



# If the jacket fits: A metaphor for teacher professional learning and development



Sandi Tait-McCutcheon\*, Michael Drake

Victoria University of Wellington, PO Box 17-310, Donald Street, Karori, Wellington, New Zealand

## HIGHLIGHTS

- Jackets are proposed as way one to conceptualise professional development.
- Eighteen lead teachers co-constructed 11 metaphors for professional development.
- Ten metaphors denoted connections between teachers and PD that could disadvantageous.
- Co-construction, positioning, humour and time assisted the metaphor development.
- The metaphors assisted lead teacher to conceptualise their relationship with PD.

## ARTICLE INFO

### Article history:

Received 30 May 2015

Received in revised form

1 October 2015

Accepted 16 December 2015

Available online xxx

### Keywords:

Teacher education

Professional development

Mathematics and statistics

Metaphors

## ABSTRACT

The purpose of this research project was to assist lead teachers to define, analyse, and refine their relationship with professional learning and development through the metaphor of a jacket. Metaphor analysis was used to study 18 lead teachers' from six New Zealand schools co-constructed written metaphors. One major finding was the significant number of metaphors that conceptualised a disadvantageous relationship between teachers and their professional learning and development. An implication of that finding is the need to make explicit and address possible negative dispositions teachers may hold toward their professional learning and development.

© 2015 Elsevier Ltd. All rights reserved.

*Things do not pass for what they are, but for what they seem. Most things are judged by their jackets. - Baltasar Gracian Y Morales*

## 1. Introduction and purpose

Consider for a moment that the relationship between yourself and your professional learning and development (PLD) was a jacket. What jacket would it be and how would you wear it? Would it be a Strait Jacket because you tend to feel confined and restricted by PLD? Perhaps it is more like an Emperor's Jacket because the effects on your practice are invisible. Or do you see your PLD as an Ole Favourite Jacket that you can tailor to meet your needs and expectations. Your choice and style of jacket could be influenced by

狭窄的衣服    皇帝的衣服    01e最喜欢的衣服

such things as your previous experiences of PLD, your personal and professional orientations to and capabilities with the content, your beliefs dispositions and subjectivities, your career stage or objectives, and your home and school responsibilities. You may choose a different jacket when participating in PLD workshops, when reporting back to others on the merits of the PLD, when applying PLD principles to practice, when being observed teaching, or when analysing student achievement data. **The jacket you select could reflect the level to which you engage with the PLD**, and so provide an indicator of the potential effectiveness and sustainability of the PLD, and ultimately the impact the PLD can have on increasing your students' achievement.

A jacket is a common article of clothing that is extensively recognised and easily visualised. Jackets come in many designs and have a wide variety of uses. They can be worn casually or formally, straight off the rack, or be customised by the wearer. The use of a common article of clothing, such as a jacket, can enable teachers to access, interpret, and communicate how they wear their PLD. The humorous and non-threatening introduction of the jacket

\* Corresponding author.

E-mail addresses: [sandi.mccutcheon@vuw.ac.nz](mailto:sandi.mccutcheon@vuw.ac.nz) (S. Tait-McCutcheon), [michael.drake@vuw.ac.nz](mailto:michael.drake@vuw.ac.nz) (M. Drake).

metaphor can allow potentially emotive or problematic issues such as negative dispositions toward the PLD or toward changing classroom practice, to be addressed. These discussions reach to the heart of developing a safe environment where teachers feel confident about contributing ideas, airing concerns, seeking understanding, reconciling differences, and collaborating.

In this article we discuss the use of the jacket metaphor within statistics PLD. **We argue that the use of the metaphor provided lead teachers with a tool to reflect on and understand teachers' general perceptions of PLD and to accentuate and accelerate their own engagement with their statistics PLD.** We begin by reviewing literature regarding the constructs of effective PLD. Next we explore the use of metaphor in research and in particular in pre-service and in-service mathematics teacher education. Methods of data collection and analysis are then explained. The findings from the study are described and discussed. We conclude by considering the implications and possible next steps of this research.

## 2. Effective professional learning and development

Teacher professional learning and development is about “teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth” (Avalos, 2011, p. 10). Ultimately all PLD should result in improved and valued educational outcomes for students (Anthony, Hunter, & Thompson, 2014; Darling-Hammond & Richardson, 2009; Timperley, Parr, & Bertanees, 2009; Timperley, Wilson, Barrar, & Fung, 2007). Four core principles that underpin effective PLD involve providing opportunities for teachers to develop adaptive expertise, having an understanding of how teachers learn, the development of teacher and teaching communities, and locating the PLD within organisations with adaptive capacity that support and align with the PLD (Avalos, 2011; Borko, Jacobs, & Koellner, 2010; Borko, Koellner, & Jacobs, 2014; Edwards, 2012; Timperley, 2011a; Timperley et al., 2009).

The first principle of effective PLD calls for teachers to develop adaptive expertise. Teachers with adaptive expertise are specialists in retrieving, organising, utilising, and reconsidering their professional knowledge and beliefs. They respond effectually to students' challenges and needs, they accurately measure and feed back on the effectiveness of teaching and learning, and they know when and from whom to request help (Timperley, 2011a). Borko et al. (2014) contended that when teachers adapt the PLD to their own contexts, whilst maintaining the integrity of the PLD's objectives and strategies, the likelihood of sustained positive outcomes from the PLD are increased.

The second principle is the need for those leading the PLD to provide opportunities for teachers to learn through drawing on their existing knowledge and experiences, identifying how new ideas or theories may work in practice, and taking control of their own learning through meta-cognitive and self-regulatory processes (Borko et al., 2014; Timperley, 2011a). It is important that teacher learning is situated within the cognitive and emotive practice of teaching (Borko et al., 2010). The capacity for, and willingness of, teacher change requires teachers to individually and collectively make connections between their existing cognition, beliefs, and knowledge and the nature of altered, reinforced, or improved practice (Avalos, 2011; Edwards, 2012).

The importance of the social contexts in which the PLD occurs is the third principle of effective PLD. Teachers need occasions within and beyond their classrooms and schools to socially and collegially construct individual and shared knowledge and expertise (Edwards, 2012; Timperley et al., 2009). Shared knowledge and expertise offers teachers opportunities to examine their practice through many sets of eyes and ears, in essence “I tell my story for

me and you hear it for you” (Miller, East, Fitzgerald, Heston, & Veenstra, 2002, p. 82). Vadeboncoeur and Torres (2003) summarised these first three principles as what teachers need most:

the time and opportunity to share their experiences, concerns and ideas with colleagues, to reflect on and study their practices systematically, to examine the theories and beliefs underlying their practice, to explore new methods and strategies, and to rethink their theoretical frameworks in the light of other frameworks. (p. 97)

However, if school leaders and policies do not support and promote the first three principles of adaptive expertise, teachers as learners, and social contexts then it becomes very difficult for new or improved knowledge and practices to influence student achievement at a whole school level. At best, teachers' practices tend to remain enactments of the PLD expectations rather than deliberate changes to improve practice and student outcomes (Timperley et al., 2009).

This article describes a metaphorical approach used in the context of statistics PLD that we believe was aligned with the first three principles of effective PLD. Lead teachers had opportunities to consider the relationships between teachers in general and PLD, to contextualise the PLD to their own environments, to learn about themselves as learners and have autonomy as learners (Avalos, 2011; Borko et al., 2014; Edwards, 2012; Timperley, 2011a).

Having considered the principles of effective PLD within this study it is also important to review the constructs and processes of metaphor that contributed to this study. In the following section we review the use of metaphor in research and in particular in pre-service and in-service teacher education.

## 3. On metaphors

Metaphors are a cognitive, linguistic, and experiential conceptual process commonly used in thinking and communication (East, 2009; Lakoff & Johnson, 2003; Noyes, 2006). They are so much part of our language that they profoundly influence the ways we perceive, think, and act, which in turn affect the metaphors we use (Bruner, 1990; Green, 1971). Our conceptualizations, our actions, and consequently, our language, are “metaphorically structured” (Lakoff & Johnson, 1980, p. 5). Santa Ana (1999) contended that the more common place metaphors become, and the more straightforward they seem, and the more powerful they can become in how we think. Martínez, Saulea, and Huber (2001) posited that metaphors “constitute an essential mechanism of the mind” (p. 965). As such, many of the conceptual processes through which we filter, interpret, understand, and frame our world are based on metaphors (East, 2003; Lakoff & Johnson, 2003; Noyes, 2006). Metaphor usage is “a ubiquitous feature of our thinking and our discourse, and the basis of the conceptual systems by means of which we understand and act within our worlds” (Taylor, 1984, p. 5).

