‘PLAYING IT SAFE’ OR ‘THROWING CAUTION TO THE WIND’, RISK-TAKING AND EMOTIONS IN A MATHEMATICS CLASSROOM

This paper attends to teacher intellectual risk-taking when attached to expression of positive emotions, in order to explore some of the reasons why teacher risk-taking may not appear in mathematics lessons. We know that risk-taking can be beneficial, but not really examined what form this might take in a classroom. In recent research, I investigated how positive emotions are discussed and used by experienced mathematics teachers. In particular, exploring methods to examine the ‘in-the-moment’ emotions of the teacher, and what examining the classrooms of experienced teachers tells us about the role of affect in mathematics teaching. In this paper I examine affect episodes for elements of risk-taking. The evidence suggests that teacher risk-taking enables the use of emotions, and vice versa, is integral to ‘good’ teaching, and that modelling such behaviours appears beneficial to student learning and should be encouraged.

**Article**

Received 11 April 2018

Accepted 12 December 20XX

Published 31 May 20XX

Updated 10 February 20XX

General issue

Vol 6 No 1 (2018)

Pages XX–XX

References: XX

[www.lumat.fi](http://www.lumat.fi)

Keywords: **Affect; teachers; classroom; emotions; risk-taking**

# THE ‘R’ in F.R.E.S.H; Examining the emotions of experienced teachers ‘in-the-moment’.

Bibby (2011) calls teaching an ‘impossible profession’ because it is fraught with contradictions, risk, tensions, and subjectivities that can rarely be reconciled. This is particularly the case for researching affect, as it is never possible to isolate this dimension from the complex context of a mathematics classroom. The research from which this paper is drawn (Lake, 2018) attempts to build a model that acknowledges such social complexity. The endeavour originated in a belief that one of the reasons that school children might express dislike of learning is because they do not experience or observe sufficiently intense positive emotions during their lessons. I collected examples from classroom practice and interviews that belies this belief.

In this paper, positive emotional expression is seen as a mechanism to support student approach behaviours (Linnenbrink and Pintrich, 2004), a definition which draws attention to the differing and unique intentions of the teacher, and recognises that emotion only ever have transitory existence through social interaction, appear in order to meet a desired goal, and are confined by a patterned and repetitive place (such as a classroom) which provides limiting conditions for the appropriateness of an emotion (Mottet and Beebe, 2000).

The full study (Lake, 2018), through discussion of the roles of self, play, modelling, and, storytelling, presents the idea of F.R.E.S.H. The idea that the affective dimension of experienced teachers in action is centred on five key elements: Focus (where teacher intensity determines what is important in mathematics), Risk (as discussed in this paper), Experimentation and modelling (which includes the roles of emotions within novelty and deviation), Shift and transition (positive emotions and change), and High intensity (at critical moments). The determination of risk is a reason why positive emotions may not be utilised fully whilst teaching, something that has not yet been sufficiently explored in relation to teacher affect. Yet “schools have traditionally been intellectually stifling, controlling environments that are highly resistant to risk taking and change. […] It is within these environments that teachers and administrators are asked (and often mandated) to risk changing classroom and school practices.” (Ponticell, 2003, p.6).

Risk-taking is defined here as the degree of willingness to engage in an activity when the outcome is uncertain, which inevitably has an emotional dimension. Behaviours are considered risky when there is a chance of undesirable consequence. Risk is an exercise of judgement, conscious or intuitive, which forms a subjective assessment based on context, willingness and predisposition, drawing from options defined by experience and an assessment of likely outcome (cost/benefit). But for teachers, they also assess for self and students simultaneously. According to Clifford (1991), learning risks constitute a special class called intellectual risk-taking (IRT) which is engaging in adaptive learning behaviours (sharing tentative ideas, asking questions, attempting to do and learn new things) that place the learner, or in this case the teacher, at risk of making mistakes or appearing less competent than others. The definition implies that teachers would define risk-taking in teaching as trying out something new or unfamiliar, potentially out of the usual comfort zone, and at least different. There are many articles that suggest a teacher taking risks in their teaching is essential to develop ‘good’ teaching, and further, that risk-taking is essential for learning. For example, Dweck (2000) suggests that encouraging children to enjoy challenges could increase their persistence and learning abilities.

