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XX. EMOTION WORK AT THE FRONTLINE OF STEM TEACHING

ABSTRACT

STEM education disciplines are facing a dilemma internationally. There is high
demand for qualified high quality teachers in science, technology and mathematics
subjects in schools and a trend towards high attrition rates of teachers in the early
years. Teacher attrition has been associated with, in part, the high demand for
emotion work required on a daily basis in classrooms. Despite this fact, there is
dearth of research on teachers' emotion management in specific disciplinary fields
such as science and mathematics education. In this chapter, we address the need for
research on teacher emotion work in science and mathematics education through
sociological analysis of the lived experiences of two of the authors. Using narrative
vignettes of classroom experiences, we consider what the sociology of emotions
can contribute to understand the emotion work required in science and
mathematics classrooms. Following an analysis of the two vignettes, we offer
suggestions for research, policy and practice for addressing STEM teachers'
emotional work through teacher education courses of professional learning.

Keywords emotion work · emotion management · STEM education ·
emotionalism · sociology of emotion

BURNING OUT AND TURNING AWAY

"You start to **feel worthless**. Really **crushed**. And you want to tell them to
stick it but you don't because you're **scared** of not having a job. I'm **fearful** all
the time. I feel **sick in my stomach**. I'm not a **suicidal** person but I could see
how someone could be driven to that" [emphasis added] Dalton, T. (2014, July
19).

Attrition of teachers within the first five years in the profession is an
internationally recognized problem (e.g., Ingersoll, Merrill & Stuckey, 2014) that
often gains media attention, as illustrated from the above newspaper quote.
Emotions such as fear, worthlessness and being sick in the stomach are not
uncommon and some teachers have begun collecting undesirable experiences in

web-logs[1]. Public disclosures about traumatic circumstances of teachers' work reveal the highly emotional nature of the job. They may also represent a call for help from the outside or a call to action within the teaching community. It is unsurprising then that such experiences lead to burnout and ultimately to teachers leaving their jobs. Although there are ample contrary cases of productive and pleasant teaching experiences, our focus in this chapter is on understanding the emotional nature of the job, how this may interrelate with teacher attrition, and how we can attend to the problem through teacher education.

Attrition is not an issue specific to science education; however, there is high demand for science, technology, engineering and mathematics (STEM) teachers globally (Goldhaber, Krieg, Theobald, & Brown, 2016), and it will be challenging for governments to meet these demands if teachers are burning out and turning away in their early years of the profession. Managing emotions like those described in the above quote constitutes the emotion work or labour (Hochschild, 1983) performed by teachers during daily encounters. A concept developed by sociologist Arlie Hochschild (1983), emotional work or emotional management refers to the effort expended to control our own emotions and the emotions of others, when complying with organisationally defined feeling rules, or normative social expectations. In this chapter, we consider the issue of emotion work by reflecting on two narrative vignettes provided by Alberto and Kathy about their past high school and primary school science and mathematics teaching experiences respectively. Our discussion focuses on the following question: How can perspectives from the sociology of emotion inform understandings about emotional work in teaching?

We conclude with recommendations to address the problem of teacher attrition, with a focus on the preparation of preservice teachers for the forgotten but critical dimension of emotional work.

METHODOLOGICAL CONSIDERATIONS

Investigating teachers' emotional work through personal narratives is consistent with the idiom of *emotionalism* (Gubrium & Holstein, 1994) whereby researchers seek to recount emotional experiences through raw detail. In reporting unfettered experiences, our accounts as former teachers can address the way in which we came to terms with "the nature and conditions of [our] existence" and how we make "sense of the wider, more differentiated, and more complex … contexts of [our] experience[s]" (Brockmeier & Harré, 1997, p. 264). We distance ourselves from ontological fallacies that would receive our narratives as representations of truth or some historical (fixed) reality that was experienced by the authors (cf. Brockmeier & Harré, 1997). Rather, the narrative vignettes presented in this chapter, constitute Kathy and Alberto's (re-) constructions of lived teaching

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[1] One example, from which we recovered the news story is the following site:
http://www.theteachersareblowingtheirwhistles.com/teachersstories.htm

experiences that establish an empathetic connection and solidarity with colleagues who are in the profession or who may have abandoned it. The importance of this chapter, then, does not come from a pretence of isomorphism between the stories and the teachers' past experiences, but rather from what the stories and our interpretation of them awakens in our readers as possibilities for shared understanding and for informed action through "the vicarious testing of life possibilities" (Clandinin & Connelly, 2000, p. 42).

