Pursuing the Elusive Construct of Distributed Leadership: Is the search over?

Abstract

A review of the literature reveals broadness in the conceptual and operational definition of the construct on Distributed Leadership (DL), making it elusive. The elusive nature of DL is due in part to the lack of attempts at trying to unpack and measure this construct, and in part to the contested definition of the term 'leadership'. The purpose of this study is to unpack and discuss key dimensions of the DL construct. To understand the DL construct, multivariate analysis was used to reduce the dimensionality of the data collected. This was to provide a lucid interpretation of the data and build theoretical measurement model for DL. And this requires the use of a proper metric. As such, Exploratory Factor Analysis was performed on the Rasch (linearized) standardized residuals. The DL instrument consists of 25 items, and the sample involved schools leaders from Singapore (i.e., 224 Principals, 322 Vice-Principals and 686 middle-level school managers). It was a component of a larger instrument within a national study investigating school leadership practices in Singapore. The findings provided evidence, through a Rasch residual-based factor analysis, the presence of four possible factors of DL – bounded empowerment, developing leadership, shared decision, and collective engagement.

Keywords: Distributed leadership, Rasch analysis, Exploratory factor analysis, Schools

Introduction

The concept of Distributed Leadership (DL hereafter) has been around in management literature for some time now, and has recently gained much attention in the educational leadership discourse (Gronn, 2000; Harris, 2004; Harris and Spillane, 2008). Hartley (2007, 2009) observed that the rise to prominence in DL can be attributed to contemporary reforms in the public service that demands greater joined-up or network regime of governance, a societal culture wherein all categories and classifications are weakened and rendered increasingly permeable (a flexible 'liquid modern' view of space and time) and the new work order consistent with the knowledge economy, where individuals work and learn beyond bureaucratic enclosures using their loose spatial and temporal codes. These changing work contexts are consistent three kinds of roles emerging within changing policy environment, namely – enhanced line roles, project roles, and networking roles (Simkins, 2005). Specifically, DLs' attraction in education lies in its potential to bring about school improvement (Harris, 2007). Claims have also been made on DL's potential impact on instructional aspects of leadership (Elmore, 2000; Smylie, Conley and Marks, 2002; Spillane and Louis, 2002), and leveraging on instructional improvement (Murphy and Datnow, 2003; Timperley, 2005; McBeth, 2008). DL, along with transformational leadership, has also been claimed to supersede transactional leadership in influencing school climate and environment, and enhancing the instructional capacities of teachers (Spillane, Halverson and Diamond, 2003). And although the literature remains agnostic about its impact on the effectiveness on student achievement because of insufficient empirical data (Bennett et al., 2003), its potential to do so remains intuitively attractive, compelling and positive (Leithwood et al., 2006; Gronn, 2008), and as such, it is officially endorsed as good practice (Hopkins, 2001).

Although DL is considered the most favoured normative model (Bush and Crawford, 2012), the understanding of DL in the educational leadership discourse is mainly broad, and to a lesser extent, contested. Ironically, the elusiveness of its meaning has contributed to its appeal (Spillane and Diamond, 2007, p.1). The term has been equated to shared leadership, delegated leadership and democratic leadership, even though these are not synonymous to the distributed perspective of leadership that Spillane (2005) offers. Indeed,

there are few clear definitions of DL (Bennett et al., 2003). The lack of clarity in the definition of DL has also been contributed to the elasticity that educational leadership researchers bestow on the term 'leadership'. A review of the literature on reveals several problems in our attempt to better understand the DL construct. They include (i) conceptual and operational issues, (ii) measurement issues and (iii) contextual issues.

(i) Conceptual and operational issues of DL

While the broadness of DL's definition is accepted among educational leadership researchers, some had attempted to make it more understandable by providing aspects of its principles. Harris (2008), for example, identified a list of facets or common principles of DL:

• is broad-based leadership

• requires multiple levels of involvement in decision-making

• focuses primarily on improving classroom practice or instruction

• encompasses both formal and informal leaders

• links vertical and lateral leadership structures

• extends to students and encourages student voice

• is flexible and versatile (non-permanent groupings)

• is fluid and interchangeable

• is ultimately concerned with improving leadership practice

While such attempts are laudable, its substantive conceptual construct remains elusive. This elusiveness potentially weakens the methodological explanatory force of its effects on a range of school improvement outcomes, which some educational leadership researchers had tried to establish (e.g., Silins and Mulford, 2002; Leithwood et al., 2004; Leithwood et al., 2007; Leithwood and Mascall, 2008; Hallinger and Heck, 2009; Heck and Hallinger, 2009; Camburn and Han, 2009; Louis et al., 2009, Mayrowetz et al., 2009; Timperley, 2009). The concern has been raised by Robinson (2008) stating that

certain aspects of the conceptualisation and measurement of distributed leadership militate against finding the links between DL and student outcomes.

Furthermore, although DL has been said to be in its adolescence stage (Leithwood, Mascall and Strauss, 2009), its empirical methodological rigor is still in its infancy. The empirical research base on the distributed perspective of leadership in education is still less developed than the articulation of conceptual frameworks (Spillane et al., 2008). In their conclusion of their book Distributed Leadership According to Evidence, Leithwood et al. (2009) stressed the importance of gaining a more nuanced appreciation of the anatomy of DL in regard to its potentially wide array of different leadership patterns and functions which arise as a response to many different challenges. Without a more nuanced understanding of DL's anatomy, "it is not at all clear how one would have conceptualized and measured distributed leadership in order to assess its effects, whatever they might have been" (Leithwood et al.: 281). They also stressed in the same text that the dilemma is the "independent variable" in impact studies of DL. This implies the necessity to go back to research basics – "What is the essence of DL?" or "What is the construct of DL?"

(ii) Measurement Issues of DL

Clearly, by way of unpacking the DL construct, researchers would be able to better understand how DL is linked to school improvement outcomes such as student learning outcomes (Harris, 2009; Leithwood, Mascall and Strauss, 2009). To establish such relationships, one approach is to adopt a quantitative research methodology that is rigorous in determining or measuring the DL construct. One aspect of quantitative methodological rigor has to do with measurement of constructs. Constructs are basically human abstractions containing the essence of observed phenomena. They are derived by the merging of theoretical and operational analyses. While much has been written on the theoretical analysis of DL, what is still lacking is the rigor of the operational analysis of DL, which is contingent on the construction of DL measures. Even though this proposition relies heavily on quantitative methodology, it is justified on two grounds. First, the pursuit of attaining rigor in large scale impact studies requires appropriate statistical models under the purview of quantitative research methods. The use of qualitative research methods such as survey data from focused group discussions or from applied

ethnographic fieldwork, to investigate the impact of DL are useful, however they are highly resource demanding, and suffers from the inability to make tight comparisons of the constitutive elements in the phenomenon being observed from the wide diverse range of contexts. Second, quantitative methodology employs the notion of reductionism at the epistemological, ontological and theoretical levels. Correspondingly, they seek to reduce an explanation, reality and theory to the smallest possible entity in order to be crystal clear of the essence of the phenomenon or concept. In this regard, we agree with Lakomski's (2008) assertion that reduction is not to be feared but that it is an important and positive means towards a better scientific, causal understanding of our cognitive activity, including the concept of DL. Hence, reductionism is helpful in the DL field of study, as well as educational leadership in general, insofar as it compels educational leadership researchers to be clear on the constituents of the DL construct, rather than accepting the broadness or looseness of it, or adding on more to it. The process of reductionism essentially ensures the derivation of the DL construct that is tight, coherent and distinguishable from other leadership models or types. The reliance on reductionism to generate the DL construct does not necessarily lead to an oversimplification of the phenomenon, which is consistent with the critique on positivist understanding of social phenomena. Rather, we rely on a post-positivist approach to the generation of a social science construct – that is, a construct can have multiple distinct but related dimensions which in combination produce the construct (Law, Wong and Mobley, 1998). Without a tight, coherent and distinguishable construct of DL, the veracity of any statistical model will be severely undermined.