Psychology researchers suggest there are three affective elements essential to appraising risk. These are potential loss, the significance of the loss, and uncertainty (Yates & Stone, 1992). Although Ponticell (2003) suggests that this model is inadequate, that *“Constructs of emotion and gain, which appeared to be embedded in loss and significance of loss, need further identification and study.”* Yet risk-taking in a social context, such as a classroom is different again, as status then becomes significant, especially for a teacher within the classroom power structure. The risk is also for both self and others. However, emotions can potentially be used to manage risk-taking. Emotions can manage risk-taking appearing in the form of vulnerability as ‘a state subject to emotions’ (Kelchtermans, 2005). Emotions can address perceived threats, and effect resistance or subversion if required. This emotional response may be more apparent when constant reconstruction is, in Zembylas (2005) terms, more contingent and fragile. Indeed, seeking risk-taking is itself a motivator and ay alleviate boredom. Bullough (2005) when discussing management of risk within the vulnerabilities of a teaching role, suggests, *“Some teachers seek to make themselves invulnerable, immune to the possibility of failing, whilst others seem to enjoy risking self”* (p.23). Kelchtermans (2005) adds that because vulnerability enables a pedagogical relationship, then it enables joy too, and should be embraced, not contained.

There is much literature about creating a climate for learning. Sharma (2015), when writing of promoting risk-taking for students, comments that, *“Indeed, to learn and grow people must take risks, but most people will not take risks in an emotionally unsafe environment”* (p.290), and a climate that supports risk-taking appears to be crucial for a social constructivist approach. However, a teacher modelling risk-taking to the students must be a powerful driver for developing students to take intellectual risks in their learning. I thus revisited the observation and interview data to examine what risks the participant teachers took in their classrooms, and what implications can be drawn. I build on previous work that explores how experienced teachers model and manage errors (Lake, 2017). For example, if criticism is perceived as a likely outcome of error, then students may become risk-averse. This suggests that how a teacher views risk, and engages in risk-taking or risk-averse behaviours themselves is important.

## Source of the data

The episodes discussed below are selected from lessons of UK teachers, where shared laughter or banter, as exemplar of expression of positive emotion, are visible to an observer. The wider study (Lake, 2018) uses episodes, selected by teacher emotional expression, deemed as such through observation, measurement of galvanic skin response (GSR), (used to roughly indicate internal emotions) and confirmed in post observation discussions. The analysis resulted in a series of four discussions; self, play, modelling, and storytelling, since expressions of positive emotions frequently appeared in conjunction with all four categories. These included data recording teacher enjoyment at recall of episodes of teaching within interviews, class laughter when teachers were being playful, and examples of teachers modelling enjoying engaging with mathematics. Additionally, characteristics of excitement were seen, such as when teachers used storytelling, either to emphasise the mathematics, or to change the rhythm of the lesson. In what follows, I draw from the data to illustrate the degree of risk-taking in the choices made by the teachers. I describe some episodes before examining the place of risk-taking for the teachers in the study. I note that the examples are from the classes of experienced secondary school teachers (> 3 years) who are working from a solid base of tried and tested practices inseparable from other classroom practices that affect learning.

## Episodes of risk-taking and emotions in mathematics classrooms

I draw on three teachers who teach classes from year 7 to year 11 (Age 11 to 16); Helen, Freddie and Adam (pseudonyms) provide a spectrum of risk-taking across the participants. For some teachers there was scant evidence of engagement in risk-taking. For example, although Helen used a game as a teaching tool to offer variety, the introduced activity is groups of students solving mathematics problems, rewarded by points, as part of the preparation for a forthcoming examination; it was a game designed to directly support exam success. The teacher gives instructions, positioned within the interactions as rule setter, as for some board games. It was not considered as risk-taking by Helen or myself, partially as the primary purpose was product orientated. Helen, established in the wider study as a strategic, outcome orientated teacher, sees risk in play when exam results are at stake, when playing becomes time wasting, she says,

“…we are coming up towards a test … you kind of want to make every second really focussed and really count, and really relevant and really going to help them with that test rather than perhaps being a bit more exploratory and a bit more outside the curriculum, outside the box.”