A TIMELY CHANGE FOR SCIENCE EDUCATION RESEARCH

In the face of STEM teacher shortages and the parallel problem of high teacher attrition, the increasing attention to emotion in STEM education research is timely (Bellocchi, Quigley, & Otrel-Cass, 2017). A focus on *emotion management* in science education began with the pioneering work of Michalinos Zembylas (e.g., 2004). In his ethnographic study of an elementary science teacher, Zembylas (2004) demonstrates how the performance of emotional work is an important aspect of teaching. Some noteworthy outcomes from that study included the identification of positive benefits from the teacher's emotional work including increased satisfaction, self-esteem, and psychological well-being. Zembylas' work has since been followed by a cascade of studies focusing on emotional regulation of high school students (e.g., Tomas, Rigano & Ritchie, 2016), and preservice science teachers (e.g., Bellocchi, Mills, & Ritchie, 2015). Aside from these recent studies, past educational research on emotions has been informed predominantly by psychological perspectives (cf. Pekrun & Linnenbrink-Garcia, 2015). For this reason, we illustrate the relevance of *sociology of emotions* for expanding our understandings about the lives and work of teachers and the issues facing policy-makers in relation to attrition.

We frame our chapter around two narrative vignettes provided by Kathy and Alberto focusing on past school science and mathematics teaching experiences. As each vignette is presented, each of the chapter authors then discusses key emotional issues that address our guiding question. Before outlining our individual backgrounds, a brief biography of our collaboration is required. Alberto and Kathy are work colleagues who recently commenced collaborative research on emotion and online learning in science teacher education (see Bellocchi, Mills & Ritchie, 2015) and in supporting Australian indigenous children in learning about emotion through multi-modal expression using video and images (Mills, Bellocchi, Patulny, & Dooley, 2017).

More recently, we have begun a new collaboration with Rebecca, Jordan and Roger drawing on their sociological backgrounds to understand emotional work in teaching and learning. In the chapter, Rebecca draws on her knowledge of emotion in health-care and her studies of inter-professional education to explore the narratives through sociological perspectives. Jordan draws on his grounding in social theory to provide perspectives on identity and well-being, and Roger offers a macro-sociological perspective connecting the emotion work evident in the

narratives to issues of gender and emotion in education. As we each reflect on the narrative vignettes, we collectively develop a broader story in this chapter; one that informs our understandings of STEM teachers' emotional work, and one that considers how these understandings can inform STEM teacher education.

TALES AND INTERPRETATIONS OF EMOTIONAL WORK IN STEM TEACHING

Vignette 1 Emotionality and primary science teaching

Kathy: As I reflect on my years as a primary teacher, I relive a wave of strong emotions. I taught maths and science along with a range of school subjects to children from ages 5 to 11 years. Research into teacher's emotions has only recently been recognised as incredibly vital (Mills & Ritchie, 2014).

During the first few years of my career, I felt that my teaching was driven by a genuine sense of purpose. I was contributing in many valuable ways to the life outcomes of my students, their families, and the wider community. Some might have described me as the idealist, the visionary, the influencer, the performer, the curriculum expert, the organizer, the scientist, the artist, and the wise sage. I relished the opportunity to lead inspirational sessions for staff at the start of the day. I enjoyed teaching the students about the physical and natural world through observation and hypothesis testing – to see them grapple with new concepts – and to open their minds to previously inaccessible ideas. Despite being the top of my year at college, I was earning below-award wages at an independent school away from my home city, but to me it didn't matter because I felt that I was making a difference. At night, I would often stay back late until I was satisfied with my curriculum preparations.

Colleagues were very supportive of each other at my first teaching post. If one of us was having a bad day, we would open the room to make a double teaching space and play dance music with the students to provide some comic relief. I once gathered my Year 1 students to sneak under the classroom windows of the next room to surprise them with an impromptu puppet show during her science lesson. I relished our science excursions with encouraging parent involvement, like "overnight camp" to observe the night sky through telescope, sleeping bags spread across the classroom floor. These early teaching experiences made me feel emotionally energized, with a deep happiness and satisfaction. No matter what difficulties I confronted in life, I found it easy to make the classroom a secure, supportive environment for my students – a place of belonging and engagement, a place of productivity and hope for the future.