However, research examining the effective measurement of DL is still scarce (Hulpia, Devos and Rosseel, 2009). The task now is for educational leadership researchers to seriously consider generating robust measures for the DL construct. The current broad conceptualization and operationalization of DL construct potentially undermines the rigor of any quantitative or qualitative research studies in DL. Although it has been noted that most contemporary empirical studies on DL employs qualitative research methodologies (e.g., Timperley, 2005; Firestone and Martinez, 2007), we maintain that construct validity is not absent in these qualitative studies of DL (even though it may be couched in different terms such as 'essence', 'concept' or 'phenomenon', and

should be vigorously and persistently pursued). Both quantitative and qualitative research methodologies cannot escape the necessity for the iterative dialectical analysis between the theoretical and observational terms of the DL construct. While the former relies on conceptual construction based on existing theories, the latter relies on practical construction based on existing observations. The latter is consistent with the operational analyses mentioned earlier.

In this sense, Spillane (2004) is therefore correct to focus on practice – asserting that "distributed leadership is first and foremost about leadership practice rather than leaders, leadership roles, or leadership functions" (p. 1). The theorization of DL practices would enable us to operationalize its concept, and in doing so, arrive at its conceptual construct. The focus on practice is also contemporaneous with understanding a construct through its operations as attempted by Spillane et al. (2008) on the leader-plus concept. The importance of understanding leadership through practice has also been emphasised by Leithwood et al. (2007) proposing that DL essentially "assumes a set of direction-setting and influence practices" (p. 20) which are "potentially enacted by people at all levels rather than a set of personal characteristics and attributes located in people at the top" (Fletcher and Kaufer, 2003: 22). The focus on practice/s or patterns of practices proposed by Leithwood et al. (2007, 2009) only strengthened the necessity to clarify the operations of DL in order to clarify the construct of DL and its inherent multiple dimensions in either quantitative or qualitative research paradigm. This is to attain rigor in future impact studies of DL.

Another principle of measurement which we advocate is the concept of linearity of the measures. The impact studies of DL mentioned above had predominantly rely on raw scores, which are non-linear. Concerns over the use of ordinal (raw scores) variables are not new and have been the subject of considerable discussion in the methodological literature (see Clogg and Shihadeh, 1994; Harwell and Gatti, 2001). Ordinal data are categorical data with certain kind of order structures or logical ordering to the categories. As such, not all numbers represent equal interval scales, no matter how equally spaced their values may appear. Rank order numbers do not specify whether the distance between 1 and 2 is equal, greater or less than the distance

between 2 and 3 in the 'amount' of the variable that it is measuring. A good example is raw scores obtained from respondents responding to Likert scales. Sadly, raw scores do not necessarily satisfy the assumption of normality necessary in many statistical procedures and statistical results may be biased or spurious which threatens the validity of inferences (Harwell and Gatti, 2001; Zumbo and Zimmerman, 1993). This is because uncontrolled or inadequately assessed random measurement error can weaken the research conclusions in relation to the fit between a model and the data (Blalock, 1965). The bigger contribution to errors in statistical inferences and correlations, however, is the fact that raw scores are non-linear (see for example, Wright, 1992, 1993a, 1993b).

(iii) Contextual Issues of DL

The final concern of DL involves its application in other country contexts. While it is important to acknowledge that most of the leadership theories to date have been developed in Western countries (such as, the United Sates, the United Kingdom and Australia), they may be laden with perspectives, practices and modes of operation that reflect Western cultural assumptions. These assumptions are characterized by consumerism, individualism and self-sufficiency, competitiveness, toughness, rationality, and self-sufficiency; while being exemplified in some non-Western countries as new, modern, scientific, and resultsoriented (Lam et al. 1999; Pilkington and Johnson 2003). By way of understanding of cultural values, it is not surprising to note that educational leadership theories are in fact "culture-bound". Culture is essentially related to environmental factors, assumptions and constraints. In other words, the cross-cultural transferability of educational leadership theories and practices is subject to the degree of similarities between the cultures. It is paramount to be cautious of the adoption of Western "cultural bound" theories in other non-Western school contexts. It is thus not surprising that several researchers remain cautious in embracing such 'universal' leadership and management concepts and principles crossculturally (e.g., Collard 2007; Dimmock and Walker 2000a, 2000b, 2000c, 2004; Hallinger and Kantamara 2000, 2001; Hallinger and Leithwood 1996a, 1996b). To do so may devalue the influence of culture on the successful implementation of policy and practice across culturally distinct countries.

Purpose of study

It is evident that there is lack of strong clarity and agreement on the conceptualization of DL. As such, researchers are often faced with several major obstacles in their quest to unpack this elusive DL construct: (1) they may not understand fully the dimensions of the DL construct in the education context, (2) they do not have reliable and valid instruments for measuring perceptions of DL practices, and (3) they continue to overlook cultural variations, preferences and sensitivities of educators who possess distinct cultural identities. In the absence of a sound empirical based theory and more robust methodology in measuring DL perceptions, researchers and educators alike can never be sure what factors provide appropriate explanation of leadership and its impact. Acknowledging these concerns, the aim of this study is to address the above problems by combining existing rich perspectives, albeit varied, on DL with a robust measurement approach in the hope of understanding and unpacking DL in the Singapore context. This study has three main research objectives – (1) To develop a scale and sub-scales for measuring the DL construct, (2) to validate the instrument through Rasch Analysis, and (3) to determine the factor structure of the DL construct.

Methodology

This study involved a survey design. A total of 1,232 Singapore school leaders participated in this study, comprising 224 Principals, 322 Vice-Principals and 686 middle-level school managers. The key variables under investigation are (i) school principals' perceptions of their own DL practices, and (ii) vice-principals and key personnel's perceptions of their principals' DL practices along corresponding items from the Principals' instrument.

Instrumentation

The instrument was developed based on our analyses of the facets of DL from existing literature. From our initial analyses of the literature, there seems to be three possible dimensions of DL and they are – (i) degree of empowerment, (ii) degree of interaction for shared decision and (iii) degree of development for leadership. The instrument consists of 25 statements relating to DL practices based on the three dimensions – nine for 'empowerment', eight for 'interactive actions for shared decisions', and eight for 'developing leadership'.

(See Appendix 1). These three dimensions were constructed based on key literature on DL and further theorization of this literature with the sole purpose of deconstructing the concepts of DL. The DL instrument went through a few rounds of peer reviews from both the research team and about 12 selected school practitioners including principals, middle managers and teachers. In the course of generating the items, we have decided to adopt a global rather than specific measure of DL to acknowledge the existence of its dimensionality. The respondents were asked to check one of the following responses in surveys: '1=Strongly disagree'; '2=Disagree'; '3=Neutral'; '4=Agree'; or '5=Strongly agree'.