A metaphor “consists of the projection of one schema (the source domain of the metaphor) onto another schema (the target domain of the metaphor) to which the meaning is conveyed” (Levin & Wagner, 2006, p. 237). The source is the domain through which the target is being metaphorically explained or conveyed and the target is the domain that we try to explain or understand (Armstrong, 2008). Sources tend to be more concrete while targets are more abstract. By bringing the knowledge of the source domain to the target domain one concept becomes related to the other and metaphors give us two ideas for one (Kovecses, 2002; Lakoff, 1994). King (2001) explored the example of “jazz improvisation” as the source domain and “conceptually oriented mathematics teaching” as the target domain when examining teachers' orientation toward

their mathematics instruction (p. 9). One of Lakoff and Johnson (1980) most famous examples of a conceptual metaphor is the conceptualisation of 'life is a journey'. In that example, the journey is the more concrete source and life is the target – the abstract, less familiar domain. In this study the source domain is the jacket and the target domain is the relationship between teachers and PLD.

When metaphors are created the properties of one structure is mapped onto another, or one structure is metaphorically structured in terms of another. From mapping and structuring, insight and understanding are enhanced (Groundwater-Smith, 1998; Wilks, Barnden, & Wang, 1996). Green (1971) contended that “the main virtue of a metaphor is that it calls to our attention certain similarities between two things” (p. 57). This comparison is implicit and works by treating one thing as though it were the other; in doing so, the metaphor can help lead the mind from the familiar to the unfamiliar, thus helping to carry us towards understanding (Chung & Miller, 2011; Patchen & Crawford, 2011).

Groundwater-Smith (1998) contended that metaphors can help us “make sense of our world” (p. 1) by getting our attention and making us take notice. In this sense, the use of a metaphor can provide new ways of reasoning, gaining insight, improving practice, and explaining and constructing meaning (Cornelissen, Oswick, Christensen, & Phillips, 2008; East, 2009). Comparing and contrasting metaphors provide ways for thinking about how we understand ourselves, how we are understood, and have the power to alter and broaden our perspectives (Bullough & Stokes, 1994). Identification and exploration of metaphors is useful for encouraging the questioning of self, exploring goals, and visualizing (East, 2009). Complex concepts can be simplified through metaphor and from the simplification we can gain a new understanding of our experience (Lakoff & Johnson, 1980; Wolodko, Willson, & Johnson, 2003). Metaphors provide a space slightly removed from practice from which we can step back and think beyond what we already know to create powerful and lasting images and ideas (Chung & Miller, 2011; East, 2009). Lakoff and Johnson (1980) contended that “because so many of the concepts that are important to us are either abstract or not clearly delineated in our experience (the emotions, ideas, time, etc.), we need to get a grasp on them by means of other concepts that we understand in clearer terms” (p. 115). For example, the metaphor “war is hell” can allow people with little experience of war to use their conception of hell to help understand what war is like. Finally, metaphors can “mark off boundaries and define conditions of membership” (Taylor, 1984, p. 17) as we negotiate our place in specialized and relatively narrowly-defined discursive communities.

### 3.1. *Metaphors in mathematics teacher education*

In this article we argue that metaphors can provide a starting point for “gaining new insights into education practice and theory” (Jensen, 2006, p. 13). The knowledge and beliefs teachers hold are personal and contextual and so can be difficult to articulate (Thompson & Campbell, 2003). Tobin (1990) posited that metaphors can provide the means through which teaching and teachers' misunderstandings and misconceptualisations can be reconciled or resolved. Ashton (1994) added that metaphor should disrupt teachers' complacency about their practice and lessen their tendency to resort to simplistic explanations of practice.

In teacher education metaphors have disclosed and mediated the relationship between espoused beliefs and enacted practice and provided the potential for changing both (Chung & Miller, 2011; Groundwater-Smith, 1998; Patchen & Crawford, 2011; Reeder, Utley, & Cassel, 2009). Explicit and tacit reflection and critical awareness can be promoted as teachers explore beyond their conscious awareness of their cognition, beliefs and practices

and consider the more implicit beliefs that shape their practices (Bullough & Stokes, 1994; Chung & Miller, 2011; Reeder et al., 2009). Martínez et al. (2001) believed metaphors could stimulate “teachers to explore new conceptual territories visible from an alternative point of view ... and ... a perspective of classroom practice which they might not have otherwise considered” (p. 974).

Empirical mathematics teacher education research has focussed on the use of metaphors with pre-service and in-service teachers. In research spanning 25 years Bullough and Stokes (1994), Wolodko et al. (2003), Noyes (2006), and Reeder et al. (2009), asked pre-services teachers to reflect on and metaphorically conceptualise their past and present experiences and beliefs about teaching and learning mathematics. The aim was to facilitate change and professional growth by positioning the pre-service teachers to confront potential differences between their beliefs and practices (Wolodko et al., 2003). Pre-service teachers iteratively compared, contrasted, and reflected on how the social and cultural contexts of their metaphors might influence their mathematics teaching and learning beliefs and practices (Noyes, 2006). Opportunities were provided for them “to develop alternative ways of thinking about teaching and self as teacher and for considering the ethical implications of holding one or another conception of teaching” (Bullough & Stokes, 1994, p. 200).

Shared conclusions and recommendations can be drawn from the four studies. Wolodko et al. (2003) and Noyes (2006) concluded that metaphor creation and analysis provided the pre-service teachers with the reasoning and motivation to make changes to their practice in ways that positioned themselves and their students more positively toward mathematics. Bullough and Stokes (1994) and Reeder et al. (2009) recommended that teaching and learning metaphors needed to be examined in context to be truly understood and beneficial to practice. Added to this was the recommendation that any examination of beliefs or practices had to be open, honest, and explicit if it were to challenge or change preservice teachers' potentially limited and/or limiting beliefs about teaching and learning mathematics (Reeder et al., 2009).

Tobin (1990), Miller et al. (2002), East (2009), and Martínez et al. (2001) sought to understand how in-service teachers conceptualised, altered, and reflected on their individual and shared teaching roles and practice, through the use of metaphor. Tobin (1990) found that when in-service teachers' metaphors changed so too did the way they conceptualised and enacted their teaching practice. Metaphors, therefore, provided a “master switch” to challenge and change the teachers' beliefs and practices. “If a switch is thrown, (the metaphor is changed) and a host of changes follow” (p. 126). Miller et al. (2002) and East (2009) also identified that the use of metaphors progressed teachers toward more collaborative and reflective planning and teaching and increased teachers' confidence in professionally and personally sharing their teaching stories. Metaphor provided teachers with the tools and language to own, name, and reframe the desirable and less desirable aspects of their beliefs and practice (East, 2009).

However, Martínez et al. (2001) were surprised to discover that more than half the in-service teachers' metaphors in their study represented a behaviourist/empiricist perspective of learning emphasising teacher as trainer and transmitter where students were described as untamed animals, out of tune instruments, and blank pieces of paper. The researchers posited similar recommendations to those of Bullough and Stokes (1994) and Reeder et al. (2009) when they hypothesised that in-service teachers needed to have opportunities to view their own and others practice from new perspectives so that the use of metaphor could function as the “stepping stones to a new vantage point” (Martínez et al., 2001, p. 974).

### 3.2. Limitations of metaphor use

While they are a commonly-used form of speech, the conscious use of metaphors by educators needs to recognize their limitations. Three potential limitations of metaphor use and analysis have been identified in the literature. The first limitation is that the development of a metaphor might appeal only to the more linguistically inclined and some people may be more comfortable representing their beliefs and dispositions through an image rather than a metaphor (Bullough & Stokes, 1994; Wolodko et al., 2003). The danger of teachers settling on a potentially disadvantageous metaphor as a rule to follow or of them assuming the acquisition/transfer metaphor of learning as one that was so common it could be taken-for-granted as being suitable or appropriate is the second limitation (Boud & Hager, 2012; Tobin, 1990). In both situations teachers could reduce the complexity of teaching to a naïve and superficial representation or be disinclined to pursue more promising perspectives (Green, 1971; Martínez et al., 2001; Phillips, 1996; Thompson & Campbell, 2003). The third limitation is that a certain amount of honesty is required when a person is asked to create or identify a personal metaphor. Such honesty is likely to be a product of the person's feelings of comfort and safety, and their orientation to risk-taking, so can require an environment in which there is a depth of trust (Bullough & Stokes, 1994). Despite the potential for limitations we argue that metaphor provided a robust approach for developing and examining lead teachers' metaphors of teachers' dispositions to PLD in general and to represent the relationship between themselves and their PLD.

该学习项目的目的是让领导教师参与到能够培养和促进学生统计能力的行动研究中

## 4. Method

Metaphor analysis is a “method particularly suited to study the meanings people invest in their actions and the interpretations they make out of them” (Kram, Wasserman, & Yip, 2012, p. 7). Analysis of any metaphor should include the language used to describe and discuss the metaphor and any pictorial representations (de Guerrero & Villamil, 2002). Metaphor analysis involves “collecting examples of linguistic metaphors used to talk about the topic ... generalising from them to the conceptual metaphors they exemplify, and using the result to suggest understandings or thought patterns which construct or constrain people's beliefs or actions” (Cameron & Low, 1999, p. 88). The goal of metaphor analysis is to gain insight into participants' individual or shared metaphors through understanding the socially constructed connections within the metaphors and the linguistic expressions that describe them (Armstrong, Davis, & Paulson, 2011). As a theoretical approach metaphor analysis is concerned primarily with how people understand their experiences (Taylor, 1984). As a methodological approach its strength lies in its systematic approach in unpacking the contents of a target domain (Andriessen & Gubbins, 2009; Kram et al., 2012).