Over time, I worked in both regional and urban schools. The emotional costs of teaching gradually seemed to become heavier. I became well respected by the school leadership and gained more curriculum leadership roles, but also gained a few enemies among my teaching colleagues. I became buffeted in the fray between teachers and the bureaucratic requirements of external curriculum policies. Staff did not want to change their curriculum to meet the new requirements. I too was

resistant to certain school-based regulatory requirements, particularly mandates to use pedagogies that were antithetical to research evidence. For example, one school-based program required staff to read their lessons word-for-word from a teacher manual in front of the students. This was to compensate for all the mythical "bad" teachers who didn't plan proper lessons. At one time, a senior staff member required that all written work from the early year's students must be copied from the blackboard for notation accuracy, which limited thinking, learning and creativity. I saw that centralised and school-based administrative decisions were often leading to the deprofessionalisation of the teaching workforce. Increased standardized testing and accountability, and the government reregulation of schooling were exasperating both the students and myself alike.

Occasionally, there were stresses from parents who didn't accept the grades in report cards, but whose children needed learning support. Often school administrators placed demands on teachers for better student outcomes, but provided low levels of support in terms of teaching hours, class sizes, provision of teacher aids, specialist teachers and learning support and staff development. Workloads were high, especially during reporting periods. I watched as many of my female colleagues left teaching even within the first year after graduation, some never taught, and many never returned. Some left from the pain of managing difficult classrooms, others hurt by gossip and false accusations that had spread throughout the parent community. Somehow, I survived. I was resilient.

When referring to my teaching career to non-teaching friends, they would laugh at my use of the term "career". "Teaching is not a career, it's just a job", they would quip. At the time, I was primary Head of Curriculum and class teacher, mentor of pre-service teachers on field experience, completing two postgraduate degrees, and lecturing in the evenings at a teacher's college. Once a week, I coordinated a team of volunteers to run an afterschool club for underprivileged children. In social discussions about occupations outside of work, it was clear that some of my friends in other professions considered themselves to have an elevated status to teachers. I would simply laugh, "Aha, but if you love what you do, you never have to work a single day of your life!"

Disaffected students were a normal part of classroom life, and these students and their parents needed more time, counselling, and attention from teachers. I no longer had the energy to offer free tutoring after school for students who were struggling with troublesome maths and science concepts, as I had enthusiastically done in the beginning. The learning and behavioural problems of students seemed to be becoming greater, the learning gaps wider, and the inequities irreparable. I sometimes felt powerless to change the system. I was beginning to feel like a cog in a wheel, moving through the motions. I recall sorting out mundane disputes between students in a detached manner. In sum, around the end of my seventh year in the frontline battles of primary classrooms, I was essentially sapped of emotional resources. On my last day of teaching, I packed up my car filled with teaching resources I had invested my wages in – an aquarium, plants, and models of the solar system. I took one last look at my primary classroom and decided it was time to move on.

Rebecca: Important parallels can be drawn across Kathy's vignette and the scholarship on emotions in the health professions. The first is that emotions are relevant to STEM teaching and medicine. While this may seem obvious, given the focus of this chapter, it serves as an important reminder. Disciplines and thought communities allow us to recognise some aspects of our work and push us to ignore others (Zerubavel, 1997). For years, emotions have been regarded as irrelevant or even detrimental to medicine (McNaughton, 2013). The same might be said of teaching, and perhaps science – where emotions are often treated as a threat to neutral observation – teaching in particular. Emotions are, however, integral to teaching, being a professional, and indeed to being human; Kathy's vignette is a poignant reminder of this fact.

A second parallel can be drawn regarding emotional work. If emotions are fundamental to teaching, then teachers could be said to perform emotional work. Teaching and most notably nursing (James, 1992), along with all other work involving interactions between humans, involves emotional work. This might include suppressing one's own feelings of frustration and lifting the spirits of a patient, engendering excitement about astronomy amongst year three students or helping to change the mood of a colleague who is having a bad day. In Kathy's vignette, we see her early experiences defined by an emotionally supportive organisational culture that encouraged teachers to use music, puppet shows and creativity to sustain an engaging learning atmosphere.

Roger: While Kathy relates her experiences in a professional and gender-neutral tone, they implicitly reveal several gendered aspects to her work, and to the emotional work she describes. Women are more commonly represented in care industries, and care industries are more often undervalued (Husso & Hirvonen, 2012), a sentiment that sometimes runs through the teaching profession. An example of this can be seen in Kathy's recollections of her friend's quip that "Teaching is not a career, it's just a job."