(i) Empowerment

Empowerment can be defined as investing in subordinates the power to make decisions. It stands in exact diametrical opposition to the conventional notion of the single 'heroic' leader standing atop a hierarchy (Camburn, Rowan and Taylor, 2003). Within conventional organisational structures, distributing leadership implies distributing decisions to other members in the organization, especially those who are in the subordinate positions. The insistence that the leader-plus perspective on leadership involves more than just the work of individuals in formal leadership positions (Spillane, Camburn and Pareja, 2007). It requires the relinquishing of decision-making power. The intent of distributing leadership inevitably translates to the practice of letting go of decision-making power to others. Empowerment is thus a necessary prerequisite for the principles of broad-based leadership where informal leaders are included and multiple levels of involvement in decision-making are made (Harris, 2008). The reticence in making this dimension in DL pronounced is perhaps due to its obviousness in most Western cultures and societies. However, its articulation in Asian contexts needs to be made more deliberate and with greater clarity – not so much that it is non-existent in Asian cultures and societies, rather its understanding and enactment may have different caricature – in a small or large extent.

Nevertheless, empowerment has been identified by Heck and Hallinger (2009) as part of the aspect of "Emphasize school governance that empowers staff and students, encourage commitment, broad participation, and shared accountability for student learning" (p. 670). However, we observed that the

operationalization of this aspect or dimension of DL is multifaceted and linked to instructional leadership, as with the rest of two aspects of DL which they had identified along with this. Empowerment has also been identified by Muijs and Harris (2003) as a dimension of DL, albeit in the discourse of teacher leadership. In summary, without empowerment the notion of leadership practices distributing over leaders, followers and their situations, and incorporates the activities of multiple groups of individuals (Gronn, 2000; Spillane et al., 2001, 2003, 2004) cannot materialize.

(ii) Interactive Relationships for Shared Decisions

DL has been said to be an emergent property of a group or network of interacting individuals, which is derived from Gronn's notion of "emergent work-related influence" (cited in Bennett et al., 2003: 15). Gronn (2000) asserted that leadership potential is present "in the flow of activities in which a set of organization members find themselves enmeshed" (p. 331). This is consistent with Spillane's (2004) assertion that "a distributed perspective on leadership argues that school leadership practice is distributed in the interactions of school leaders, followers, and their situation" (p. 2), and that "leadership practice (thinking and activity) emerges in and through the interaction of leaders, followers, and situations" (Spillane et al., 2001: 27). Hence, DL involves interactions of group members and takes place in the interactive web of leaders, followers, and their situation. And within these interactive relations, influence resulting to decisions takes place. The idea that leadership practices are distributed over leaders, followers and their situation and incorporates the activities of multiple groups of individuals (Gronn, 2000; Spillane et al., 2001, 2003, 2004, 2006) could only happen in the continual interactive relations among organizational members.

When empowerment takes place, influence is no longer asserted only from the superior but also from the subordinates. Decisions concomitantly are no longer single directional but also dual-directional – i.e., having to share decisions with others. As an illustration, the subordinate could either respond to the superior's initiation by engaging an action back to the superior, or initiates or engages an action or influence first towards the superior from which the superior follows. In other words, the initiation of an act of engagement or influence could start from anyone – the superior or subordinate, or between

subordinate and another subordinate. Proponents of DL thus allude to interactions that are not single directional but dual directional in the superior-subordinate relationship. This interaction is also synonymous to the notion of openness to boundaries of leadership in the definition of DL (Bennett et al., 2003), and transcending notions of formal or informal distinction of leadership roles. Harris (2008) speaks of this interactivity when she cited flexibility and versatility (non-permanent groupings) as principles of DL. However, the presence of interactivity, flexibility and permeability in DL requires coordination for organizational effectiveness, which entails shared decisions. Heck and Hallinger (2009) had identified the notion of shared decisions as one dimension of DL, which they termed 'Make collaborative decisions on educational improvement'. Also, in the construction of their DL Inventory, Hulpia, Devos and van Keer (2010) outlined two dimensions of DL alluding to the importance of coordination and shared decision – 'Cooperation of the leadership team', and 'Participative decision making of all school members'. The case for shared decisions in collective action has also been identified by Muijs and Harris (2003) in understanding DL in the context of teacher leadership. In essence, in order for concertive action and conjoint agency to take place (Gronn, 2002; Bennett et al., 2003), a substantial degree of coordination in decision-making must take place. Although Spillane (2003) theorised further three types of distribution that could exist in distributed leadership – collaborated, collective and coordinate, we considered all three have to do with coalescing the open and fluid interactive relations among members or groups within the organization through shared decisions.

(iii) Developing leadership

Bennett et al. (2003) has raised the importance of leadership development in DL but without situating it within the discourse of identifying the dimensionality of the DL construct. Our assertion for leadership development as a dimension of the DL construct is based on the argument that without building leadership competencies, empowerment cannot take place. Empowerment is dependent on superiors' confidence in subordinates' competence in enacting the leadership actions that once belonged to the superior's (e.g., influencing others, making decisions, and communicating the vision). Empowerment is enabled when superiors trust in their subordinates'

decision-making, which is dependent on subordinates' competencies in doing the subordinates' actions before empowerment is given. In this regard, DL does not equate to superficial delegation (Harris, 2008), where a task is passed down from the superior to the subordinate absent of capacity and authority. Finally, without empowerment interactive relations for shared decisions cannot materialized.

Although the term 'developing leadership' can cover a multiple range of ideas, we choose to adopt a more parsimonious substantive conception or essence of leadership – that is, influencing others to do what they might not otherwise have done towards a shared goal. Our preoccupation on the conception or essence of leadership is to minimize possible slippages to understanding leadership according to aspects of its practices, instead to the substance or essence of its practices. For example, an aspect of leadership practices is culture building, but a set of transformational leadership practices in culture building is and should be more or less different to a set of DL practices in culture building. The focus on developing knowledge, skills and attitudes of a more parsimonious conception of leadership – influencing others towards a shared goal – would therefore minimize the blurring of leadership concepts drawn from the wide range of adjectival leadership types.

Table 1 summarises the key literature that was drawn upon to aid us in the generation of the construct of DL according to its dimensions.

Table 1: Summary of Concepts from Literature in Generating the DL Construct

Dimension	Author/s	Research Type	Implications of Key Concepts on the DL Dimension
Empowerment	Heck and Hallinger (2009)	Empirical *(Quantitative)*	2nd aspect of DL: Emphasize school governance that empower staff and students, encourage commitment, broad participation, and shared accountability.
	Spillane, Camburn and Pareja (2007)	Empirical *(Mixed-methods)*	Leader-plus perspective on leadership involving more than the work of individuals in formal leadership positions requires the relinquishing of decision-making power.
	Harris (2008)	Conceptual	Broad-based leadership where informal leadership and multiple levels of involvement in decision-making take place requires formal leaders to let go of decision-making powers to others.
	Muijs and Harris (2003)	Conceptual	Collective action, empowerment and shared agency in teacher leadership.
	Bush et al.(2010)	Empirical *(Qualitative)*	Empower staff members
Interactive relations for shared decisions	Heck and Hallinger (2009)	Empirical *(Quantitative)*	1st aspect of DL: Make collaborative decisions focusing on educational improvement. 3rd aspect of DL: Emphasize participation in efforts to evaluate the school's academic development.
	Hulpia, Devos and van Keer (2010)	Empirical *(Quantitative)*	1st aspect of DL: Cooperation of the leadership team. 3rd aspect of DL: Participative decision making.
	Spillane, Camburn and Pareja (2007)	Empirical *(Mixed-methods)*	Emphasize the practice aspect of DL – i.e., a product of the interactions and intersections of school leaders, followers, and their situations.
	Spillane, Halverson and Diamond (2004)	Conceptual	Distribute perspective practice emerges in and through the interaction of leaders, followers, and situations.
	Spillane (2004)	Conceptual	Leadership practice is distributed in the interactions of school leaders, followers, and their situations.