Three research questions provided the focus for this study:

1. How do lead teachers metaphorically represent the relationship between teachers in general and PLD?
2. Did conceptualising the relationship between PLD and teachers in general assist lead teachers to better understand their own relationship with PLD?
3. Did conceptualising the relationship between PLD and teachers in general assist lead teachers to more readily connect with this PLD?

1. 领导教师是如何对教师和专业发展之间的关系进行隐喻的？
2. 将教师与专业发展之间的关系隐喻是否能够更好的帮助领导教师理解他们自己与专业发展之间的关系？
3. 将教师与专业发展之间的关系隐喻是否能够更好的帮助领导教师做好自身专业发展的准备？

### 4.1. The theoretical frame

The theoretical frame informing this study is twofold. First it is framed by a **sociocognitive perspective** whereby qualitative and quantitative data have been used to understand “acts of thinking ... that go on, in real time, in the minds of individuals, built out of and in response to other voices” (Flower, 1994, p. 31). The lead teachers individual thinking and shared discourse are both situated and social, and knowledge is viewed as “a dynamic integration of interior processes and exterior forces” (Theado, 2013, p. 23). Second this study draws on the **theoretical perspective of cognitive linguists Lakoff and Johnson (1980; 2003) and Kovecses (2002)**. From this perspective metaphors are said to reveal deeply held conceptualisations about a topic and language is seen as the means for coordinating our perception of, and participation in, everyday experiences (East, 2009; Theado, 2013). **A sociocognitive/cognitive linguistic frame supported our investigation to better understand lead teachers experiences, conceptualisations, and relationships with PLD.** 社会认知以及认知语言学家的理论能够帮助我们更好地理解领导教师的经历、相关概念理解以及和专业发展的关系。

### 4.2. The context of this study

The statistics PLD cluster comprised 25 lead teachers and their Year 1–8 students (aged 5 to 13) from nine primary (elementary) schools in New Zealand. The first author of this article was the PLD facilitator and the second author was an external expert. **The broad aim of the statistics PLD was to engage lead teachers in effective developmental action research that raised and sustained student achievement in statistics (Author, 2010).**

The statistics PLD was not an acquisition and transfer model (Boud & Hager, 2012). We did not want lead teachers positioned to learn what we thought they needed to know nor did we expect them to transfer our teaching to their schools and students. Lead teachers' learning and development were considered important constructs and both were necessary as part of an approach that placed students and their improved achievement at the centre of the process (Anthony et al., 2014; Timperley, 2011a, 2011b). As Timperley (2011a) proposed, lead teachers needed to have opportunities to strengthen their professional knowledge and hone their professional skills.

Some lead teachers volunteered for the position of statistics lead teacher in their school, others were given the role because they were the mathematics lead teacher, others were enticed with the offer of a great morning tea and lunch, and a smaller group were directed to attend. We were aware that for some participants attendance could not be assumed to correlate with participation or engagement (Boud & Hager, 2012). As such, it was important that the statistics PLD was not a generic one size fits all model. Rather it was an adaptive model where the content focused on teacher and student cognition, belief, and practice while the structure and processes focussed on collaborative, professional learning clusters (Edwards, 2012; Koellner & Jacobs, 2015). This PLD focused on “these teachers, at this school, with these students, at this time, and was contextualised within individual teacher's practice settings” (Author, 2010, p. 50). The aim, as described by McEntee et al. (2003) was getting “to the heart of our practice, the place that pumps the lifeblood into our teaching, where we reflect, gain insight, and change what we do with our students” (p. 55).

**The most recent mathematics PLD** the statistics lead teachers had participated in was the Numeracy Development Project (Ministry of Education, 2007). The Numeracy Development Project PLD included workshop guidelines and teaching and learning support material. Teachers were given recommended guidelines regarding assessment, grouping for instruction, planning, and model lessons. The predetermined nature of the NDP meant some

参与人员

最近参加过的专业学习

factors such as time and allocation of resources were decided before the PLD began (Cobb, 2012; Young-Loveridge, 2010).

There were no workshop guidelines or teaching and learning materials pre-prepared for the statistics PLD. The lead teachers were positioned to have a say in the content of the PLD, how time was spent, where workshops were held, and how baseline data and success would be measured. It was important that the PLD initiated and sustained opportunities for changes in professional knowledge that impacted positively on classroom practice (Boud & Hager, 2012). However, when asked by the first author how they would like to manage and organise the statistics PLD the response from lead teachers was “Don't you know?”

#### 4.3. School settings and participants

This research was conducted with 18 lead teachers from six of the original nine schools who participated in the metaphor research of the statistics PLD over a one year period. Some schools and lead teachers withdrew from the PLD for personal and professional reasons. Information regarding the lead teachers and their schools is provided in Table 1.

#### 4.4. Data collection

Prior to the beginning of the statistics PLD the authors co-constructed three jacket metaphors to share at the first workshop. The written examples we shared were representative of the jackets we had worn as mathematics lead teachers undertaking PLD and the jackets we had seen teachers wearing as facilitators of mathematics PLD. The jackets we shared could be seen to represent a relationship that could construct or constrain the potential effectiveness of the statistics PLD (Cameron & Low, 1999). It was important to provide both constructive and constraining metaphors within our examples so as not to guide lead teachers toward one disposition or the other (Thompson & Campbell, 2003).

Our approach could be considered a “deductive approach” because we “projected” our metaphors onto the lead teachers (Cornelissen et al., 2008, p. 9). The intent was neither to infer nor imply how the lead teachers would conceptualise PLD through metaphor. Instead the intent was to provide a starting point for reflections, discussions, and elaborations (Thompson & Campbell, 2003). Three jackets, *Dress*, *Emperor's*, and *Ole Favourite*, were introduced using the following descriptors:

The Dress Jacket: *PLD is like a Dress Jacket because it is worn only*

*for special occasions such as an observation. The teacher does not see how the content of the PLD applies to their teaching or to their students learning so they put it on only when they feel they have to.*

The Emperor's Jacket: *An invisible jacket worn when the teacher has attended all the PLD but attendance has not led to changes in practice. There is little evidence in the classroom of learning from the PLD.*

The Ole Favourite Jacket: *Styled and embellished to suit and complement the wearer. The PLD is adapted so the jacket can be a good fit for the teacher, their students, and school.*

We then took an “inductive” approach (Cornelissen et al., 2008, p. 10) by asking the lead teachers to collaboratively elaborate on the provided metaphors and to co-construct alternative linguistic and pictorial metaphorical representations of PLD as a Jacket. The sentence stem *PLD is like a \_\_\_\_\_ jacket because ...* was provided but the lead teachers were not expected to adhere to it. We intentionally chose not to use or ask the lead teachers to use personal pronouns such as ‘I’ or ‘my’ in their descriptions because this could position them to share what they believed we wanted or expected to hear (Armstrong et al., 2011). By not having to personalise the metaphor to their own experiences lead teachers were able to identify and express more varied metaphors.

The co-constructed metaphors were revisited and revised at three statistics PLD workshops over the period of one year. A complementary combination of *observations and unstructured interviews were the main data collected* (Zhang & Wildemuth, 2009).

Observations included *field, personal, and theoretical* notes. Field notes included the lead teachers' personal observations and reflections and questions of each other. Personal notes encompassed notes regarding the first authors' feelings, impressions, and reactions. Theoretical notes were added after the lead teachers' discussions and included hunches, possible emergent categories, hypotheses, and trends. Field, personal, and theoretical notes were added to throughout the duration of the research, allowing us to “plot the progression of [our] thinking” (Gillham, 2000, p. 24). Unstructured interviews are a natural extension of participant observation and rely on the spontaneous generation of questions between the researcher and the research participant (Fontana & Frey, 2005; Patton, 2002). The first author had conversations with the lead teachers and generated questions regarding their metaphors, their conceptualisations of the metaphors, and their relationships with the metaphors.

Lead teachers were provided with copies of all notes as member

**Table 1**  
Lead teacher and school information.

School	Roll	Lead Teacher	Year group taught	Teaching experience in years
School A	168	Lead Teacher A1	New Entrant	15
		Lead Teacher A2	7–8	6
School B	287	Lead Teacher B1	1	21
		Lead Teacher B2	5–6	4
School C	306	Lead Teacher C1	New Entrant	18
		Lead Teacher C2	4–5	27
School D	443	Lead Teacher D1	2	16
		Lead Teacher D2	3–4	31
		Lead Teacher D3	5–6	10
		Lead Teacher D4	7–8	29
School E	365	Lead Teacher E1	2	4
		Lead Teacher E2	3–4	6
		Lead Teacher E3	5–6	11
School F	440	Lead Teacher F1	1	24
		Lead Teacher F2	3–4	2
		Lead Teacher F3	5–6 (a)	25
		Lead Teacher F4	5–6 (b)	5
		Lead Teacher F5	7–8	10

checkers and the second author undertook the role of peer-debriefer (Cohen, Manion, & Morrison, 2007; Guba & Lincoln, 2005). The elicited metaphors were analysed in terms of their meanings, uses, and impacts for individuals and the group.