Women are also more likely to engage in emotional work. Lois (2003) distinguishes men and women's emotional work, describing 'tight' emotion work aimed at quickly directing and controlling the emotions of others (such as by police and fire fighters) as predominately male work, and 'loose' emotion work aimed at listening and sympathising (such as by counsellors and nurses) as predominately female. Theodosius (2008) notes that women are more likely to engage in emotional work by warrant of their greater involvement in care and teaching work. It is important, though, to acknowledge Bolton and Boyds' (2003) critique of Hochschild, that emotional work is not always a form of alienation; sometimes it is an expression of the best in us as workers and colleagues. Kathy describes a supportive, playful environment in her early career, and recounts a wonderful story about performing a sneak puppet show for a fellow teachers' classroom. This is a good example of how emotional work can improve interpersonal wellbeing when enacted for purposes described by Bolton and Boyd (2003) as 'prescriptive' (out of professional pride/ commitment) or 'philanthropic' (gift exchange to colleagues).

However, Kathy recounts how her emotional load became heavier as she gained more leadership roles. This is in keeping with research that identifies

difficulties in reconciling organizational needs with the care needs of the jobs faced by many women, as noted by Husso and Hirvonen (2012). However, this could also have been part of a movement into a more competitive, masculine culture in the higher level, administrative side of the school. Men tend to dominate the senior management roles in most organisations, and studies have found that women are more likely to engage in upward management of 'bullying' male bosses in managerial and legal professions (Lively, 2000). Kathy might have experienced a movement into a less mutually supportive, and more masculine, competitive, and seemingly more conservative, in terms of enforcing outdated pedagogical practices.

Another gendered facet of her story was how she put in extra time to teach struggling children with special needs after class. This is again reflected in the literature on women performing much unrecognized labour in care contexts, and the personal dissonance this tension between organizational and human goals creates in teachers (King, 2012). But it is perhaps best revealed by its absence— that by the end of her time teaching, when she was burnt out, Kathy only performed what was officially expected of her in her teaching role, rather than performing above and beyond the role as a matter of course – as seems to be the expectation faced by many women in care work.

Jordan: Kathy's vignette is an enlightening reminder that emotions are always more than responses to stimuli or codes of social interaction. While emotions certainly do fill these roles, they also contribute substantially to the development of a sense of self. Kathy's willingness to prioritise fulfilling and rewarding work over pay rates, convenient hours and lighter workloads is supported by her pursuit of what Weber famously referred to as a 'calling' in his canonical work on the Protestant Ethic. But a more contemporary reading based on the sociology of emotions literature would indicate that Kathy's emotional experiences in the workplace contributed to a powerful and motivating sense of self (Lasky 2005), that became a source of fulfilment more pervasive than income or workload. This morale is reflected in the research literature on school teachers that indicates that if teachers can build a sense of self upon experiences of work that make a positive difference, they will be willing to make sacrifices to other aspects of their working life. Yet, if the institutional and bureaucratic pressures of the job challenge the authenticity of this charitable and generous sense of self, then teachers face a contradiction from the pressures of managing two contrasting selves. Arguably, this finding is reflected in Kathy's experiences. What is theoretically interesting here is the evidence that emotional experiences were not simply experiences for Kathy, but a key aspect of her Verstehen – or her way of engaging with and making sense of the world. It was through her emotional experiences that Kathy made sense of the bureaucratic school structure, the challenges of her students and the demands of their parents. Most importantly to her role as a teacher, it was the combination of positive and negative emotional experiences that supported the construction of an authentic self (Ruti 2014) capable of contextualising the high and lows of teaching into a meaningful narrative that can connect with her initial desire to inspire students. Perhaps the challenges to authenticity posed by working

within rationalised institutions are too much to overcome in the long term, leaving Kathy no choice but to sacrifice the sense of self that she worked so hard to accomplish or move on to another line of work.

Alberto: What we see in Kathy's story is how emotions such as empathy and care for the wellbeing of her students and colleagues, led her to create micro-social structures such as after-school learning support groups, and puppet shows with her year 1 students to lift the mood of her teaching colleague in an adjacent class. Not only is Kathy's personal emotional work evident from the vignette, but also examples like the puppet show illustrate the collegial work performed by teachers to support the emotional experiences of others. Whereas the notion of emotional work set out by Hochschild suggests a strong individual focus, Kathy's story indicates the possibility for collective emotion work to be just as significant in social groups as any labour that is conducted individually or in lack of physical presence of others. This could be a highly important factor in the retention of science teachers as EunJin Bang, Anne Kern, Julie Luft and Gillian Roehrig (2007) found through their longitudinal study of science teaching. Although their focus was on secondary science, teachers in their study who left within the first year did so because of unfavourable school climate, feeling unsupported from colleagues, lack of administration support, and students' classroom conduct.

