a schema of approaches that a speaker might call on in order to protect (or not!) their own face or the face of another. These include not doing the FTA by simply agreeing or keeping quiet; doing the FTA *off record, e.g.,* implicating the FTA rather than doing it directly; doing the FTA *on record* with action designed to give face to the hearer; and doing the FTA on record baldly, that is, without attempt to respect face. The use of redressive FTAs by teachers in their interactions with students is, not surprisingly, commonplace (*e.g.,* Bills, 2000; Rowland, 2000). For example, in Turn 6 above we see the teacher redressing the threat to Owen's face when he admits that neither does he "get it". She first uses a supportive comment and then probes the reason for his perplexity. However, neither he nor Brendan is able to articulate the cause of their confusion, and, in fact, Brendan adamantly asserts that the procedure "makes no sense". We construed this as a bald on-record FTA towards the teacher because he is taking little account of her face needs in his dismissal of her explanation. Rowland (2000) suggests that going on record baldly "suggests greater concern for one's own face than for that of one's audience […] it sounds like bullying, but it may be the only way that someone in a position of weakness can avoid being ignored or bullied themselves" (p. 87). Brendan probably feels that he is in a position of weakness because he does not "get it", and his bald threat can serve to pre-empt possible criticism by his two peers or the teacher. It could also be interpreted as an attempt by him to persuade the teacher to provide either a better explanation or indeed the correct solution. The teacher does neither, providing instead an oral explanation of the procedure in Turn 9. This is indicated, in particular, by her instruction to the children to "stop [her] when [they] get lost". In Turn 11, Brendan describes the exercise as 'stupid' which we interpret as a further on-record FTA towards the teacher. In the previous turns, she has clarified the procedure and the children have "solved the example as a group", but he is telling her—without redress—that the explanation given is not sufficient. The teacher either does not perceive this offence or chooses to ignore it. Rather in Turn 12, she mitigates the threat to Brendan's face by attending to his emotional wants ("There's no need to stress about it"), by drawing him into a

joint enterprise with her ("We can learn it together") and by asking him how he had executed the procedure. But now (Turn 13) he blatantly refuses to cooperate with her. Owen's input (Turn 14) could be an attempt to rescue her from an embarrassing fallout: however, given his antipathy towards mathematics and his tendency to follow Brendan's lead (see, for example, Turn 5), it is more likely that he is suggesting that the exercise in itself is not important, thus further threatening the teacher's positive face wants.

The analysis of Cara's lesson play from the perspective of politeness gave us insights into the positionings of the various actors in the play. Work on the complementarity of politeness and positioning theory conducted by Tatsis, Wagner and Maj-Tatsis (2018) supported these insights. In order to understand the connection between the two theories, we provide a brief overview of positioning theory as developed by Harré and van Langenhove (1999) and elaborated in the context of mathematics education by Wagner and Herbel-Eisenmann (2009) and Edelen, Bush, Schmidt, Fulton, Kebreab and Rutledge (2022) in the context of mathematics education. Harré and van Langenhove used a triad in their application of positioning theory to discursive practices. The triad consists of three distinct points: *positions, social acts,* and *storylines*. Positions are usually conceptualised in research literature as a set of beliefs or as a metaphor to represent relationships. Wagner and Herbel-Eisenmann discuss the distinction between the term when conceptualised as a noun and as a verb. Used as a noun, there is a tendency to think of position as stable; however, the verb highlights the fluidity of the concept. Drawn to the latter perspective, they focus on moments of action rather than what might be considered fixed individual characteristics. Positioning can be *interactive*, where one person positions another or *reflexive* where one positions oneself. In the Turn 5 and Turn 14 of episode above, for example, we can see Owen positioning himself in line with Brendan. A social act includes speech or movement or any action that is significant and meaningful within the interaction (Edelen *et al.,* 2022). It can serve to position and reposition individuals; likewise, an individual's positioning at any moment can influence their decision to carry out a social act. For instance, despite Brendan's dismissal of her explanation, the teacher's input in Turn 12 is influenced by her positioning as caring and supportive. A storyline is the term given to an established pattern of interaction and can relate to both historical and more immediate positionings. It is the story or narrative upon which a person draws to understand or organise an interaction; moreover, it allows for individuals to position themselves (Wagner & Herbel-Eisenmann, 2009; Andersson, Ryan, Herbel-Eisenmann, Huru & Wagner, 2022). The teacher's storyline is made clear in Turn 1 and Turn 2—she believes that an oral explanation of the steps of a procedure can facilitate these children's learning of the mathematics in question. This is an example of first-order positioning where the positioning within a particular storyline is established. As mentioned earlier, a teacher's use of the word 'we' can often discourage children's sense-making of a situation and thus they can appear to be complicit with the storyline. However, in the episode above, Brendan acts to change the storyline, thus engaging in what is termed second-order positioning. Tatsis, Wagner and Maj-Tatsis (2018) argue that FTAs in politeness theory "align with second order positioning generally" (p. 1029). We can see this in Brendan's "I'm not doing it again, I don't want to" (Turn 13), a disruption of the teacher's storyline. We develop some of these ideas further in our examination of the next episode where Cormac makes an appearance.