Helen’s selected position is as judge and adjudicator for the game, rather than as participant (as for Freddie). The adopted position enables her to monitor behaviour and offers variety with little risk in terms of behaviour management. This view is supported by what she says in interview, about being able, as a teacher, to play with the curriculum,

“I like doing games. I am quite a fan of games. I do sort of an auction activity where kids bid for equipment and they have to do a task. I quite enjoy doing that...”

Another participant teacher, Adam, engages in a foolish scenario about a shepherd counting his sheep as a means to attend to the natural numbers. Once he has selected a student to be a shepherd, the class inevitably begins to bleat.

“(Baa) Mark just... can you check all your sheep? (Baa) Can you do...? [Pointing to each one gesture] …count the sheep. Alright.” [Teacher writes the counting numbers on the board, there was some laughter and inaudible banter at this point, humorously suggesting that the counting was very difficult for Mark to do].

Adam could have made himself shepherd, with a different relational impact, and much less risk, but this raises the question as to whether the affective impact would be less.

Teachers also experience boredom. The evidence suggests that risky activities can counter boredom (Mandler, 1984). This is illustrated by Freddie. He included himself in a face measuring activity, when he could, as is common, have monitored the student activity. He comments that doing this is potentially embarrassing for students,

“Yeah, they can be very self-conscious, but then I found that when I did the measurements as well, because I was curious about how mine would stack up, and I was saying ‘oh, cor look at my head’, and they could see that if it didn’t matter to me, then they kind of take their cues from you. Cos they’re trying to judge how important this actually is, in real life. So when they see that somebody who knows about it is not that bothered by it, then I think it’s... they find it just interesting rather than judgemental, if that kind of makes sense.”

Instead he allowed students to measure his face, and to record his data to compare with a perfect face using the golden ratio. He is however engaged in modelling what he wants the students to be doing. This is a risky action as it potentially allows non-engagement for the rest, as some measurements involve covering his eyes with a ruler. However, his reward may have been the reduction of distance between teacher and students, even though, as he says afterwards, he felt like “a plum”. If repeated, this type of inclusion potentially creates a safe environment, a ‘riskable classroom’ (Kellermeier, 1996).

DISCUSSION

Outline what is discussed in each paragraph

So what can be learnt from the risk-taking in the classrooms of these experienced mathematics teachers? I know from interview that Helen had poor behavioural management experiences in her former schools, and it is reasonable to assume such experiences would increase her awareness that showing emotions in class has associated risk, thus perhaps forming a block to risk-taking in the classroom, and hence to expressing positive emotions as for humour, *“We learn by experience whether or not it [humour] is a tactic we can use effectively”* (Ziv, 2010, p.12). From the interviews with Helen it appears that security is important to her. In the lesson, she followed common procedures associated with the role of a teacher. There is security for teachers from teaching mathematics in a traditional textbook form, as any balance is not then risked by experiment. The balance in Helen’s case lies between assessment requirements (upon which the students, and hence the teacher, are judged ‘good’ or not), and individual needs (in terms of understanding school mathematics only as required for assessment).

For Adam, there is a high degree of risk involved in creating a spontaneous scenario. There is a degree of vulnerability involved, as engaging in playfulness involves revealing self. Play depends on a willingness to potentially look foolish as well as a positive relationship with established limits, as there is a risk the teacher/student relationship can go sour. In this episode, Adam requires a degree of confidence that the older students will not think it silly or childish to become sheep in their mathematics lesson. This implies that to engage fully in risky behaviour, a teacher needs a perception of some reward for the endeavour. He also has to carefully judge how far to go before returning to the task, so it requires careful management.