	Gronn (2000)	Conceptual	Emergent dimension to influence where leadership is present in the flow of activities in which members find themselves enmeshed.
	Spillane (2003)	Conceptual	Leadership stretched over the practice of leaders – collaborated distribution, collective distribution, and coordinated distribution.
	Gronn (2002)	Conceptual	Conjoint agency and concertive action in DL involves shared decisions.
	Harris (2008)	Conceptual	Leadership that is flexible, versatile, fluid and interchangeable; links vertical and lateral leadership structures; and requiring multiple levels of involvement points to interactive relations requiring shared decisions.
	Muijs and Harris (2003)	Conceptual	Collective action, empowerment and shared agency are necessary in teacher leadership.
Developing leadership	Bennett et al. (2003)	Conceptual	Surfaces the importance of leadership development in their literature review of DL.
	Harris (2008)	Conceptual	DL is not superficial delegation. Hence, a task is passed down from the superior to the subordinate without the absent of capacity and authority. Thus, the importance of capacity building in leadership competencies in DL. Empowerment is dependent on superiors' confidence in subordinates' competence in enacting the leadership actions that once belonged to the superior's (e.g., influencing others, making decisions, communicating, etc).
	Harris (2008)	Conceptual	Broad-based leadership where informal leadership and multiple levels of involvement in decision-making take place requires leadership development of informal leaders.
	Murphy (2006)	Conceptual	Surfaces categories of leadership skills in DL (e.g., building strong relationships with teachers, rethinking conceptions of power, and fashioning organizational structures).

Analysis

(a) Data cleaning and constructing a common scale

Rasch Model is a probabilistic model for which the raw scores are sufficient statistics for the determination of measures, and it does extremely well at "constructing linearity out of ordinality and at aiding the identification of the core construct inside a fog of collinearity" (Schumacker and Linacre, 1996: 470). Rasch analysis converts raw rating scale responses into linear units of measurement called 'Logits' or 'Log-Odds Unit'. For polytomously scored items, such as the level of agreement on a five-point scale on our instrument, there are five categories of responses. The probability for any person n responding in category k to item i, according to Wright and Masters (1982), is given by:

$$P_{nik} = \frac{\exp \sum_{j=0}^{k} [b_n - (d_i + m_j)]}{\sum_{r=0}^{s} \exp \sum_{j=0}^{r} [b_n - (d_i + m_j)]} \quad k = 0, 1, 2, \ldots, s$$

Wright (1993) went further to argue that "by observing that when data fit the theory, the specification that a one logit positive difference between any person and any item anywhere on the scale always has the same stochastic consequence" (p. 288). When data fit, the interval specification of the theory is established in the data. This puts "ability" (in this case, "the strength of a perception") and "difficulty" (in this case, "the difficulty in agreeing to an item") on a common interval scale. Most importantly, non-linear raw scores results in spurious correlations while clearly, linear measures result in correlations that are closer to their "true" values.

In order that the items are properly calibrated, respondents who did not take the rating scales seriously and are misfitting in their responses (sometimes referred to as misbehaving on the rating scale), were removed. Rasch analysis was then run on the data for the measurement of respondents' perceptions of DL. From the analysis, the fit of the items and persons were analyzed. As a guide to what may be considered large infit and outfit mean squares, Wright and Stone (1979: 168) noted that in their practical experience, rejecting

persons with a normal deviate (fit statistic) of about 2 is 'unnecessarily conservative'. This implies that values slightly above 2 may be tolerated. As such, respondents and items with large z-standardized infit and outfit mean squares of more than 3, as well as large residuals, are considered misfitting and were removed. In the first run, 4 persons (i.e., 1 Principal, 1 Vice-Principal and 2 Key Personnel) were deemed misfitting and removed from the next run. A final Rasch analysis was then run for the cleaned data set (i.e., 1,228 persons) and using all 25 valid items in the instrument. With this final analysis, we obtained the final person measures in logits of their perceptions of the DL.

(b) Exploratory factor analysis on Rasch standardized residuals

Once the interval scale is established, it is important to note that a given variable may be a hybrid of small existing factors that a single measure will represent (Linacre, 1998). Linacre further added that if factor analysis still needs to be done it should be done using the standardized residuals (i.e., of observed responses minus their expectations) of the item calibrations as these residuals are linear. A residual is defined as "the difference in what is predicted by a model and what is actually observed" (Ludlow, 2002: 1). According to Ludlow (2002), while some researchers may have dismissed the residual as a nuisance and a distraction he considers residuals as key in the development of theories and models. Evidently, the purpose of the factor analysis of Rasch standardized residuals is an attempt to:

"extract the common factor that explains the most residual variance under the hypothesis that there is such a factor. If this factor is discovered to merely 'explain' random noise, then there is no meaningful structure in the residuals." (Linacre, 1998: 636)

Providing further support to the use of factor analysis on standardized residuals rather than observed scores, Smith (1996) concluded that when the data are dominated by a small number of highly correlated factors, or one factor, the use of Rasch analysis is recommended. Once a factor has emerged, the advice was to separate its items out of the instrument and use Rasch analysis to analyze them further in order to make sense of the variable (see Goekoop and Zwinderman, 1994). Factor analyses using raw scores and Rasch standardized residuals can result in different factor structure (Green, 1996).

However, factor analyses of Rasch measures were simpler to interpret, more stable and informative than those of raw scores (Chang, 1996).

Results

(a) Person and Item Separation Reliabilities

Table 2 shows that the person separation reliability is 0.95. The large value indicates a large spread in persons' measures on the perceptions of DL practices and that the instrument can reliably tell the persons apart. At the same time, Table 2 also depicts the instrument's (items) separation reliability as 0.98. This means that the items are well targeted and provide a good spread of the different aspects of perceptions of DL practices in order to sufficiently and hence reliably measure the respondents on this measure.

Table 2: Summary of Persons and Items Separation Reliabilities

Input: 1232 Persons, 25 Items; Measured: 1228 Persons, 25 Items

Summary of 1111 Measured (Non-Extreme) Persons

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	102.6	25	3.46	0.46	0.97	-0.4	0.96	-0.4
S.D.	14.4	0	2.4	0.13	0.75	2.5	0.78	2.5
MAX.	124	25	8.38	1.02	5.28	9.9	5.47	9.9
MIN.	26	25	-6.95	0.29	0.04	-5.9	0.04	-5.9

REAL RMSE 0.53 ADJ.SD 2.34 SEPARATION 4.43 PERSON RELIABILITY 0.95
MODEL RMSE 0.48 ADJ.SD 2.35 SEPARATION 4.88 PERSON RELIABILITY 0.96
S.E. OF PERSON MEAN = .07

MAXIMUM EXTREME SCORE: 115 PERSONS
MINIMUM EXTREME SCORE: 2 PERSONS
DELETED: 4 PERSONS

Summary of 25 Measured (Non-Extreme) Items

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	4558.8	1111	0	0.06	0.99	-1	0.96	-1.3
S.D.	118.4	0	0.49	0	0.29	4.3	0.35	4.3
MAX.	4758	1111	0.85	0.07	2.13	9.9	2.34	9.9
MIN.	4347	1111	-0.86	0.06	0.66	-7.8	0.62	-7.2

REAL RMSE 0.07 ADJ.SD 0.49 SEPARATION 7.26 PERSON RELIABILITY 0.98
MODEL RMSE 0.06 ADJ.SD 0.49 SEPARATION 7.58 PERSON RELIABILITY 0.98
S.E. OF PERSON MEAN = .10

UMEAN=.000 USCALE=1.000
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.0

(b) Factor analysis

The decision on the number of factors extracted from the Exploratory Factor Analysis of Rasch standardized residuals was based on the following predetermined criteria:

(i) The latent root criterion. That is, in accordance with the Kaiser (1960) rule, eigenvalues greater than 1 are considered significant. The eigenvalue is the sum of the squared correlations between a factor variate and the p original variables;

(ii) The percentage of variance criterion (aims to achieve a specified cumulative percentage of total variance extracted by the successive factors); and

(iii) The Scree test (Cattell, 1966) criterion. The Scree test is used to identify an optimum number of factors that can be extracted before the amount of unique variance starts to dominate the common variance structure.