Episode 2

15	*Cormac*	I got the answer but I don't know if I did it right.
16	*Teacher*	Show us how you did it Cormac! Maybe we can all learn something.
17		*[Cormac demonstrates his work]*
18	*Teacher*	Brilliant work Cormac, did anyone else do it like this?
19	*Brendan*	I did Miss but my answer is wrong so, like, what happened?
20	*Teacher*	50+90=140, not 130.
21	*Brendan*	Oh, okay then. So I got it right?
22	*Teacher*	Almost! Try with this question, but do the same thing and see—don't be afraid to go slowly. Everyone else try it as well. Look at the example on the board if you need to. Owen, why are you not doing the question?
23	*Owen*	I won't get it right so there's no point.
24	*Cormac*	So if they give us two angles then we can find the last one by taking them away from 180, is that right? Does it work for scalene?
25	*Teacher*	Exactly Cormac. The angles in any triangle add up to 180 degrees, so we can subtract from 180 to find the angle we don't know. This works for any triangle, it doesn't matter what type. Are we okay with this?
26	*Brendan & Cormac*	Yeah.

Cormac's entrance in Turn 15 and the teacher's response mark a shift in the classroom atmosphere. He informs her (or perhaps the group) that he got the answer. Reflecting his lack of confidence, he hedges his input to protect against the possibility that his assertion is incorrect. Rowland (2000), in clinical interviews he conducted, found that linguistic hedges (*e.g.,* 'I think', 'probably', 'about', 'around', 'maybe') were exploited by himself and his students in the interest of politeness—he used them to protect the face of the interviewees, while they usually used them to serve their own face wants. The teacher's "Maybe we can all learn something" (Turn 16) suggests a hope on her part that the other two students will grasp the procedure following Cormac's input; yet her hedging protects them lest this does not occur. Her affirmation in Turn 18 of Cormac's explanation and her follow-up question provide further evidence of her aspiration that Brendan and Owen will arrive at the endpoint she desires.

Brendan's admission that he used Cormac's procedure but attained an erroneous solution (Turn 19) is more polite than we have seen in his earlier input. Sensing that he has achieved some success, he now asks the teacher for help which is a change from the blatant refusal to cooperate observed in the previous episode. It seems now that he has repositioned himself in relation to the procedure as the teacher had hoped. The teacher is unapologetic when she points out Brendan's calculation error. The error is likely to be no more than a slip and, similar to a finding reported by Bills (2000), she does not believe that her use of a bald strategy in this instance will affront him. However, in Turn 22, the teacher's reply of "Almost" to his question can be interpreted as a strategy to save his face and to ensure that he continues his more polite stance. Her questioning of Owen in the same turn is an on-record FTA in which his—Owen's—negative face are likely to be offended. Owen follows up by expressing the futility of further participation on his part—"there's no point". The teacher now decides to ignore his statement. She senses perhaps that he is resolute in his resistance to her storyline and that diversion of her attention to the other children who are engaging in the procedure is the most productive course of action for now. When Cormac goes on to generalise the solution method for the sample set of exercises (Turn 24), he hedges his conjecture to protect his face should he be incorrect. The teacher gives weight to this in Turn 25, using the pronoun 'we' twice—first to indicate mathematical correctness of the generalisation he has proposed and second in her question aimed at ensuring that the students are in agreement with this rule. The choral "Yeah" from Brendan and Cormac, and Owen's silence point to the different positions taken by the three students in relation to the explanation given.

Discussion

Cara's script was unlike those written by other prospective teachers who engaged in the project in that it was characterised by a number of bald FTAs particularly by students towards the teacher. As such, it presented us with an opportunity to examine her awareness of the many storylines that can be at play even in a short mathematics teaching episode. In her own elaboration of her script, Cara noted that the teacher boosted the esteem of Cormac through modelling and collaborating on an example, that she identified Brendan's calculation error and reassured him about the correctness of his method, and that Owen maintained his dismissive attitude. We can reasonably assume that, as the Lesson Play is based on her own teaching practicum, the teacher in the script is playing out Cara's own storyline. While ironically Cara is engaging in a bald FTA towards herself—she did not, after all, solve the problem of Owen—she is conveying her belief that his storyline as 'dismissive towards mathematics' is deeply entrenched and difficult to change. She also seems to have grasped how learners use language to manage their face needs and to assert their positions. In the discussion that follows, we elaborate on the insights that our examination of her script has given us as well as some implications for our work as mathematics educators.