Looking foolish in front of students is not the only risk. European culture is one where childishness is often a criticism, so teachers also risk criticism of neoteny (behaving in a childish way, in a negative sense), as Adam does in the episode above. Yet Brown (2008) suggests that humans are adaptable in terms of problem solving just because they are among the most neotenous species on Earth, that when an activity becomes habitual, and therefore easy, the risk reduces. An implication for experienced teachers is that they need to continually engage in reflexive re-positioning. They need to be willing to keep making the game different to maintain the risk and reward balance; the ideal 50% balance as discussed by Clifford (1991). I suggest this as motivation for Adam to create the sheep scenario, whilst his experience enables him to balance a further risk; whilst engaging in extended scenarios a teacher must manage behaviour carefully, especially as play may seem to students to be a relinquishment of expected routines. Whilst experiencing the scenario, students might easily lose sight of any mathematical purposes.

## The implications of highlighting risk-taking in conjunction with emotions

On occasion the teacher might be challenged in an unacceptable way, especially if the rules are ill-defined. This is important, as in the lessons where the teachers were seemingly taking risks, such as Freddie and Adam, this was in combination with strong ground rules, and expectations that were frequently reinforced. This suggests these risk-taking teachers know from experience the importance of clearly defining the boundaries within which risks might be taken. For example, they might model playfulness in conjunction with engendering potentially controversial situations through use of questions, or through creating surprising connections or revelations. This may require abandoning some of the expected roles of a teacher, which again is potentially risky. Yet one might easily suggest such teachers are likely to have more impact on student learning and engagement. Goffman (1997) suggests that when some expected roles have been abandoned, there may be less potential for conflict between teacher and students. A teacher can choose to be creative or to digress from expected role norms; to use deviative forms of play as a teaching strategy. In doing so, they need to accept any associated risk and associated vulnerability, and any associated emotions.

Prior experiences may have shown the participant teachers that risk-taking is a successful stratagem, and if they are willing to accept the risk of failure, then they can expect enjoyment. This may present as continually seek freshness, fluidly re-positioning to generate and support positive learning, and to respond to the student needs. The cases from which these illustrations are drawn imply that when routine sets in, a self-aware and reflective teacher may seek different ways of playing to gratify and entertain both the students and themselves. The expression of positive emotions evoked by anticipation of enjoyment is likely to make the risk-taking successful; students can see this modelling and expectation, and respond positively.

Classroom management includes assessing the balance between losing control and safety in the familiar. Judging how much risk-taking is appropriate is challenging for teachers. Teachers are open to student, parent and institutional judgements. whilst playfulness includes potential criticism of neoteny. Other judgments include assessing the likelihood of rejection by students for whom perhaps playfulness is either not the norm, or who only see such behaviours as an opportunity to push limits. Teachers function within systems of rules for behaviours, and may perceive taking risk-averse choices as reducing the likelihood of external criticism. For example, the duty within the role is to meet curriculum requirements, usually in the form of examination success. Within these constraints are individual dispositions, whilst within what is already often an effortful role, using positive emotion requires intensity, and hence effort. Further, it takes energy to put oneself ‘out there’. For example, to attempt humour which will not necessarily be accepted means there is vulnerability too, as experiencing the rejection of attempts is painful to an individual. In a mathematics classroom, the existing norms may not be conducive to the use of positive emotions. If used unsuccessfully, teachers may not repeat, and may withdraw further attempts, as it seems to be perfectly possible to teach mathematics without any emotional displays, either positive or negative. Similarly, teachers are continually assessed, so the connection between joyfulness and teaching (such as Adam’s neoteny), and the essential creativity to engage in the action of play, might disappear through too much criticism from self or from outside judgements.

A further role of positive emotions in regard to risk-taking has emerged from the criteria for storytelling (Lake, 2018), especially that positioning as removed from real life reduces risk for both teacher and potential anxiety for students. Used well, positive emotions by remove, not just humour as discussed by Ziv (2010), do not endanger a teacher’s authoritative position,

“Part of the pleasure that is created by every humorous message stems from the awareness that “this is not for real.” This awareness offers a respectable way out of expressions or actions that threaten the group. If these were taken seriously, punishment or rejection would follow, but when exactly the same message is conveyed humorously, it is more easily withdrawn. It is enough to say, “But I didn’t mean it seriously,” and the threat is removed.” (p.13).