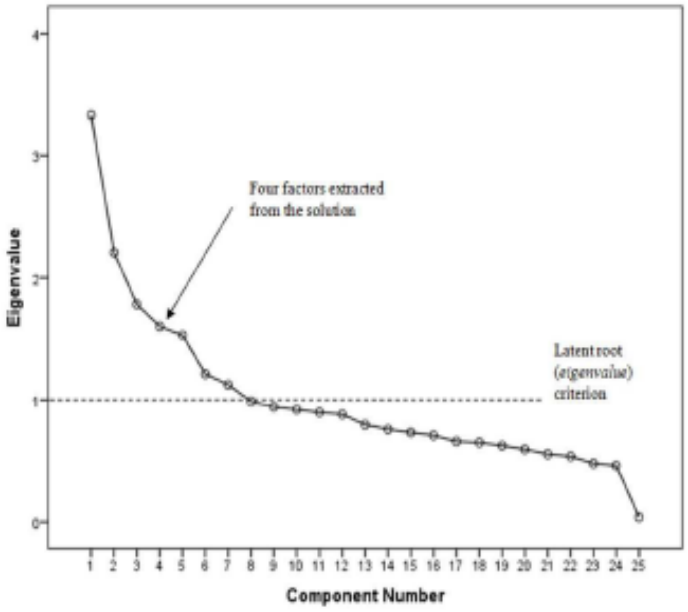
The total variance explained (shown in Table 3) and a Scree test (shown in Figure 1) indicated the presence of four factors, in the matrix accounting for 13.3%, 8.8%, 7.1%, and 6.4% of the matrix variance respectively. From the scree plot, the eigenvalue for the first factor is 3.3, followed by 2.2, 1.8 and 1.6 for the second, third and fourth factor respectively. The total variance explained by the four factors was 35.7%.

Table 3: Total Variance Explained from Principal Components Factor Analysis of Standardized Residuals

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.335	13.341	13.341	3.335	13.341	13.341	2.521	10.085	10.085
2	2.208	8.830	22.171	2.208	8.830	22.171	2.055	8.221	18.306
3	1.782	7.128	29.299	1.782	7.128	29.299	1.888	7.553	25.859
4	1.603	6.414	35.713	1.603	6.414	35.713	1.741	6.963	32.822
5	1.530	6.121	41.834	1.530	6.121	41.834	1.611	6.443	39.266
6	1.210	4.840	46.674	1.210	4.840	46.674	1.608	6.430	45.696
7	1.123	4.493	51.167	1.123	4.493	51.167	1.368	5.471	51.167
8	.987	3.946	55.113						
.....									

NB: Eigenvalues greater than 1 were considered.

Figure 1: Scree Plot on Rasch Standardized Residuals



The four factors were rotated to orthogonal structure using varimax procedures with eigenvalues greater than one. Items loading >.30 are listed under their tentative factor labels in Table 4. The four factors from the standardized residuals solution were:

• ***Factor I***. There were 5 items in this factor. The loadings reflected a general emphasis on a 'bounded' model of empowerment, albeit with predominantly negative loadings for the Singapore context. However, this does not mean that Singapore school leaders do not empower, rather they do so with certain caveats. The 'bounded-ness' is indicated by the following terms: 'some key operational decisions', and 'make decisions within their work scope'. Also, opportunities for distributed decisions are to be made within a bounded purpose of attaining the school agenda and informal positions. On the whole, the analysis indicates that empowerment is understood within a set boundary. This factor is labeled 'Bounded Empowerment'.

• ***Factor II***. There were 5 items in this factor. The loadings indicated a broad emphasis on developing leadership competencies – seeking opportunities for staff to gain leadership developmental experiences. However, it must be noted that Singapore schools leaders do not feel that they need to 'accept ultimate accountability for any outcome of shared decisions' or 'build trusting relationships with and among staff'. This factor is labelled 'Developing Leadership'.

• ***Factor III***. There were 6 items that loaded on this factor. The loaded items reflected a broad belief about shared decisions. The items related to promoting shared responsibility and the benefits of shared decisions. However, it must be noted that Singapore school leaders feel that when they promote shared decisions they should not be expected to (i) build rapport or trusting relationships with staff, or (ii) provide them with constructive feedback. This factor is labeled 'Shared Decisions'.

• ***Factor IV***. There were 3 items that loaded on this factor. The items all reflected the notion of a collective sense of engagement or participation, such as 'encouraging staff engagement', 'providing platforms for team work' and 'involving staff in shared school decision-making'. This factor is labeled '*Collective Engagement*'.

Table 4: Items loading >.30 on the factor analysis on standardized residuals of the DL practices instrument (NB: Items depicted below are phrased for Principals' instruments)

FACTORS		I	II	III	IV
Factor 1: Bounded Empowerment					
Q11	I coordinate to ensure alignment of decisions made by different staff.	.375			
Q1	I relinquish control of some key operational decisions to my staff.	-.499			
Q4	I encourage staff to make decisions within their work scope.	-.709			
Q3	I create opportunities for my staff to take initiatives to improve school processes and outcomes.	-.712			
Q2	I give my staff opportunities to assume informal leadership responsibilities.	-.732			
Factor 2: Developing Leadership					
Q22	I exploit every opportunity for my staff to gain experience in developing their leadership competencies.		.757		
Q21	I am continuously looking to develop staff at all levels in my school with leadership potential.		.683		
Q23	I ensure that the competencies of shared leadership are incorporated in our staff development programs.		.616		
Q10	I proactively build trusting working relationships with and among my staff.		-.320		
Q6	I assure staff that as their leader I accept ultimate accountability for the outcome of any shared decisions they make.		-.424		
Factor 3: Shared Decisions					
Q15	I constantly affirm the importance of shared responsibility for decision-making			.498	
Q14	I encourage my staff to consider all relevant stakeholders' viewpoints (teachers and leaders) when making shared decisions			.432	
Q5	I go out of my way to demonstrate the benefits of shared decision-making			.383	
Q10	I proactively build trusting working relationships with and among my staff			-.301	
Q19	I provide regular guidance to staff after giving them leadership responsibilities.			-.615	
Q18	I provide constructive feedback to staff to help develop their leadership competencies.			-.671	
Factor 4: Collective Engagement					
Q9	I make the best use of staff talent by involving them in shared school decision-making.				.720
Q8	I provide platforms for teachers to work in teams to improve school processes.				.651
Q7	I encourage staff engagement in all key school-wide decisions				.593

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization (Rotation converged in 12 iterations).

Discussion

The Exploratory Factor Analysis on the Rasch standardized residuals generated four factors or dimensions on DL. The analysis not only concurs with the major literature on DL, but also further sharpens the construct on DL and its multi-dimensionality. Further, the analysis sheds light on the perceived practices of DL in the context of Asian Singapore schools.