4.5. Data analysis

1. 作者独立分析相关的隐喻句子，将句子分为名词、副词等
2. 将词分类
3. 合作为分类命名
4. 回答第一个问题
5. 回答第二个以及第三个问题

The analysis of elaborated and elicited metaphors followed five steps. In step one the authors analysed the metaphor data separately, then independently identified sentence parts as nouns, verbs, adjectives, and adverbs used in the written description (Andriessen & Gubbins, 2009). In step two we grouped the sentence parts according to commonalities. For example, the use of 'follow' and 'apply' to describe the lead teachers dispositions toward enacting the PLD. Steps one and two were critical as they helped to establish interpretative validity within the study and address whether the findings would be interpreted similarly by different people (Creswell, 2008). In step three the authors collaboratively produced a set of category titles (e.g., PLD as a script to be followed) that represented prevalent patterns from the data. Any disagreements between the authors at step three were resolved through discussion on the categories and the metaphors constituting those categories (Eren & Tekinarslan, 2013).

A process of metaphor checking (Armstrong et al., 2011), similar to the analytical method of member checking (Lincoln & Guba, 1985), was undertaken during steps one to three. Metaphor checking involved "systematically checking researcher interpretations directly with the participants to ensure a common understanding" (Armstrong et al., 2011, p. 153). The authors and lead teachers discussed the developing metaphors throughout the year, examined their commonalities and differences, and aligned researcher interpretation with participant intent so as to establish a shared understanding of the metaphors and their underlying conceptualisations. Through the on-going process of triangulated member checking we ensured the lead teachers had a "voice in the analysis" that increased the reliability of our interpretations (Armstrong et al., 2011, p. 162). At step four we responded to, and attempted to answer the first research question: How do lead teachers metaphorically represent the relationship between teachers in general and PLD?

Step five involved analysing the unstructured interview responses to answer the second and third research questions: Did conceptualising the relationship between PLD and teachers in general assist lead teachers to better understand their own relationship with PLD?, and Did conceptualising the relationship between PLD and teachers in general assist lead teachers to more readily connect with this PLD?

In presenting our findings we acknowledge that our findings are not the only or correct way to interpret the lead teachers' metaphors and responses. However, the research design has enabled the systematic exploration of the metaphors and responses from a number of epistemological viewpoints (Armstrong et al., 2011; Ritchie, 2003). The results of the jacket metaphors are discussed first followed by the results of the impact of the jacket metaphors.

## 5. Results: jacket metaphors

Over time, lead teacher participants in this research collaboratively constructed jacket metaphors to conceptualise their own and others' relationships with PLD. Four category titles were agreed to at step three of the data analysis: **Metaphors of a Design Adherence relationship with PLD, Prescribed PLD, Feigned PLD, and Adaptive PLD.** Within the Design Adherence relationships with PLD were a Chef's Jacket, the School Blazer, the Fashion Jacket, the Life Jacket, and the Lab Coat. The Strait Jacket and Dress Jacket metaphors

四个类型：1. 依附型 2. 指示型 3. 不真诚型 4. 自适应型

represented Prescribed PLD. Feigned PLD included the Emperor's Jacket, Cape, and Anorak Jacket. Finally Adaptive PLD was embodied by the Ole Favourite. The four categories are described below and lead teachers' descriptions and drawings are used to further illustrate the categories.

### 5.1. Metaphors of a design adherence relationship with PLD

The co-constructed design adherence metaphors included the Chef's Jacket, the School Blazer, the Fashion Jacket, the Life Jacket, and the Lab Coat. Within a design adherence metaphor the relationship appears to be more about **compliance, application, and mimicry and less about understanding or utility. The teachers are prepared to follow the PLD guidelines but are less willing to spend time contextualising the PLD and internalising new learning or practices.** 教师按要求做事 但不深入思考

The Chef's Jacket: *The Chef's Jacket is worn by teachers who see the PLD as a recipe to follow. If you follow these guidelines and apply these pedagogies you will get these positive results. The recipe will probably be followed but the wearer is not committed enough to make changes to the recipe and make it more their own (Fig. 1).*

The School Blazer: *The wearer of the School Blazer expects to be able to do what is recommended and get good results. They want a one-size-fits-all model and they want to be able to apply the recommendations and have success. The School Blazer wearer wants to be told what to do and they will go and do it. They will probably not adapt the PLD so that it is a better fit for their teaching or their kids (Fig. 2).*

The Fashion Jacket: *The Fashion Jacket wearer wears their PLD as the latest and greatest thing. They wear it because it is good to be seen to be fashionable. The PLD is fashionable, trendy, and popular – but the novelty can quickly wear off or you may have to get the newest fashion and wear that. With a Fashion Jacket you often don't have the time to actually make it your own (Fig. 3).*

The Life Jacket: *PLD can be worn as a Life Jacket when teachers think they only need it for emergencies. The Life Jacket wearer sees the*

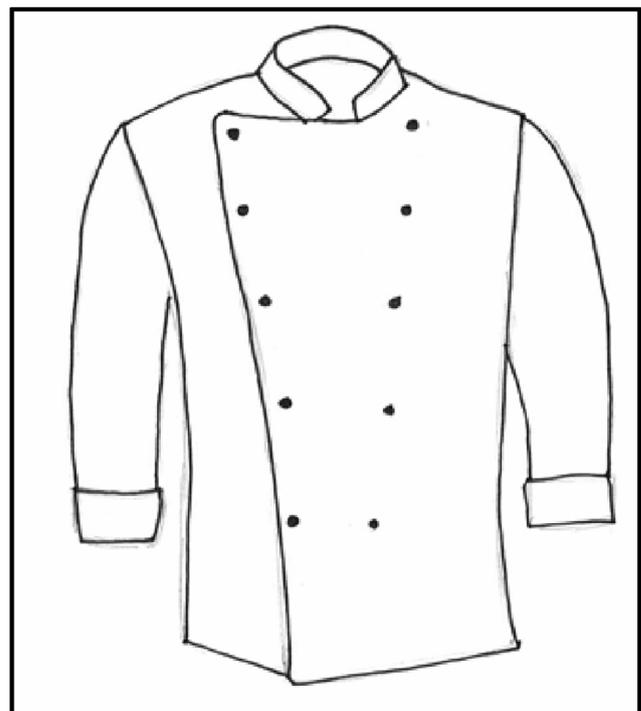


Fig. 1. The Chef's Jacket.



Fig. 2. The School Blazer.



Fig. 3. The Fashion Jacket.

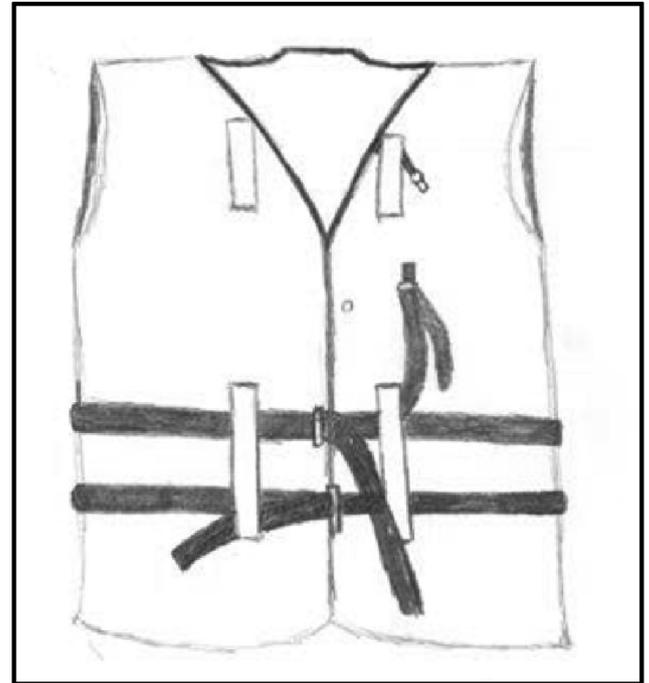


Fig. 4. The Life Jacket.

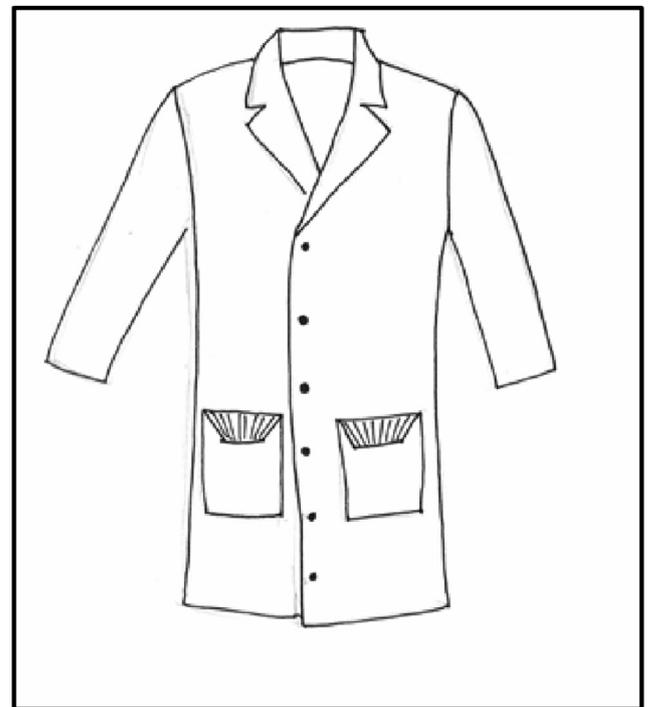


Fig. 5. The Lab Coat Jacket.