Vignette 2 Under fire from f-bombs and c-bombs

Alberto: I was allocated 8th grade mathematics, some junior science classes, and an 11th grade chemistry class in my first year of teaching. I was not sure exactly what to expect because groups of students and classes can all have their unique personalities. It was in the first weeks of that year of teaching when I recall asking myself "What am I getting into." The mathematics class allocated to me was considered to be a low-achieving class based on previous academic performance.

During one lesson early in the year, we were in a small classroom located within a demountable building. The students had settled into the room and the lesson was underway. At one point, I faced the chalkboard to write some instructions for the lesson. As I did so, an argument developed behind me. I was not sure how it had started, but I will never forget how it ended. From what I recall of the incident, a boy sitting in the front row very close to where I was standing, had an altercation with a female student a few seats away in the row behind him. I think the girl had made a comment about his personal hygiene and the boy, taking offense to her comment, began to defend himself verbally.

As the girl threw an insult in his direction, he retorted with "F..k you b…h!" At this point, and for reasons that never became clear, another boy sitting in the very back row (i.e., approximately three rows behind the aggrieved boy), began throwing small pieces of eraser and verbal slurs at the first boy, while the girl retorted in kind with "f..k you c..t!" Now a three-way screaming match was exploding in a matter of seconds right behind me. If I had been asked hypothetically that morning, or any time before that day, "How do you deal with situations like this one," I am sure I would have rattled off what I had learnt in my

teacher education course on classroom management. I am also sure, that my reply would have looked nothing like what I did in the moment of that lived experience. In the initial phase of the altercation, I asked the students to end their argument and refocus on their work.

At this stage, I was not expecting the full-blown verbal warfare that was about to explode as the f-bomb and c-bombs were yet to be dropped (colloquial Australian expressions for "f..k" and "c..t"). Once I heard these expressions, I spun around immediately, I could feel my anger swelling, making my body shake but this was shrouded in hesitance and fear. I pointed at the eraser-thrower at the back "You, stop that!" I turned and pointed at the c-bomber girl "You. In that corner [pointing to one part of the room]!" I then turned and pointed to the f-bomber boy in the front row, "You. OUTSIDE!" I am no shrinking violet, but hearing that kind of language use by 14-year-old students tapped a nerve. The school principal disliked seeing students on classroom verandas and this played on my mind, leaving me to feel nervous, as I addressed the girl in the classroom, leaving the f-bomber boy waiting outside. Despite my anger at the extent of profanities used, I found it in myself to ask her what had happened. After collecting her version of events, I went to the veranda, closed the door, and asked the boy to explain his version. I can't remember much more past this point, other than the fact that after teaching a few more classes that day, I went home and asked myself if this is what I had signed up for. I didn't feel like a "science-maths teacher" on that day. I felt like I was doing something else, and that I had to be something else. This experience was the first and most memorable that led me to question whether these types of experiences represented what I had signed up to do.

Somehow, I looked past that event and despite others like it, albeit not quite as intense as that one, I taught for eight years before leaving to take up a new career in academia. In fact, as each year went by teaching became easier to manage, I thoroughly enjoyed the job and my relationships with the students. I had become more experienced, students had begun to know me from previous years or through siblings whom I had taught, families knew me, and I had developed a good reputation within the school community. From that initial maths experience and related episodes when teaching science, I learnt to regulate my own reactions and feelings towards students and classroom experiences that were unfavourable. At that time, I had also become more aware of the powerful role that effective social bonds with students, their families, and colleagues can have in improving teaching and learning experiences.

I can now account for my past teaching experiences by differentiating three key stages of transformation regarding emotional events. The first phase was marked by unbridled reactions to events that unfolded in the classroom (e.g., the f- and c-bomb episode). Once I had come to realise the impact this was having on me mentally and physiologically, a new stage began. In this second stage, I suppressed any expressions of how I truly felt so that I would not act on my anger, for instance, through actions like shouting. Yet, after some time, I felt that I was cheating my students by not letting them see how I truly felt and realised that trying to suppress the expression of my feelings was not good for me. I also