Further, Morreall (1983) suggests laughter is indicative of security for group members, that conflict is unlikely. In my context, the implication is that teachers who use positive emotions can safely engage in teaching and learning without threat to self-esteem or status in that place and time, and indeed this suggests positive emotion use is an effective means of social management applicable to a mathematics classroom. Yet each teacher needs to assess how much risk-taking to incorporate for themselves, and to come to find the pleasures, playfulness, stories, and modelling of enjoyment of mathematics at a unique and appropriate point in their teaching career. One of the intentions is to examine how risk-taking might be encouraged whilst working with early career teachers, and when this proves beneficial to their teaching.

There is also some bias, as a position of adopting risk-averse choices in teaching, and hence reducing unpredictability (Sutton & Wheatley, 2003), is likely to be common. I suspect I did not see this view of mathematics teaching more often in the study as such teachers would be unlikely to risk being ‘discovered’ (in what might be perceived as a form of duplicity) through observation, and hence are less likely to engage in emotion research. This is purely supposition perhaps, but likely, and a limitation of my data.

The role of positive emotions within pushing boundaries as part of experiment acts to cushion and even functions (as suggested by Ziv (2010) for humour) to stretch the important skill of adaptability within a mathematics classroom, stretching the boundaries of what is possible before “irreversible sanctions kick in” (p.13). A teacher can model pushing boundaries as supportive of learning mathematics, or model risk-taking on the part of students. Students can imitate teacher actions, such as their use of positive emotions, and mimic behaviours seen as successful on the part of the teacher, ideally as ‘thoughtful imitation’ (Sfard, 2007, p.610).

Perry & Dockett (2007) suggest that in early childhood, many early mathematical understandings that create meaning are formed through play. They emphasise the role of play in creating situations supportive of innovation, risk-taking, and problem solving. The separation from reality that play allows creates a safe place for risk-taking, by supporting a reduction of potential shame or embarrassment, or a safe place for developing curiosity, and for predictive exploration into uncertainties.

## Risks in a system not built for it? Barriers, both professional and personal

Any teacher should be careful how positive emotions are used for several reasons, as there are perceived threats and risks involved. In this section, I review some issues arising from the data and analysis. I have explored how those participant teachers that use positive emotions allay such risks, or at least manage them. This summary highlights some reasons why not all the participant teachers used positive emotions combined with risk-taking in their teaching of mathematics.

There are counter positions to many of the positions taken by the participant teachers. For example, if current practices are considered sufficient, for a risk averse teacher, the motivation for change is limited. I have discussed managing behaviour for learning, whilst handing over control to students is often seen as risky behaviour, especially as this potentially leaves a teacher open to criticism. The main reasons may be based within perceptions of discomfort or lack of confidence, in expecting chaos, so that the perceived risk outweighs perceptions of benefit.

A current research interest is exploring how what we know about the affect whilst teaching of experienced teachers can be used to support new entrants to the profession as high risk, because of role, cannot be ignored. The participant teachers are experienced and secure in their classrooms, and perceived risk from external factors is perhaps less than for a new teacher. I would like next to explore what moved these experienced teachers out of their comfort zone, where and when they pushed their limits, and what made them willing to do so. This has implications for teacher retention, as characteristic of all the participant teachers was a commitment to, and satisfaction from their role (Lake, 2015). It is worth noting that “By comparing preferences of new teachers with those entering other professions, we find that individuals choosing to teach are significantly more risk averse” (Bowen et al., 2014). This is important, as if we are seeing risky practices within ordinary lessons of experienced teachers, then this implies that teachers can become more risk-taking as their confidence develops and they move towards becoming better teachers. Yet the constraints remain, as Clifford (1991) said,

 “there is a real possibility that we are too culturally addicted to success to sell students on the notion of moderate intellectual risk-taking and too convinced that learning is inherently aversive to create exciting, enticing, and enjoyable risk-taking conditions” (p.274).

# The challenge then becomes how to support and encourage teachers to engage in risk-taking.

# Acknowledgements

Grateful thanks to my PhD supervisor and to UEA for studentship funding whilst collecting this data. Also, thanks to my colleagues at UCL, who have listened patiently to the many iterations.

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