PLD as being useful only in emergencies such as when teaching students who are struggling – who were not succeeding the old way. Teachers are not going to totally commit to the PLD because they do not see the need to make changes to practice for students who are already doing well. They are not truly taking the PLD recommendations on board (Fig. 4).

The Lab Coat: Teachers wear their PLD as a Lab Coat when they see the PLD as an experiment but not something that has been proven to be effective. Often teachers are told about the latest and greatest PLD ideas but they are not involved in developing those ideas. They need to be convinced that investing their time and effort in the PLD is going to be worthwhile before they make any changes to existing practice (Fig. 5).

## 5.2. Metaphors of a prescribed relationship with PLD

Metaphors of a prescribed relationship with PLD co-constructed by the lead teachers included the Strait Jacket and the Dress Jacket. In these metaphors lead teachers described the relationship between the teachers, their students, and schools and the PLD as decontextualised. The metaphors illustrate a relationship whereby the PLD appears to be done to the teachers and they reciprocate by

表面上，老师按要求做了，也为学生施加了一定的影响

### doing the guidelines to their students.

There is evidence of a disconnect between the PLD and the teachers and distrust between the PLD developers and the teachers. That disconnect and distrust could lead to the application of new learning but not adaptation or understanding.

*The Strait Jacket: When the PLD is too predetermined and pre-arranged it can feel like you are wearing a Strait Jacket. This happens when everything has already been decided and you turn up and are told what to do and how to do it – whether that might suit you, your school, or your students or not. The wearer of the Strait Jacket feels restricted and confined and they have very little wriggle room to make the PLD their own. They do not feel part of the PLD and so if it isn't effective they can easily blame the jacket – it wasn't designed with our students in mind (Fig. 6).*

*The Dress Jacket: The wearer of the Dress Jacket only brings it out for special occasions. Most of the time it hangs on a coat hanger protected by a plastic cover. One special occasion the Dress Jacket would be worn would be for a classroom observation of the changes to practice resulting from the PLD. The Dress Jacket feels uncomfortable and the wearer might feel restricted because they have to wear it. It does look nice for others though (Fig. 7).*

### 5.3. Metaphors of a feigned relationship with PLD

Feigned relationships with the PLD were conceptualised through the Emperors, Cape, and Anorak Jacket. The relationship was perceived as artificial because whilst teachers may have said they have adopted new learning and teaching they had not transformed that new learning and teaching to be part of their practice. The relationship between the teacher and the PLD is based on pretence and keeping up appearances. 教师无法将新的教学方式常规落实

*The Emperor's Jacket: The Emperor's Jacket is invisible. The wearer of the Emperor's Jacket pretends they are wearing the jacket/PLD but*

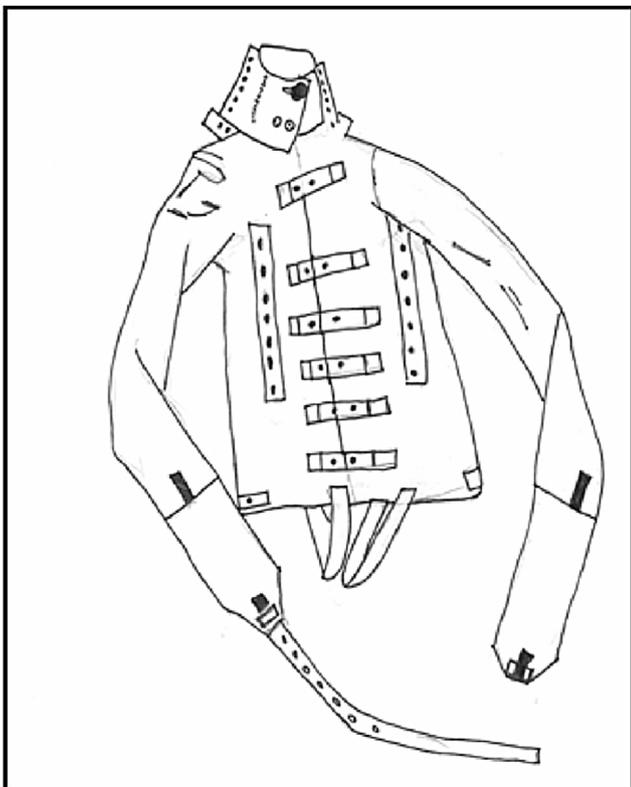


Fig. 6. The Strait Jacket.

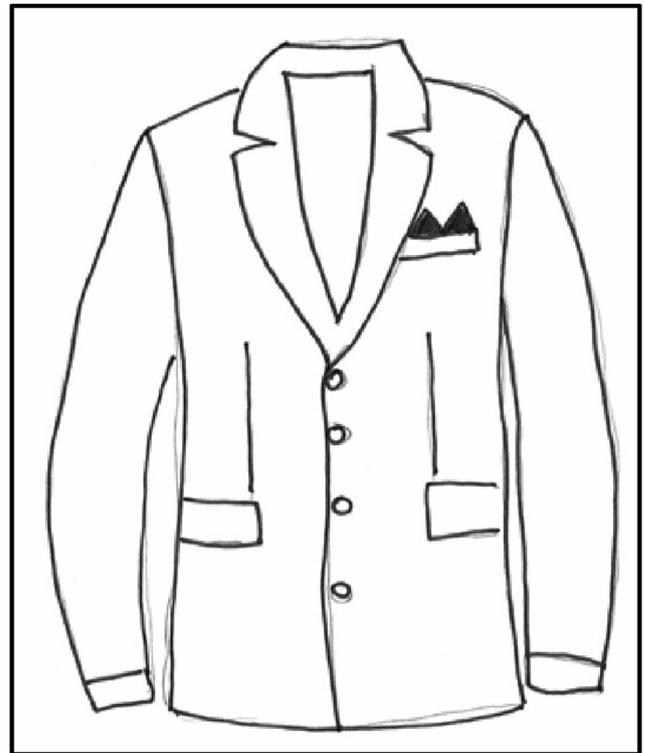


Fig. 7. The Dress Jacket.

*really they are not. Sometimes they pretend to wear a jacket because they don't understand the content of the PLD. Other times they pretend because they believe the PLD is unrelated to them, their students, or school. They nod their head in all the right places and vigorously agree with others but they may have no intention of making changes to their practice recommended by the PLD. If you went into their classroom to observe you would not see much evidence of the PLD in action. The Emperor's Jacket is worn to fit in and please others and to play the role of engaged, reflective, learner (Fig. 8).*

*The Cape Jacket: The Cape Jacket can be worn similarly to the Emperor's Jacket. As far as anyone else is concerned the Cape is being worn and the PLD is being done. But underneath the Cape the wearer is really doing what they've always done. They are pretending to go along with the new learning or practices. The teacher might feel they have to wear a Cape Jacket because they believe they have to hide their old teaching ways (Fig. 9)*

*The Anorak Jacket: An Anorak Jacket is a big padded jacket that protects you from the elements. An Anorak Jacket as PLD protects you against the elements of the PLD. Things like time away from the classroom, the expectation that because you have been made lead teacher you are an expert, or low achievement results from the kids in your class. You feel like you need to protect yourself so you put on your Anorak. You can also blame the Anorak/PLD if the positive changes in practice or results that were expected don't occur (Fig. 10)*

### 5.4. Metaphors of an adaptive relationship with PLD

An adaptive relationship with PLD is metaphorically represented through the Ole Favourite Jacket. This jacket would, and should, look different on each wearer and would change according to the students being taught. 根据学生的需求制定变化

*The Ole Favourite Jacket: The Ole Favourite Jacket suits and fits the wearer perfectly. It did not necessarily start off as a favourite but along the PLD journey the wearer has been able to tailor it to their fit and*

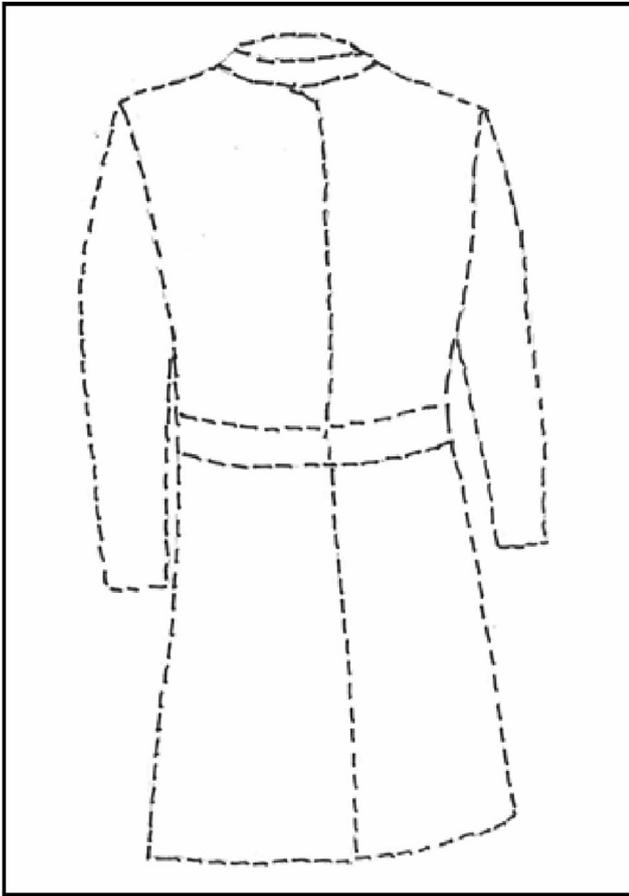


Fig. 8. The Emperor's Jacket.