realised that covering up my emotional expressions did not convey the right signals for students to judge my feelings, and I understood that this would limit their own courses of action in response to what I displayed. At this point, I entered a third stage, where I chose to show my true feelings without reacting to them in the way that I had during stage 1. That is, I would let students see my anger, joy or disappointment for example, through my facial expressions. However, with feelings like anger, I would avoid actions such as raising my voice. Instead, I would signal my feelings non-verbally (e.g., angry face), and then articulate how I felt ("I am annoyed at that"), before issuing a consequence for any unsuitable student behaviour. During this third stage, I also made deliberate efforts to share personal stories to establish social bonds with my classes as a pre-emptive measure. I wanted students to see me as a fellow human being rather than simply as their science or maths teacher or the automaton that they must have experienced in my second stage. I eventually returned to the ideas about managing classrooms from my university studies and started to construct more sophisticated strategies based on the interaction between my readings and classroom experiences in phase 3. For example, I have written previously about metaphors used to differentiate my approach to junior school classes (policeman metaphor) when compared to senior classes (Steve Irwin, entertainer metaphor)(Ritchie, Bellocchi, Pöltl, & Wearmouth, 2006), which evolved continually as I progressed through my three career stages.

Jordan and Roger: Alberto's reflections in this section captures Holmes' (2010) notion of 'Emotional Reflexivity' whereby the performance and understanding of emotional states can be reflexively interpreted and reinterpreted by both the performer and the audience. Rather than suggesting that individuals are necessarily reflexive about their emotions and risking the implication that all emotional states are intentional, Holmes argues that reflexive theories "need emotionalizing" (Holmes 2010, p. 139). In so doing, Holmes points to the various ways that the reflexive process of interpreting social meanings, relationships and actions requires consideration of the role of emotions. We can see this clearly in Alberto's reflections on emotion management and the challenge of determining how honest he ought to be with his students regarding his own emotions.

While traditionally the emotional roles of teachers were more fixed and structured by tradition, such that teachers were expected to present cold and unemotional personas that masked care or affection, Alberto faces the challenge of renegotiating how to engage with students in effective and sincere ways. However, this cannot be accomplished without some recognition of his own emotional experiences that naturally push or pull him in particular directions. He cannot rely on reason or emotion alone to do this, but must find a balance that enables him to incorporate the skills and knowledge acquired through his education, with the variety of emotional interactions taking places in the rather complex dynamic of a classroom.

Alberto's reflections highlight how the roles of reason and emotion are not only inseparable and interdependent, but also constantly challenged and renegotiated throughout his personal development as a teacher. This reflexive process is not

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attributable to rational action, but to a process of self-awareness and reflection that entangles experience, reason and emotion. Alberto's recollections here hint at how masculinity can shape emotional responses to situations of conflict, and their resolution. He describes a situation between students that is gendered—an altercation between a girl and two boys—and his response could perhaps be interpreted as gendered. He recalls his own confusion as a precursor to the event—with little awareness of the tension in the room and the possibility of swift escalation to full aggression and even violence—and his own, reactionary, groundswell of anger and outrage at the language, emotions that strongly enervated his response.

While his reactions were not inappropriate to the context—there is a role for discipline in teaching—his response was clearly assertive, authoritative, and perhaps typically masculine in its confusion as to the emotional dynamics underlying the situation, and in the degree of anger that came to characterize the response. In some contexts, such 'masculine' approaches to handling emotionally charged situations in the classroom might not be so appropriate—or at least not optimal when compared to taking pre-emptive emotion work to avoid the situation occurring in the first place—in terms of the emotional toll it takes on teachers. Alberto recalls how the event made him reflect on what went wrong that day, and encouraged him to greater efforts to befriend students and families to pre-emptively avoid such emotionally charged situations repeating themselves. This demonstrates a potential shift away from a 'masculine' emotional culture of automatic authoritative responsiveness to classroom conflict, towards a more reflective—or gender-neutral—response.

Alberto's vignette again reveals the complexity of emotion management. Hochschild (1979) notes that emotion management is not just about locking down or repressing emotions, it also about evoking emotions in us or other people. This can be seen in Alberto's different forms of emotional work used on junior students (stern emotional control) and senior students (enervating jokes and humour)(cf. Ritchie et al., 2006).

The former strategy does touch on other aspects of the masculine approach to emotionality, or more precisely to the often-cited need for men to appear rational, calm and even stern rather than emotional in taking charge of situations (Louis, 2013). Jack Barbalet (1998) argues that emotions and rationality form complements rather than substitutes, though we traditionally place the latter above the former, and this is reflected in the development of Alberto's emotional skillset. In his self-described 'stage 1' period of teaching, Alberto reacted in a manner he felt was 'over-emotional', with feelings of anger, and actions such as shouting, that were unmediated by reflection or engagement in emotional work.