Bounded Empowerment

The findings indicate that Singapore school principals were generally perceived to be empowering their staff members but in a restrictive or bounded sense. In other words, the act of giving subordinates authority to make decisions in modern day organizations does not necessarily translate to relinquishing all control of decisions to subordinates. This is evident when they were perceived to be relinquishing only some key operational decisions, and encouraging staff to make decisions within their work scope. In addition, even if decisions were to be made by staff, principals saw the need to coordinate for alignment. Clearly, initiatives by staff must situate within the ambit of the school framework, processes and outcomes. Not surprisingly, this bounded empowerment fits perfectly with the Asian cultural value for hierarchy, and the Singapore pragmatic value for efficiency and need for control in order to attain efficiency as observed by both local and foreign commentators – strategic pragmatism (Schein, 1996), and economic pragmatism (Author, 2006). Here, both the pragmatic value for efficiency and control and the Asian cultural value for hierarchy prevailed. The need for control is ubiquitous in all public institutions in Singapore. In his study of governance in Singapore, Worthington (2003) described the Singaporean state as a "neo-Gramscian hegemonic state – corporatist, authoritarian, oligarthic and elitist, and 'depends for its reproduction and continuity on strong, balanced forces of both coercion and consent'" (p. 248). For the case of Singapore, the Asian cultural value for hierarchy is enhanced by the pragmatic value for efficiency and control.

While this finding points towards a bounded nature of empowerment in the Asian Singapore context, we postulate that the dimension on bounded empowerment can be universal. First, empowerment is bounded insofar as there is clear scope in which decisions can be made. In other words, there are

certain areas of decisions that cannot simply be given to others. Woods et al. (2004) is accurate to highlight that non-negotiable values and aims are not inappropriate even when distributed leadership favours autonomy. Second, empowerment is bounded insofar as the person giving the power to make decision to subordinates is kept informed of the decisions made by the subordinates. In other words, teachers' autonomous decisions are not without the superiors' knowledge and approval, even if it may be silent. The act of relinquishing decisions to others does not equate to relinquishing responsibility and accountability. Woods et al. (2004) highlights the importance of accountability in the goals and values set by formally constituted leaders who are accountable for the performance of the organisation, especially if these goals and values are seen as non-negotiable. In their case study research, Bush and Glover (2010) found that heads in schools with DL practices retain a central role not least because of the accountability framework within which schools operate. Third, empowerment is bounded insofar as decisions made by the subordinates are aligned to school goals and in harmony with decisions made by others within the organisation towards the school goals. Decisions made by empowered subordinates need to be coordinated in ways that achieve alignment with the school goals and with other departmental goals. This is precisely consistent with Gronn's notion of 'concertive action' (or holistic) – and what Spillane terms 'person plus' synergistic relationship (Spillane, 2006), as opposed to 'additive action'. While the latter is the aggregated effect of a number of individuals contributing their initiative and expertise in different ways to a group of organization, the former is about the additional dynamic which is the product of conjoint activity and where the outcome is greater than the sum of individual actions (Bennett et al., 2003; Gronn, 2002). Interestingly also, Murphy et al. (2009) had surfaced impediments on shared leadership – within the Western context, citing the difficult of administrators to see teachers as leaders and for teachers to view themselves or colleagues as leaders.

Furthermore, Silins and Mulford (2002) alluded to the notion of bounded empowerment in terms of coordinated decisions when they stated that governance regimes are perceived as legitimate by teachers only when they are being actively involved in decision-making. When teachers believe they are empowered in areas of importance to them, they are very positive in the way

the school is organized and run. In other words, teachers co-decide with their school leaders and not make decision on their own. The emphasis is also on the scope in which teachers are allowed to be involved in the decision-making. In reality, teacher empowerment is not the absolute absence of the principal control as much as principals are not leaders with absolute control. In summary, it can be said that empowerment simply does not and cannot translate to individual subordinates having unfettered power to make limitless decisions without being accountable to superiors and peers. This truism holds true in both Western egalitarian and Asian hierarchical organisations.

The findings on 'Bounded Empowerment' is also tangentially related to Gronn's (2008) argument for the existence of a 'hybrid' version of leadership in the DL discourse, whereby both hierarchical and heterarchical modes of ordering responsibilities and relations intermingle or co-exist. In the former, each level is influenced by a higher level. In the latter various levels influence each other in some particular respect – i.e., no clear ordering of elements. For example, the enactment of school principals in relinquishing control of some key operational decisions to staff members contains both hierarchical and heterarchical modes of ordering insofar as while some decisions can be relinquished to staff members to exert influence and decision-making power with others, some decisions are solely the privilege of the school principal to exert influence and decision-making over others. Likewise, the enactment of encouraging staff to make decisions within their work scope meant that while certain decisions can be made among staff members, certain decisions is only made by the school principal.

Developing Leadership

The findings indicate that Singapore school principals were perceived to be developing leadership competencies – exploiting opportunities for staff to gain leadership experience, looking to develop staff at all levels, and including shared leadership in staff development programmes. The findings augur well for Singapore education system as a whole in terms of not only the continual leadership succession planning in schools, but also building school capacity to support school-based curriculum development and innovation where teachers, together with their department heads, are encouraged to engage in bottom-up

initiatives within the discourse of diversifying and widening of school outcomes (MOE, 2005). Notwithstanding this positive outlook, the findings also indicated that Singapore school principals distribute leadership practices in a cautious manner. This we suspect is due to several reasons. Where pragmatic efficiency and effectiveness is highly prized, task-orientation supersedes people-orientation in the superior-subordinate relationship. When school outcomes determine the future determination of the country's economic well-being and socio-political meritocratic stability, the distribution of decisions to co-leaders cannot be reliant on trust alone. Furthermore, the Asian culture of hierarchy in the work place does not encourage shared accountability among co-leaders. Accountability rests solely on one school leader regardless whether decisions are distributed or not. School principals in Singapore may thus be more comfortable with a kind of distributed leadership that preserves their power and authority, and rightly their accountability.

The dimension of '*Developing Leadership*' is closely tied to the first dimension on '*Bounded Empowerment*' insofar as they mutually reinforce each other. The degree to which a leader relinquishes power to the follower is dependent on the degree of leaders' confidence or trust in the competence of the subordinate to perform the task. An aspect of leadership is decision-making as influence to reach a shared goal among members in the group. The competence-confidence-empowerment triplex applies in all horizontal and vertical relationships in the structure of organizations and systems – among teachers, heads of department, between teachers and heads of department, between heads of department and school leaders (principals/vice-principals), between school leaders and district superintendents and education ministry headquarters. The degree of empowerment is thus contingent on the degree of confidence in the competence of organizational members to make the right decisions for the organization as a source of influence to reach shared goal group members. Finally, the relationship between trust or confidence and competence is inextricably linked to accountability. The act of developing leadership capacities and competencies in the context of empowerment of subordinates is synonymous to the act of being accountable.

To promote leadership practices that empower teachers, the development of the following examples of leadership competencies are necessary: taking

initiative, rallying others towards common group goals, considering individual needs of group members in decision-making in consideration of others, making decisions based on micro and macro contextual knowledge (e.g., situational and organizational analysis), and promoting shared ownership and accountability. DL thus requires the building of leadership capacity of staff members. Using Critical Theory lenses, empowerment is thus rightly defined as building people's capacities such as knowledge, energy and authority to act successfully within an existing system and structures of power – working within the system, on their own behalf (Inglis, 1997; Maynard, 2004). Besides building leadership capacities and competencies of staff members, it is also necessary to consider extending the reach of opportunities for leadership development – both for formal and informal leadership roles (Bennett et al., 2003; Harris, 2008).