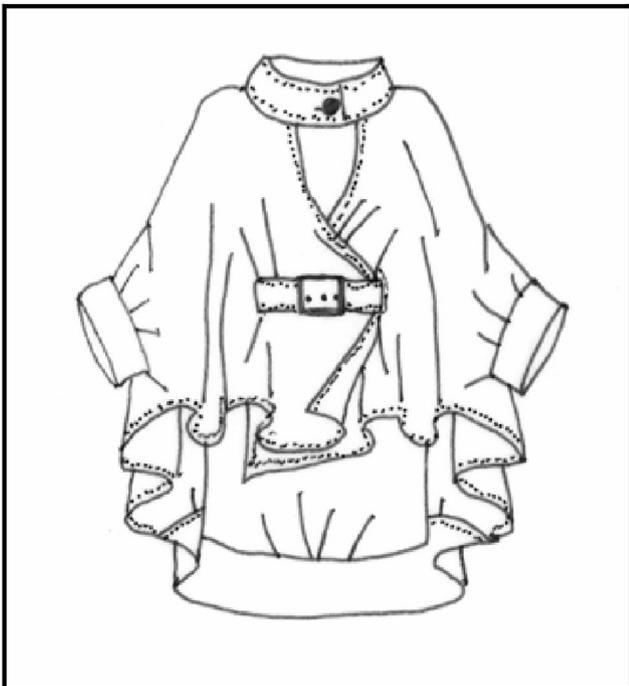


Fig. 9. The Cape Jacket.

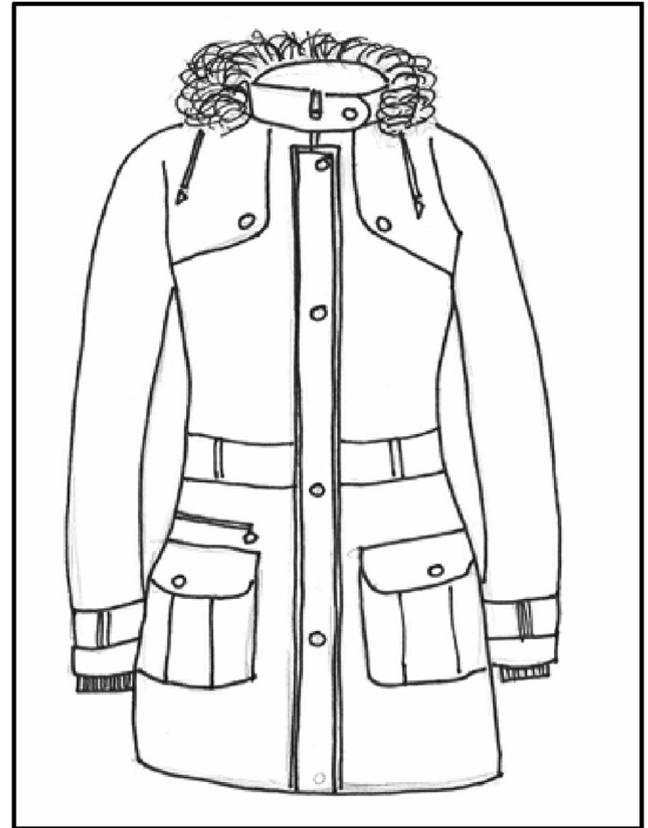


Fig. 10. The Anorak Jacket.

and confidence and are able to tailor it again if they need to. They understand that they have to commit something of themselves to get a good fit and the most out of the PLD. The Ole Favourite Jacket is intentionally presented as pattern pieces rather than a complete jacket to illustrate the need for teachers to tailor this jacket to themselves (Fig. 11).

## 6. Results: impact of the jacket metaphors 表述方式：简单阐述+教师话语呈现

Analysis of the lead teachers' responses to the unstructured interview questions and their comments during observations evidenced four themes. These themes related to how the use of metaphors to conceptualise the relationship between PLD and teachers in general assisted lead teachers to better understand their own relationship with PLD and to more readily connect with this PLD. The themes included social construction, positioning, humour, and time for reflection.

### 6.1. Social construction

The opportunity to co-construct the metaphors was valued by the lead teachers. They saw this as an opportunity to draw on their own experiences and learn from the experiences of others. In combining their ideas and experiences the lead teachers felt they were able to describe the deeper features of the relationship between teachers in general and PLD.

Working with others to create and annotate the metaphors meant we could build on each other's ideas and chuck around different thoughts and ideas. Other people's ideas reminded me of experiences I had forgotten or they described my experience more eloquently. Lead Teacher D1

embellish it to suit their tastes. They wear the ole favourite with style

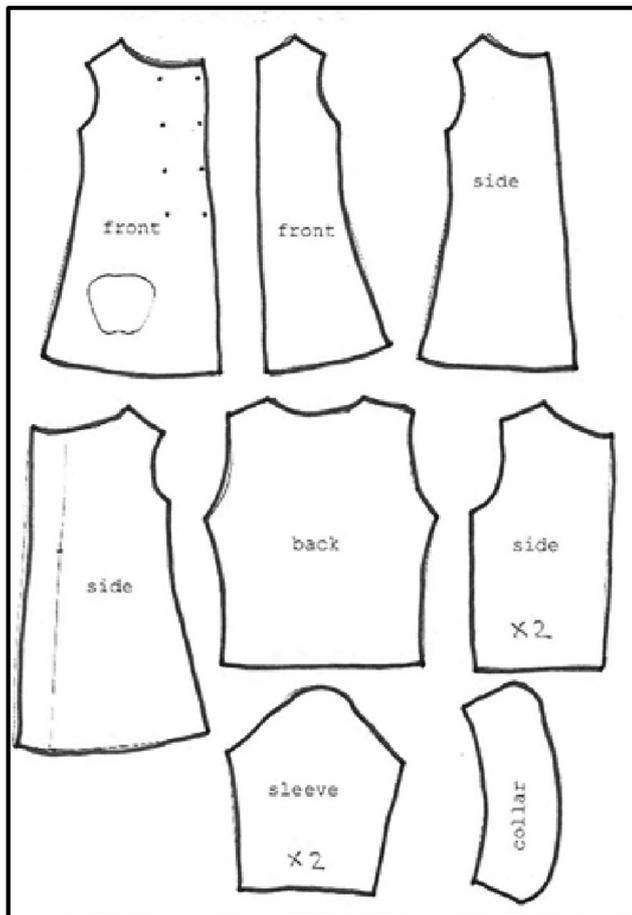


Fig. 11. The Ole Favourite Jacket.

We got a better big picture representation of the jackets as PLD by working together to create them. Some people were a lot more creative than me and described relationships beyond the obvious ones I saw. Lead Teacher C2

### 6.2. Positioning

Lead teachers identified that they valued being able to create and discuss the metaphors in third person positioning. Not being asked or positioned to individually commit to a metaphor by using personal pronouns such as 'I' or 'my' meant lead teachers were inclined to be more honest with their reflections and descriptions. The request to discuss metaphors and their relationships with PLD was considered less-threatening when they were referring to an anonymous other rather than to themselves.

I appreciated being able to create and discuss the metaphors as belonging to someone else – another teacher – and not me. I was probably really talking about myself but it felt a bit safer being able to pretend the descriptions were about someone else. Lead Teacher F4

When I first heard about the metaphors I was really worried about how honest I could be. Then when I realised we were going to create metaphors of how other teachers might see PLD I felt a lot safer. It was much easier to talk about an imaginary 'other' teacher than it was to own up to feeling that way yourself. Lead Teacher D3

### 6.3. Humour

Similarly lead teachers commented that through humour they could also be more honest. In sharing a joke and having a laugh about some of the less desirable metaphors and PLD relationships the lead teachers commented how they were able to be more candid and authentic within the guise of humour.

Because we created metaphors that represented other teachers' relationships with PLD we could have a laugh about how absurd some of those relationships were. We might not have been so open and honest with our descriptions had we been asked to talk about ourselves first up. Lead Teacher E3

Coming up with metaphors that represented teachers in general relationships with PLD was hilarious. It was so much fun reflecting on how we had seen others respond to PLD – while also quietly admitting that we probably responded in the same negative ways at times. Lead Teacher A2

### 6.4. Time

The opportunity to try the metaphorical jackets on for size between workshops was also appreciated. Lead teachers commented that they often found themselves thinking about which jacket they were wearing and when. They also observed they had started to notice and analyse jackets other teachers could be wearing. Time was seen as a key construct for conceptualising the PLD or jacket to be a better fit.