To curb these experiences, he shifted in stage 2 to a classic rational approach of suppressing emotions and engaging a tighter form of emotional control, which is somewhat akin to Hochschild's (1979) concept of 'surface acting'. This 'surface' approach to 'papering over' emotions does not convey an authentic emotional experience, is disappointing for students and debilitating for teachers (as Alberto recounts), and is worrisome given findings linking 'surface acting' to increased

levels of stress, mental health problems, and dissatisfaction with work (Naring, Briet, & Brouwers, 2007). Alberto's third stage was the real breakthrough, in that by this time he had learned to be much more aware of his own and others' emotions, and to neither to allow nor repress unfiltered emotions. Instead, he reflected on their appropriateness, and the appropriateness of their component actions, such as hand gestures, vocalizations and facial configurations for particular situations and classes.

CONTRADICTIONS AND COMMONALITIES IN THE NARRATIVES

Rebecca and Jordan: Both Kathy and Alberto's vignettes highlight the emotional work that teachers perform. Kathy describes the work she did to lift students' and colleagues' emotional states. Alberto describes the effort he put into reflecting on his anger, and regulating his reactions to maintain control over the classroom and facilitate learning. Alberto's account also hints at the limits of emotional work. After his unexpected efforts at disarming 'c' and 'f' bombs in the classroom, he writes, 'I didn't feel like a "science-maths teacher." I felt like I was doing something else and that I had to be something else.' While we may be able to manipulate our outward presentation to comply with role requirements, whether or not we can sustain this emotion work depends on whether the role we are acting, feeling and being fits within our identity and our other roles. If it does not fit, role strain and burnout will likely eventuate (Lois, 2006).

Alberto's vignette also shows that emotions, and the emotional dimensions of teaching, are not solely experienced cognitively, but viscerally and socially— within interactions. He describes his embodied response to the confrontation in his classroom: anger so strong it prompted him to start shaking. This description reminds us to use theoretical tools that account for more than the conscious elements of our emotional experiences. Theories of emotions such as Hochschild's concept of emotional work leave something to be desired on this front. While they acknowledge the biological aspects of emotion, the focus is primarily on the manipulation of emotional experiences within our conscious control.

Alberto's vignette highlights an example of how relationships of power are not always stable and predictable, but contested and malleable. While this point is not uncommon in the literature of political sociology (Lukes, 1986), the presence of such a blatant disregard of Alberto's authority as the teacher in this scenario forced him to fulfil a role that is clearly outside of what aspiring teachers seek to play. The task of switching from the role of police officer (as he describes it) to the supportive mentor and friend requires an enormous amount of emotional energy and as Alberto suggests, this was not something that his tertiary education had fully prepared him. While Hochschild describes scenarios where performance roles and their related statuses are challenged, the moment of indecision that Alberto describes seems to lie outside of her theory of emotional work. Perhaps it is in this moment that Alberto experiences a contradiction between deep and surface acting, or simply a tension between expectation and reality.

The temporal dimension of each account offers another point of analysis. Alberto provides snapshots of significant moments of emotional work, whereas Kathy describes a trajectory. She shifts from motivated visionary in her early years to detached and depleted automaton in her final years – propelled by increasing demands on her time, coupled with decreases in autonomy over her work. A similar phenomenon occurs in medicine. In their seminal study of medical education, Howard Becker, Blanche Geer, Everett Hughes and Anselm Strauss (1961) found that first year students are often motivated by humanitarian ideals and eager to make a difference. By the time they complete their studies, many are disillusioned. The overwhelming volume of content and the short amount of time in which to learn it pushes many to replace their previous ideals with a singular goal: survival. This parallel depicts time as a resource necessary to professionals – teachers and health professionals alike – undertaking the preparatory, support and emotion work that allows them to take pride in their work. It also points to time as a necessary resource for enjoying aspects of one's work, such as a puppet show for the class next door, and processing less desired emotions. While some emotions are fleeting, experienced in the moment, complex emotions take time to feel (Olson, 2015).