Besides developing knowledge, skills and attitudes on influencing others towards a shared goal, leadership development should also include knowledge, skills and attitudes specific to DL. Although research work on this area is still new (e.g., Murphy et al., 2009), some have established areas or aspects for DL development. For example, Murphy (2006) identified the following categories: building strong relationships with teachers, rethinking conceptions of power, and fashioning organizational structures. Future instrument building of the DL construct could further consider operationalizing this dimension to include more specific items in developing leadership that enhance leadership competencies in general and specific distributed leadership competencies.

Shared Decisions

The findings show that Singapore school principals promoted shared decisions and responsibility among staff members. This is heartening bearing in mind that over the last decade or so the Education Ministry has been encouraging schools to take more initiative in curriculum development and innovation in their respective niche areas and school outcomes, which essentially requires greater devolvement of curricular decisions to teachers and department heads. In environments where curriculum is constantly evolving, and teachers and department heads are caught in the web of fluid interconnections to cope with the constant curricular changes, shared decisions are inevitable. School principals' promotion of shared decision practices is also an indication that

they are relinquishing control of decisions, albeit in a bounded manner as described above. However, once more, principals' practices that promote shared decisions are done cautiously as indicated in the negative loading for 'I proactively build trusting working relationships with and among my staff'. Once again, this is to serve pragmatic efficiency and the Asian cultural value for hierarchy as described earlier. The act of promoting shared decisions is to accomplish the necessary task of getting things done in the most efficient manner, and not for developmental needs as evidenced in the negative loadings for two items – 'I provide regular guidance to staff after giving them leadership responsibilities', and 'I provide constructive feedback to staff to help develop their leadership competencies'. Interestingly, although Asian cultures are well known in preserving the value for collectivism, the preservation of hierarchy must be equally maintained. In an Asian Singapore pragmatic context, empowerment and leadership development must be followed by the actual outcome of shared decision so that school processes are kept tight to achieve the most in school outcomes.

The relationship between bounded empowerment and shared decision is inextricably intertwined as much as empowerment is to leadership development. As discussed earlier, the relinquishing of control and authority is not absolute, instead within bounds. In a distributed leadership context, when authority or decision-making power is passed on to subordinates, decisions made by subordinates are eventually 'shared' insofar as superiors are kept informed of the decisions and remains stoically responsible and accountable to the outcomes of the decisions made by others. Shared decision is therefore a necessity to keep empowerment in alignment to the group goals – i.e., the school goals. This sits squarely with Heck and Hallinger's (2009) dimension on 'Make collaborative decisions on educational improvement'. Collaboration is a servant to strategic goals of the organization. Shared decision is also a necessity for the coordination of broad-based (vertical and horizontal) leadership structure. Indeed for conjoint action to take place (Gronn, 2002), coordination in decision-making must be present in the form of participative (Hulpia et al., 2010) or shared decision-making of staff members.

The degree to which organizational members reach shared decisions depends on the degree to which goals and values of individual members of the

organization coalesce. However, the degree to which these goals and values coalesce is dependent on the nature of power relation among members in the organization. In fact, the notion of power has yet to be developed by the proponents of activity theory (Daniels, 2006), which had influenced Gronn's conceptualization of DL. We postulate that for shared decision to be reached among organization members, greater symmetrical and lesser asymmetrical power must take place, or rather and more realistically, a moving towards this end of the symmetrical power spectrum. This notion of symmetrical power, where every member in the organization has equal opportunity to assert influence over another regardless of hierarchy applies in both Western and Asian settings. In the latter, although staff members are given equal opportunity to assert influence, they may choose not to eventually assert influence if they wish to apply the value for respect to hierarchy.

The notion of symmetrical power relations is also in tandem with to the notion of 'consensual power' (Haugaard, 2002) where decisions among organizational members are reached through consensus as opposed to conflict. Although some commenters (e.g., Achinstein, 2002; Kelchtermans, 2004) claimed that conflict is central to community as it provides the context for learning to take place, we propose that in order for organizations to remain sustainable communities, conflicts can and should be a means to reach consensus. Finally, we also recognize that there are certain deontological values that underpin symmetrical or consensual power relations such as respect, trust, care and shared responsibility and accountability. Both symmetrical and consensual power relationships and their inherent values are potential dimensions to be explored in the future in the DL construct. The importance of values could also be considered for future development of the DL measure.

Collective Engagement

Finally, the findings indicate that Singapore school principals promoted collective engagement among staff members, which is evident in the following positive loaded items – '*I make the best use of staff talent by* ***involving them in*** *shared school decision-making*', '*I provide platforms for teachers to* ***work in teams*** *to improve school processes*', and '*I encourage* ***staff engagement in*** *all key school-wide decisions*'. All these are consistent with the DL principles asserted by Harris (2008), namely, multiple levels of involvement in decision-

making, encompasses both formal and informal leaders, and links vertical and lateral leadership structures. The key principle here is on the collective involvement of every staff members to the task at hand regardless of levels or positions, which involves the contribution of different talents from different individual staff members in a coordinated way towards a common goal. Once again, pragmatism can be detected in this analysis insofar as engagement in collective or team activities are for the purpose of maximizing the school shared processes.

Collective engagement fits perfectly with the idea that DL is an emergent property of a group or network of interacting individuals, and Spillane's (2004) notion of leadership practice being distributed in the interactions of school leaders, followers and their situations. The first common sense behind Spillane's (2004) argument is that DL is first and foremost about practice rather than leaders, roles and functions, and is therefore situated in the interactions between leaders and followers. The second is that leadership practice takes place in the interactive web of leaders, followers, and their situation. Hence, leadership does not reside in the leader or follower, rather in the interactive actions and interactions between leaders and followers. These interactions are what we termed 'Collective Engagement' where leadership practices are distributed over leaders, followers and their situation and incorporates the activities of multiple groups of individuals (Gronn, 2000; Spillane et al., 2001, 2003, 2004). And within these interactive relations, influence resulting to decisions takes place. Collective engagement could be seen as the social material base for shared decisions to materialize.

The dimension on 'Collective Engagement' also involves division of labor of expertise among group members, which is consistent with the notion of conjoint activity (Gronn, 2002). In other words, the distribution of labor according to expertise enhances conjoint activity. When staff members are brought together, it is possible to forge a concertive dynamic which represents more than the sum of the individual contributors (Bennett et al., 2003). In fact, Bennett el al. (2003) proposed that initiatives may be inaugurated by those with relevant skills or expertise. However, the presence of expertise alone does not guarantee collective engagement. In our view, it enhances or aids in collective engagement. The onus is on school leaders to promote collective

engagement through various utilizations of rules (e.g., value for team as opposed to individual effort) and resources (e.g., time and space for collective engagement). Nevertheless, what remains convincing is that DL has the potential to develop expertise, and thus maximizing the human capacity, through team work (Harris, 2004), but whether collective capacity building leads to leadership development as proposed by Mayrowetz (2008) remains questionable. Our stand is that a good degree of intentionality on developing leadership capacity and competencies must become part and parcel of DL practices. The idea of collective engagement also resonates well with the notion of patterns of distribution in DL – spontaneous collaboration, intuitive working relations, and institutionalized practice (Gronn, 2002). Leithwood et al. (2007) extended this taxonomy to include planful alignment, spontaneous alignment, spontaneous misalignment, and anarchic misalignment. We therefore propose that future instrumentation of the DL construct look into enriching the dimension on collective engagement, which is closely tied to the notion of patterns of distribution (Leithwood et al., 2007, 2009).