I started to notice more jackets and elaborations on jackets we had constructed. I recognised when teachers in my school were wearing the jackets we had discussed. That helped me to more quickly understand how they were feeling and relating to the PLD. Lead Teacher F3

Ta-daa! What do you think of my jacket? I've made some changes since we last met. I've tailored it to suit me better – I was feeling a bit squashed before. Our school has re-worked some of the times we had set for the PLD and now I feel like I've got more room to move in my jacket. Lead Teacher B1

### 6.5. Conceptualising this PLD

The opportunities for social construction, lead teacher positioning, use of humour, and time all contributed to the lead teachers feeling they were more open to, and readily connected with, the statistics PLD. Co-constructing metaphors for other teachers in general appeared to alleviate any deficit theories or doubts lead teachers may have brought to the statistics PLD. Lead teachers positioned themselves more positively to adapt the PLD to their own and their schools contexts.

Because I was able to learn about the metaphors that could represent other teachers dispositions toward PLD first I felt I was a lot quicker at recognising my own dispositions and how those dispositions could positively or negatively impact on how much I got out of this PLD. It made me think – what jacket am I wearing for this PLD and why? Lead Teacher C1

In many ways developing and discussing the metaphors forced me to get over my own hang-ups about PLD and get on with

benefiting from this PLD. It's funny really, many of the complaints I would have had were voiced through our metaphors and I recognised how limiting they could be to my learning. Lead Teacher D

I got over being grumpy about this PLD far quicker than I would normally. I realised how negative some of my thoughts and practices had been with PLD and being able to openly talk about them meant I got over them quicker. Lead Teacher F3

## 7. Discussion: the effect of jackets

Through an iterative process of discussion and reflection, metaphor allowed the lead teachers to open up about their inner thoughts regarding teachers in general and their own relationships with the PLD (Kram et al., 2012). Discussions and reflections caused teachers to think beyond what they initially recognised or believed by illuminating “the inner realities and perceptions that shape their instruction” (Patchen & Crawford, 2011, p. 287). In the following section we discuss the significant number of metaphors that could be viewed as representing a disadvantageous relationship between the teacher and their PLD and the value of considering the relationship with PLD through metaphor.

Ten of the 11 metaphors co-constructed by the lead teachers represented a disadvantageous relationship that could be seen to constrain any potential effectiveness of the PLD. The only metaphor that represented a constructive relationship was the Ole Favourite Jacket which was initially created and shared by the authors. Lead teachers identified significant concerns regarding the connections between the PLD and teaching practice (Bullough & Stokes, 1994; Martínez et al., 2001). The lead teacher metaphors that illustrated design adherence, prescribed, and feigned relationships with PLD did not appear to promote opportunities for adaptive expertise where learning was transformed into practice (Avalos, 2011). What did appear to be represented through these metaphors was compliance and obedience to the PLD through application and acquiescence (Timperley et al., 2009). The relationships described were not ones where teachers were engaging at a personal or professional level with the PLD so as to contextualise it to their practice. Instead, teachers in the metaphors could be described as taking on the recommendations of the PLD whilst simultaneously keeping their existing teaching practices hidden and protected. This pretence could be described as distrust between teachers and their PLD and evidences a disconnect between existing and new teacher practices. There also appeared to be a lack of commitment shown by teachers represented in the design adherence, prescribed, and feigned metaphors. Teachers were willing to apply the principles of the PLD but they were not able to take control of it (Timperley, 2011a). If not successful, the PLD was held to account and not the teacher. Some teachers represented in the metaphors felt the PLD did not take into account how they or their students learned, others felt they did not fully understand the value of the PLD, and others were not convinced enough to make changes to their practices (Edwards, 2012). Whilst the principles appear to be being applied, the sustained integrity of the PLD could not be assumed (Borko et al., 2014). Each situation represented through the metaphors indicated a lack of commitment on behalf of the teacher.

Whilst the relationships with PLD depicted by the lead teachers through metaphor could be viewed as detrimental the process of considering their own relationship with PLD was valuable. The humorous co-construction of metaphors for an anonymous other contributed to the lead teachers feeling safe and supported within the statistics PLD environment (Chung & Miller, 2011; Edwards, 2012; Timperley et al., 2009). Positioning the lead teachers to

create metaphors for an anonymous other increased their confidence to participate in the discussions and they described feeling less vulnerable with such positioning. In working collaboratively on the jackets metaphors lead teachers were able to share their own theoretical positioning and lived experiences but also had social and cultural opportunities for interpretation and clarification (Ritchie, 2003; Steen et al., 2010). Collaboration was seen to result in a more detailed and profound picture and understanding of relationships with PLD (Miller et al., 2002). Time to reflect on and reconsider their co-constructed and own metaphors was also valued and contributed to the depth to which they could understand and enhance their relationship with the statistics PLD (Vadeboncoeur & Torres, 2003).

The jacket metaphors assisted lead teachers to identify their own relationship with PLD and take more control of that relationship (Borko et al., 2014; Timperley, 2011a; Wolodko et al., 2003). Change in their relationship with PLD could occur because the lead teachers had been able to make connections between their own relationships with PLD and those they co-constructed for others through metaphor (Avalos, 2011; Edwards, 2012). The authors were able to assist the facilitation of change because through access to the metaphors we had a better understanding of the beliefs, dispositions, and potential barriers these teachers brought to their PLD. The metaphors provided “a starting point for dialogue about these issues and thus give us a way to resolve misunderstanding and conflict” (Tobin, 1990, p. 455).

## 8. Conclusion

How teachers feel about themselves, their school, their students, and professional learning opportunities can impact greatly upon the success of PLD as it influences the choices made, the effort put forth, and the persistence shown. As PLD facilitators, we need to acknowledge the tension that may arise through learning something new, to acknowledge the conflict that may arise through change, and to identify barriers to successful implementation (Timperley et al., 2007). We believe that the process of using jackets can improve the effectiveness of PLD because it intentionally addresses many of the reasons that participants may have for being reluctant to embrace practices promoted in PLD, even when they are known to have a positive impact on learning for students. As de Guerrero and Villamil (2002) suggested, metaphor can be “effectively used as a tool to increase self-reflection and critical awareness” (p. 117).

By itself, the use of a metaphor such as jackets cannot provide the conditions needed for effective PLD. Nor is this particular metaphor one which can be used endlessly without losing its appeal or effectiveness. However, we argue that when designing PLD it is essential for providers to consider ways of speeding up engagement with the new knowledge and practices that are known to improve student outcomes. The careful choice of an appropriate metaphor is one way of doing this, one we have found to be successful.

To conclude, we believe that PLD cannot be a generic ‘one size fits all’ model (such as a school blazer). By using the metaphor of a jacket the PLD facilitator can begin professional learning by instigating reflection and sharing. Everybody has a jacket, and each jacket is different. As such the metaphor captures and embodies the concept of difference and can help make public things that are often hidden (Ashton, 1994). It is only through doing such things that teachers will come to wear their PLD with style and confidence.