PREPARING STEM TEACHERS FOR THE EMOTIONAL WORK AHEAD

The teaching profession suffers from chronic annual turnover and attrition worldwide, with related ramifications for the STEM education disciplines (e.g., Bang et al., 2007). Research on the reasons why teachers leave the profession are aligned to the vignettes explored here: 75% of teachers leave because of low salary; 39% of teachers leave to pursue a better career; and 29% leave because of dissatisfaction with teaching conditions. The four main problems with working conditions cited by teachers are: student discipline problems; lack of support from the administration; poor student motivation; and lack of teacher influence of school and classroom decision-making (Ingersoll & Smith, 2003). Clearly, increasing the rewards and working conditions of STEM teachers, or teachers in general, to reduce stress is part of the solution, rather than blaming the victims and recommending that teachers simply become more resilient to oppressive workforce structures.

However, understanding and addressing the emotional work of teaching is another important dimension of reducing burnout among teachers. The emotional work of teachers includes behaviours such as "surface acting", or displaying emotions that are not felt. It also involves "deep acting", in which the teacher undertakes certain activities in order to feel a socially required emotion. Another potential dimension of emotional work is the suppression of emotions (Naring, et al., 2007). What can be done to prepare STEM pre-service teachers for the emotional work of the job before they arrive at the classroom door?

We are conscious of avoiding simplistic arguments that would lead teachers into learning coping mechanisms for dealing with extreme situations. Some of the experiences reported by teachers in the media, such as our opening quote, are

beyond anything that can be considered reasonable. In cases of violence, abuse, and forms of institutional bullying, different strategies from those we offer are needed to redress the often complex issues that lie beyond matters of teaching practice, self-awareness, and classroom management. Our aim here is to consider those strategies that can be taught in teacher education courses to prepare preservice teachers in dealing with low to medium intensity issues, such as those represented in Kathy and Alberto's vignettes.

Analysis of the vignettes has pointed to several ways in which scholarship from the sociology of emotions can inform practice and the preparation of pre-service teachers. First, the emotional dimensions of teaching should be acknowledged within school systems and within university curricula aimed at training pre-service teachers. If the high rates of burnout amongst teachers and parallel shortages of STEM teachers are to be addressed, emotions should be a primary focus of teacher education, policy and research. Emotions can be effortless and easy, but they can also be complex, confusing, draining and require ongoing management. Thus, teaching involves emotional work.

University curricula and ongoing professional development could more explicitly include reflective lessons on emotional work. In doing so, it could be made clear that this form of labour is not just an individual skill, it is dynamic. The emotional work required of a teacher is responsive to students' needs and group dynamics, while also mirroring the organisational climate and expectations of the school and the profession. In Kathy's vignette, we also saw the potential for *collective emotional management* as a strategy of collegial support in helping others to deal with their teaching circumstances. Preparing pre-service teachers for this kind of supportive role is achievable in university courses.

Second, such curricula on emotional work in undergraduate and postgraduate teaching degrees could be effectively guided by Billett's (2011) socio-personal conceptualisation of work-integrated learning. This model highlights (1) the different experiences and kinds of learning that take place at universities and on placements; (2) the need for three forms of knowledge required for successful work performance: conceptual, procedural and dispositional; and (3) the active role of the learner in integrating knowledge, in all three forms, across university and placement experiences. In Billet's construct, conceptual knowledge is factual and theoretical; procedural knowledge refers to specific steps and strategies; and dispositional knowledge refers to the embodiment of relevant values.

Learning about emotional work, conceptually, in university would be the first step towards raising pre-service teachers' awareness of this facet of their (and other teachers') work while on placements. Encouragement of ongoing reflection on one's emotions and emotion work could help pre-service teachers to construct and embody emotional work practices that will work for their social and personal circumstances and, potentially, decrease experiences of role strain and burnout. Use of *emotion metaphors,* as developed by Zembylas (2004), could be one way of scaffolding teacher reflections. Identifying the use of metaphorical language in reflective accounts of teachers' emotional experiences can help in identifying the way in which they perceive these events and the emotional work involved in

teaching. More recently, techniques such as breathing exercises have been used effectively with science teacher educators and this approach could be extended to preservice STEM teachers (cf. Tobin, King, Henderson, Bellocchi & Ritchie, 2016). A famous quote by Henry Adams (1871; p. 261) argues, "A teacher affects eternity – you never can tell where this influence stops". The emotional cost of teaching is high, but it needs to be nurtured to support the lifelong difference made to future generations.

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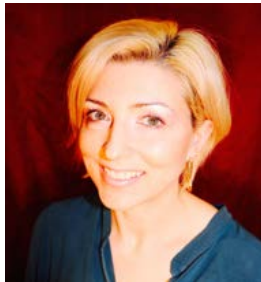
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