Conclusion

In this paper, we have attempted to unpack the construct of DL and its multi-dimensionality according to four dimensions using Exploratory Factor Analysis on the Rasch (linearized) standardized residuals in a Singapore school context. These four dimensions are: 'Bounded Empowerment', 'Developing Leadership', 'Shared Decisions', and 'Collective Engagement'. We have also showed how the school principals in Singapore were perceived in regard to their DL practices, and how societal culture plays a huge part in shaping how DL practices played out in schools. Specifically, Singapore school leaders draw upon the Asian cultural values for collectivism and hierarchy, and economic pragmatism in the enactment of DL actions, and this significantly alters the way DL is understood and practised in Singapore schools. This is consistent with the notion that leadership practices are very much influence by context – in this case, the interplay between values of hierarchy, collectivism and pragmatic efficiency and control in the Singapore society. The motivation behind this study is premised on the belief that DL does have the potential to contribute to the overarching theory on school leadership, and on school improvement processes and outcomes. However, this requires a clearer and

sharper understanding of the essence or construct of DL using more robust methodology in measuring DL. Adopting a psychometric approach in understanding DL will potentially eliminate the stigma of DL being labelled as broad, loose or elusive. This study has at best contributed to the further sharpening of the DL construct. Is the search over? We believe more work is needed in removing the dross from the gold.

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Appendix 1: Perception of Distributed Leadership Practices

Empowerment

No.	Items	Your Rating				
		Strongly disagree				Strongly agree
1.	I relinquish control of some key operational decisions to my staff.	1	2	3	4	5
2.	I give my staff opportunities to assume informal leadership responsibilities.	1	2	3	4	5
3.	I create opportunities for my staff to take initiatives to improve school processes and outcomes.	1	2	3	4	5
4.	I encourage staff to make decisions within their work scope.	1	2	3	4	5
5.	I go out of my way to demonstrate the benefits of shared decision-making.	1	2	3	4	5
6.	I assure staff that as their leader I accept ultimate accountability for the outcome of any shared decisions they make.	1	2	3	4	5
7.	I encourage staff engagement in all key school-wide decisions.	1	2	3	4	5
8.	I provide platforms for teachers to work in teams to improve school processes.	1	2	3	4	5
9.	I make the best use of staff talent by involving them in shared school decision-making.	1	2	3	4	5

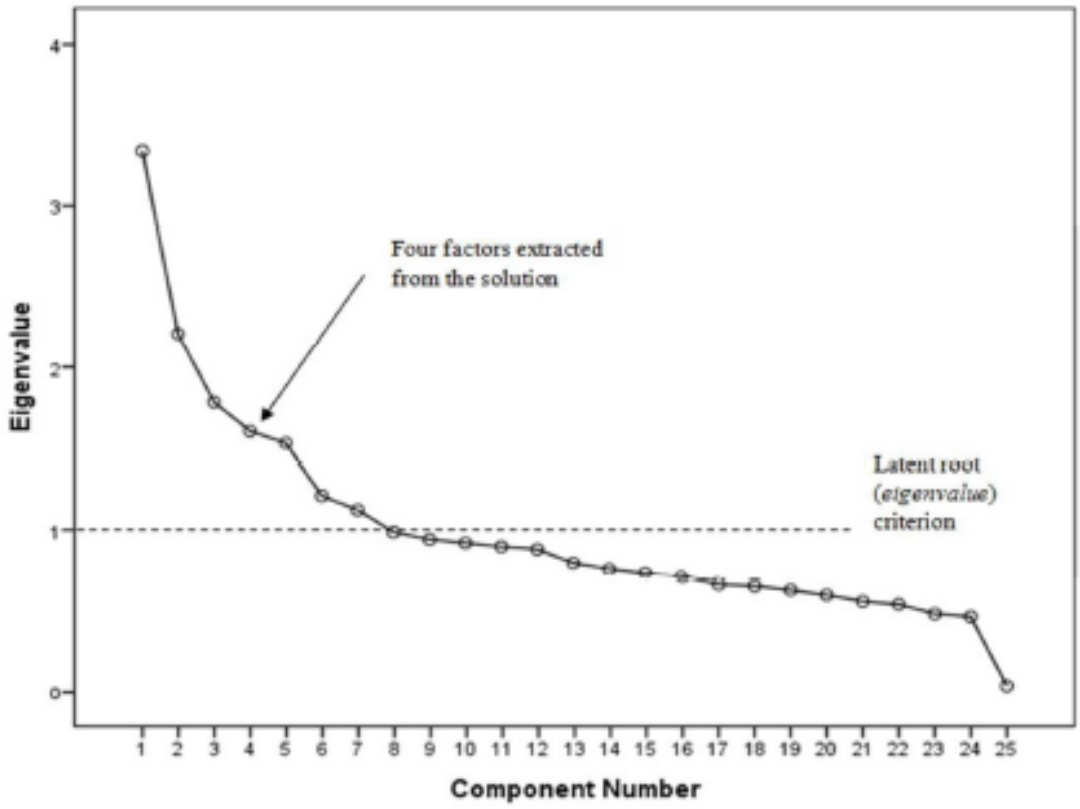
Interactive relationships for shared decisions

No.	Items	Your Rating				
		Strongly disagree				Strongly agree
10.	I proactively build trusting working relationships with and among my staff.	1	2	3	4	5
11.	I coordinate to ensure alignment of decisions made by different staff.	1	2	3	4	5
12.	I always take the competence of my staff into account when deciding whether to involve them in shared decision-making.	1	2	3	4	5
13.	I provide platforms for staff to build networks among colleagues to work collaboratively.	1	2	3	4	5
14.	I encourage my staff to consider all relevant stakeholders' viewpoints (teachers and leaders) when making shared decisions.	1	2	3	4	5

15.	I constantly affirm the importance of shared responsibility for decision-making.	1	2	3	4	5
16.	I constantly encourage staff to express their viewpoints about work to me.	1	2	3	4	5
17.	I invest significant time and energy to build rapport with my staff.	1	2	3	4	5

Developing Leadership

No.	Items	Your Rating				
		Strongly disagree				Strongly agree
18.	I provide constructive feedback to staff to help develop their leadership competencies.	1	2	3	4	5
19.	I provide regular guidance to staff after giving them leadership responsibilities.	1	2	3	4	5
20.	I constantly develop leadership talents across all levels of my staff.	1	2	3	4	5
21.	I am continuously looking to develop staff at all levels in my school with leadership potential.	1	2	3	4	5
22.	I exploit every opportunity for my staff to gain experience in developing their leadership competencies.	1	2	3	4	5
23.	I ensure that the competencies of shared leadership are incorporated in our staff development programmes.	1	2	3	4	5
24.	I provide opportunities for staff to work in teams as a means of developing their decision making skills.	1	2	3	4	5
25.	I often discuss school leadership problems and possible solutions with my staff as a way of developing their leadership skills.	1	2	3	4	5



Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.335	13.341	13.341	3.335	13.341	13.341	2.521	10.085	10.085
2	2.208	8.830	22.171	2.208	8.830	22.171	2.055	8.221	18.306
3	1.782	7.128	29.299	1.782	7.128	29.299	1.888	7.553	25.859
4	1.603	6.414	35.713	1.603	6.414	35.713	1.741	6.963	32.822
5	1.530	6.121	41.834	1.530	6.121	41.834	1.611	6.443	39.266
6	1.210	4.840	46.674	1.210	4.840	46.674	1.608	6.430	45.696
7	1.123	4.493	51.167	1.123	4.493	51.167	1.368	5.471	51.167
8	.987	3.946	55.113						
.....									

NB: Eigenvalues greater than 1 were considered.