## References

Andriessen, D., & Gubbins, C. (2009). *Metaphor analysis as an approach for*

- exploring theoretical concepts: the case of social capital. *Organization Studies*, 30, 845–863.
- Anthony, G., Hunter, R., & Thompson, Z. (2014). Expansive learning: lessons from one teacher's learning journey. *ZDM – The International Journal on Mathematics Education*, 46, 279–291. <http://dx.doi.org/10.1007/s11858-013-0553-z>.
- Armstrong, S. L. (2008). Using metaphor analysis to uncover learners' conceptualisations of academic literacies in postsecondary developmental contexts. *The International Journal of Learning*, 15(9), 211–218.
- Armstrong, S. L., Davis, H. S., & Paulson, E. J. (2011). The subjectivity problem: Improving triangulation approaches in metaphor analysis studies. *International Journal of Qualitative Methods*, 10(2), 151–163.
- Ashton, E. (1994). Metaphor in context: an examination of the significance of metaphor for reflection and communication. *Educational Studies*, 20(3), 357–366.
- Author. (2010). *Details removed for blind peer review process*.
- Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. *Teaching and Teacher Education*, 27(1), 10–20.
- Borko, H., Jacobs, J., & Koellner, K. (2010). Contemporary approaches to teacher professional development. In P. Peterson, E. Baker, & B. McGaw (Eds.), *International encyclopedia of education* (Vol. 7, pp. 548–556). Oxford: Elsevier.
- Borko, H., Koellner, K., & Jacobs, J. (2014). Examining novice teacher leaders' facilitation of mathematics professional development. *The Journal of Mathematical Behavior*, 33, 149–167. <http://dx.doi.org/10.1016/j.jmathb.2013.11.003>.
- Boud, D., & Hager, P. (2012). Re-thinking continuing professional development through changing metaphors and location in professional practices. *Studies in Continuing Education*, 34(1), 17–30. <http://dx.doi.org/10.1080/0158037X.2011.608656>.
- Bruner, J. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.
- Bulough, R. V., & Stokes, D. K. (1994). Analysing personal teaching metaphors in pre-service teacher education as a means for encouraging professional development. *American Education Research Journal*, 31(1), 197–224.
- Cameron, L., & Low, G. (1999). Metaphor. *Language Teaching*, 32, 77–96.
- Chung, M., & Miller, J. (2011). Do we live in a box of crayons? Looking at multicultural metaphors written by teachers. *Multicultural Education*, 18(4), 39–45.
- Cobb, S. C. (2012). *You use your imagination: An investigation into how students use 'imaging' during numeracy activities* (Unpublished Master's Thesis). Christchurch: University of Canterbury.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* (6th ed.). London: Routledge.
- Cornelissen, J. P., Oswick, C., Christensen, L. T., & Phillips, N. (2008). Metaphor in organizational research: context, modalities and implications for research: Introduction. *Organization Studies*, 29, 7–22.
- Creswell, J. W. (2008). *Research design: Qualitative, quantitative, and mixed methods approaches*. London: Sage Publications.
- Darling-Hammond, L., & Richardson, N. (2009). Teacher learning: what matters? *Educational Leadership*, 66(5), 46–53.
- East, E. (2009). Using Metaphors to uncover the selves in my practice. *Studying Teacher Education: A Journal of Self-Study of Teacher Education Practices*, 5(1), 21–31. <http://dx.doi.org/10.1080/17425960902830377>.
- Edwards, F. (2012). Learning communities for curriculum change: key factors in an educational change process in New Zealand. *Professional Development in Education*, 38(1), 25–47. <http://dx.doi.org/10.1080/19415257.2011.592077>.
- Eren, A., & Tekinarslan, E. (2013). Prospective teachers' metaphors: teacher, teaching, learning, instructional material and evaluation concepts. *International Journal of Social Science & Education*, 3(2), 435–445.
- Flower, L. (1994). *The construction of negotiated meaning: A social cognitive theory of writing*. Carbondale, IL: Southern Illinois University Press.
- Fontana, A., & Frey, J. H. (2005). The interview: from neutral stance to political involvement. In N. K. Denzin, & Y. S. Lincoln (Eds.), *The sage handbook of qualitative research* (3rd ed., pp. 695–728). Thousand Oaks, CA: Sage.
- Gillham, B. (2000). *Case study research methods*. New York: Continuum.
- Green, T. (1971). *The activities of teaching*. New York: McGraw-Hill.
- Groundwater-Smith, S. (1998). On elephants and supermarkets: Images and metaphors of teacher professional development. In , Vol. 29. *Australian association for research in education annual conference, Adelaide, November*.
- Guba, E. G., & Lincoln, Y. S. (2005). Paradigms and perspectives in contention. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (3rd ed., pp. 183–190). Thousand Oaks, CA: Sage.
- de Guerrero, M. C. M., & Villamil, O. S. (2002). Metaphorical conceptualizations of ESL teaching and learning. *Language and Teaching Research*, 6, 95–120.
- Jensen, D. F. (2006). Metaphors as a bridge to understanding educational and social contexts. *International Journal of Qualitative Methods*, 5, 1–17.
- King, K. D. (2001). Conceptually-oriented mathematics teacher development: Improvisation as a metaphor. *For the Learning of Mathematics*, 21(3), 9–15.
- Koellner, K., & Jacobs, J. (2015). Distinguishing models of professional development: the case of an adaptive model's impact on teachers' knowledge, instruction, and student achievement. *Journal of Teacher Education*, 66(1), 51–67.
- Kovacs, Z. (2002). *Metaphor: A practical introduction*. Oxford, UK: Oxford University Press.
- Kram, K. E., Wasserman, I. C., & Yip, J. (2012). Metaphors of identity and professional practice: learning from the scholar–practitioner. *The Journal of Applied Behavioral Science*. doi:0021886312439097.
- Lakoff, G. (1994). What is metaphor? In J. Berden, & K. Holyoak (Eds.), *Advances in connectionist and neural computation theory*, 3 (pp. 203–258). Norwood, NJ: Ablex.
- Lakoff, G., & Johnson, M. (1980). *Metaphors we live by 1980*. Chicago: University of Chicago Press.
- Lakoff, G., & Johnson, M. (2003). *Metaphors we live by 2003*. Chicago: University of Chicago Press.
- Levin, T., & Wagner, T. (2006). In their own words: understanding student conceptions of writing through their spontaneous metaphors in the science classroom. *Instructional Science*, 34, 227–278.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park: Sage Publications.
- Martinez, M., Saulea, N., & Huber, G. (2001). Metaphors as blueprints of thinking about teaching and learning. *Teaching and Teacher Education*, 17(8), 965–977.
- McEntee, G. H., Appleby, J., Dowd, J., Grant, J., Hole, S., Silva, P., et al. (2003). *At the heart of teaching: A guide to reflective practice*. New York: Teachers College Press.
- Miller, C., East, K., Fitzgerald, L. M., Heston, M. L., & Veenstra, T. B. (2002). Visions of self in the act of teaching: using personal metaphors in a collaborative study of teaching practices. *Teaching and Learning*, 16, 81–94.
- Ministry of Education. (2007). *Numeracy professional development projects: Book 1: The number framework*. Wellington, New Zealand: Author.
- Noyes, A. (2006). Using metaphor in mathematics teacher preparation. *Teaching and Teacher Education*, 22(7), 898–909.
- Patchen, T., & Crawford, T. (2011). From gardeners to tour guides: the epistemological struggle revealed in teacher-generated metaphors of teaching. *Journal of Teacher Education*, 62, 286–298. <http://dx.doi.org/10.1177/0022487110396716>.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.
- Phillips, D. C. (1996). Philosophical perspectives. In D. C. Berliner, & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 1019–1105). New York: Simon & Schuster Macmillan.
- Reeder, S., Utley, J., & Cassel, D. (2009). Using metaphors as a tool for examining preservice elementary teachers' beliefs about mathematics teaching and learning. *School Science and Mathematics*, 109, 290–297.
- Ritchie, D. (2003). "Argument is war" – or is it a game of chess? Multiple meanings in the analysis of implicit metaphors. *Metaphor and Symbol*, 18, 125–146.
- Santa Ana, O. (1999). 'Like an animal I was treated': anti-immigrant metaphor in US public discourse. *Discourse & Society*, 10(2), 191–224.
- Steen, G. J., Dorst, A. G., Herrmann, J. B., Kaal, A. A., Krennmayer, T., & Pasma, T. (2010). Metaphor in usage. *Cognitive Linguistics*, 21, 765–796.
- Taylor, W. (1984). Metaphors of education discourse. In W. Taylor (Ed.), *Metaphors in education* (pp. 4–20). London: Heinemann Educational Books.
- Theado, C. K. (2013). Metaphors we teach by: examining teacher conceptualizations of literacy in the English Language Arts Classroom. *Language and Literacy*, 15(2), 20–39.
- Thompson, L. K., & Campbell, M. R. (2003). Gods, guides and gardeners: preservice music educators' personal teaching metaphors. *Bulletin of the Council for Research in Music Education*, 158, 43–54.
- Timperley, H. (2011a). *A background paper to inform the development of a national professional development framework for teacher and school leaders*. Melbourne: Australian Institute for Teaching and School Leadership.
- Timperley, H. (2011b). *Realizing the power of professional learning*. Maidenhead: Open University Press.
- Timperley, H., Parr, J., & Bertanees, C. (2009). Promoting professional inquiry for improved outcomes for students in New Zealand. *Professional Development in Education*, 35(2), 227–245. <http://dx.doi.org/10.1080/13674580802550094>.
- Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Teacher professional learning and development: Best evidence synthesis iteration*. Wellington: New Zealand. Ministry of Education.
- Tobin, K. (1990). Changing metaphors and beliefs: a master switch for teaching. *Theory into Practice*, 29(2), 123–127.
- Vadeboncoeur, J. A., & Torres, M. N. (2003). Constructing and reconstructing teaching roles: a focus on generative metaphors and dichotomies. *Discourse*, 24(1), 87–103.
- Wilks, Y., Barnden, J., & Wang, J. (1996). Your metaphor or mine. In B. Partee, & P. Sgall (Eds.), *Discourse and meaning* (pp. 141–161). Philadelphia: John Benjamins Publishing.
- Wolodko, B. L., Willson, K. J., & Johnson, R. E. (2003). Metaphors as a vehicle for exploring preservice teachers' perceptions of mathematics. *Teaching Children Mathematics*, 10(4), 224–229.
- Young-Loveridge, J. (2010). A decade of reform in mathematics education: results for 2009 and earlier years. In *Findings from the New Zealand numeracy development projects: 2009* (pp. 15–35). Wellington: New Zealand. Learning Media.
- Zhang, Y., & Wildemuth, B. (2009). Thematic content analysis. In B. Wildemuth (Ed.), *Applications of social research methods to questions in information and library science* (pp. 308–319). Westport, CT: Libraries Unlimited.