We do not have any reason to believe that Cara has been exposed to politeness theory in her academic work and we recognise that in our analysis we are imputing her intentions. We are also aware that this is an imagined script rather than one that occurred in a classroom. Notwithstanding this, it contains a mix of polite and impolite moves such as might happen in a conversation. In fact, she uses politeness in ways described by Bills (2000), Rowland (2000) and others, *e.g.,* on-record FTAs by the teacher in the case of minor errors, and use of hedges by students to protect their own face. However, Cara also offers us an insight into something we do not often see in the literature, that is, how students who are disaffected with mathematics use politeness to convey their individual positions and relationships with mathematics. Cormac, the underconfident one, was diffident in his assertions. Brendan, who is frustrated if he does not have the correct solution, adopted a more conciliatory polite tone as the lesson progressed and he experienced success. Owen, a student who refuses to engage, remained defiant and continued to use FTAs towards himself and the teacher throughout the interaction. While the script is fictitious, it would seem to be one that could well be replicated in a classroom. For example, Turner, Midgley, Meyer, Gheen, Anderman, Kang and Patrick, (2002) discuss avoidance strategies that some early adolescent students adopt in mathematics, *e.g.,* withdrawing effort, resisting novel approaches and not asking for help. We can see some of these strategies at play in Cara's script. Although Cara is unlikely to be aware of politeness theory, we attribute her insights to her experience in the classroom and her reflection on that experience.

It is also not likely that Cara was familiar with the tenets of positioning theory. Despite this, her script reveals her understanding that positioning is fluid and can be influenced by the acts of others. Owen positioned himself with Brendan early in the interaction; later, on experiencing some success, Brendan aligned himself with Cormac. In the face of Owen's continued resistance, the teacher directed her supportive efforts towards Cormac and Brendan. Cara's script also gives us an insight into the multiple storylines that can be at play in any interaction. As mentioned earlier, the teacher's storyline (and by extension, Cara's) was revealed in the opening turns. One was that she was caring and supportive of her students and wanted them to succeed. The other was she saw this—from a mathematical teaching perspective—as an oral explanation of the procedure with easy numbers. In the earlier part of the interaction, two children acted to disrupt this storyline. This disruption is evidenced in their use of FTAs that were initially directed towards themselves but, as the interaction progressed, were increasingly oriented towards the teacher and her explanation of the procedure. It is possible that the explanation was too abstract for them and that they needed more time working with cut-out triangles as described in the lesson plan. Notwithstanding this, the depiction of Brendan and Owen baldly threatening the teacher's face by refusing to engage further is quite surprising. The use of bald strategies has been reported more often in conversations between students than between teacher and students (*e.g.,* Tatsis & Rowland, 2006) probably due to the reduced power differential between peers. It might be that Cara had experience of bald FTAs in her work with children who are disaffected with mathematics and drew on that experience in her authoring of the script. What is also surprising to us is that Cara adhered to her storyline as *teller*

despite the fact that it was disrupted by students on a few occasions and was having little effect on one student in particular. Her belief in this storyline is borne out in its positive effect she imagines it having on Brendan and Cormac. Her adherence to it is also surprising because the emphasis in our mathematics education modules is on fostering deep mathematical thinking and on creative, adaptive approaches. This suggests to us that prospective teachers can, for a variety of reasons, find our storylines at variance with their own. It could be that, like Owen, Cara's own storyline is deeply entrenched and that she cannot, for now, separate her caring role from her role as teller.

Our analysis of this Lesson Play served to give us a better understanding of the behavioural and mathematical challenges that a prospective teacher such as Cara can encounter. There are some important implications for our work as mathematics teacher educators. We have described how the analysis gave us an insight into Cara's storyline as a beginning teacher. In questioning the reasons that the pedagogical approaches we emphasise do not always transfer to teaching practicum, we acknowledge that we should bring prospective teachers' own storylines to the fore in our teaching. We also need to explore together possible convergences of our respective storylines. In addition, the interaction imagined by Cara revealed her sophisticated understanding of the ways students use language during a mathematics lesson. By incorporating an examination of scripts such as Cara's into our courses, we can offer prospective teachers a productive means of developing an understanding of the complexity of practice. Finally, we are now of the view that Lesson Play based on teaching practicum has the potential to reveal understandings and beliefs about mathematics teaching and learning that may not be garnered elsewhere.

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Notes

[1] The playwright is identified by the pseudonym 'Cara'. As was the case in the analyses conducted by Zazkis, Sinclair and Liljedahl (2013), we corrected the occasional minor error in the script but adhered to Cara's sentence structure and punctuation. We also changed the names of the children from those used in the original.

[2] Goffman's (1967) work on face and face-threatening acts is based on an American (and hence Western) cultural context, thus suitable for Ireland where this research is situated.

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The International Commission on Mathematical Instruction (ICMI) has launched the 26th ICMI Study, devoted to reflect on the recent Advances in Geometry Education. The ICMI Studies are a major activity of ICMI, aimed to contribute to a better understanding of the challenges faced by mathematics education in our multidisciplinary and culturally diverse world and to collaborate in advancing to their resolution. The main products of the 26th ICMI Study are a conference (the deadline for submitting proposals of participation is September 15, 2023) and a volume of the New ICMI Studies Series. Collectively, the two initiatives aim to provide a groundbreaking and far-reaching account of advances in geometry education.

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For any information, question or inquiry, you can contact the 26th ICMI Study co-leaders, Angel Gutierrez (angel.gutierrez@uv.es) and Tom Lowrie (thomas.lowrie@canberra.edu.au).