Canonical correlation between principal leadership and school capacity

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Abstract: This study aims to (a) examine the canonical correlation of principal leadership construct set and school capacity constructs set; (b) identify the most dominant composites of principal leadership; and (c) determine the most dominant composites of school capacity. The research was conducted by a survey method using questionnaire, which was distributed to three districts in North Sumatera. With random sampling technique, we received 352 responses from the teachers. We analysed the data using canonical correlation to identify which composites have the main contribution to construct a set of variable. The result shows a significant relationship between principal leadership and school capacity construct set. Furthermore, the result of this study indicates the leader should have a strong character to share his vision regarding school development. Moreover, trust, communication, and teacher professional development are key predictors in determining school capacity. Therefore, collaboration is a crucial culture of school successes, while the emotional engagement between teacher and organisation has no significant value in constructing school capacity. School capacity only can increase if the conducted school program is coherent for student and staff, focused, and sustainable.

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1 Introduction

Research regarding principal leadership has developed since the 1980s. Researchers and academics, in general, have agreed that principal leadership is essential for the success of principals (Caldwell, 1992; Cheng, 1994; Heck, 1993; Murphy and Hallinger, 1992; Hallinger et al., 1996). Principal leadership bridges the conflict between instructional and transformational leadership by integrating both into a comprehensive leadership model (Li et al., 2016; Marks and Printy, 2003; Hallinger et al., 1996). The principal leadership model offers a leadership model that is adapted according to the needs of the organisation which, in practice, will be valuable in various organisational contexts because the characteristics of the organisation will choose the principal leadership model that suits it (Hallinger et al., 1996; Li et al., 2016). Bossert et al. (1982) argue, referring to the contingency approach, no single managerial style is suitable for all schools, so the principals must find the form and structure that is most appropriate for their local circumstances. This view is indeed in line with Hofstede's (1983) view which indicates that each region has a different management culture so that successful management of organisations in developed countries does not necessarily correspond to the other areas.

Interestingly, the principal leadership that is considered powerful does not necessarily directly impact student achievement (Hallinger et al., 1996; Leithwood, 2016). However, leadership is a critical instrument in maximising organisational functions, which in turn will improve student achievement (Leithwood, 2016; Li et al., 2016; Harris, 2004). The

principal leadership's effect on school effectiveness is mainly mediated by other school conditions that shape the learning climate in schools, and in turn will have an impact on student achievement (Hallinger et al., 1996; Hallinger and Heck, 2010; Kleine-Kracht, 1993; Louis et al., 2010; Witziers et al., 2003; Li et al., 2016). Therefore, Wahlstrom and Louis (2008) held that the principal was responsible for the quality of teachers who would carry out quality learning in the classroom. The next question is, how can principal leadership create quality teachers?

Previous studies reveal that principals and school supervisors can use their power directly to control the quality of teacher teaching and ensure the delivery of material following the school's academic goals (Marks and Printy, 2003; Bush, 2016). Moreover, the principal also has the power to control various services in schools to ensure the quality of academic services experienced by students (Bush, 2016). Likewise, the principal influence on learning activities in the classroom is not discussed comprehensively, so that it brings its dilemma (Wahlstrom and Louis, 2008). In this regard, Li et al. (2016) found that the principal leadership's direct influence on professional teacher learning was not substantive compared to if it was mediated by school capacity. The study strengthens the study of Youngs and King (2002), which indicates that school capacity is a critical variable that influences the quality of classroom learning. School capacity is reflected in a collection of organisational resources that interact naturally, such as communication, trust, quality of student support, continuous focus on improving, and the professional capacity of teachers, so as to support reform throughout the school, coherence of school policies, teacher development, and finally increased student learning (Newmann et al., 2000; Cosner, 2009; Heck and Hallinger, 2009).

However, according to the contingency approach on principal leadership as proposed by Bossert et al. (1982) before, the dimensions proposed by previous researchers related to principal leadership and school capacity (Li et al., 2016; Leithwood, 2016; Harris, 2004; Marks and Printy, 2003; Hallinger et al., 1996; Bossert et al., 1982) are not necessarily in accordance with the characteristics of educational organisations in North Sumatra, Indonesia. These dimensions must be tested further to ascertain the principal leadership pattern and school capacity as appropriate following the characteristics of educational organisations in North Sumatra, Indonesia. Thus, this study aims to (1) examine the canonical correlation of principal leadership construct set and school capacity constructs set; (2) identify the most dominant composites of principal leadership; and (3) determine the most dominant composites of school capacity. The purpose of the research will be achieved by using canonical correlation. Canonical correlation analysis is generally used for two main purposes, namely (1) identifying dimensions between dependent and independent variable groups; and (2) maximising the relationship between these dimensions (Hair et al., 2010). From a managerial point of view, this allows researchers to understand the structure of different sets of variables as variables related to dependency relationships (Hair et al., 2010). This capability serves the authors to identify the critical dimensions of principal leadership and school capacity that are relevant to conditions in North Sumatra, Indonesia. Defining the dimensions of the principal leadership and school capacity models will not only help determine what leadership factors are appropriate in a region but more than that, this study can predict what dimensions are critical to the determinants of school effectiveness. Therefore, this study can contribute to the achievement of best practices and the emergence of new knowledge related to leadership in educational organisations.

2 Theoretical framework

2.1 Leadership dilemma

The framework for this research is developed based on the concept of management and leadership. In the beginning, the idea of Education Management is still taboo in organisational theory. In the UK, this concept only began to be discussed in 1988 after the release of the Education Reform Act (ERA) in London (Bush, 2008). Furthermore, Bush (2008) explains that in the past, educational organisations were managed bureaucratically on the direct orders of the government. However, the dynamics and development of educational organisations have provoked educational practitioners and researchers that bureaucracy has limitations to foster educational organisations (Bush, 2008, 1999; Bell, 1991). Referring to ERA, Team Brighouse (in Bush, 2008) concludes that head teachers have an essential task with matters related to leadership and management. This situation brings the educational organisation closer to the competitive, dynamic, and independent business governance style (Bell, 1991; Bush, 2008; Shattock, 2013). Likewise, Shattock (2013) stated that the management of higher education organisations in the UK post-1992 leads to a Top-Down style, different in the pre-1992 era. These circumstances are used to ensure the flexibility of the leadership council to create and control organisational strategy to achieve good governance, based on transparency, accountability, and participation (Shattock, 2013). Some doubts about the importance of leadership in developing effective and innovative schools in facilitating the quality of teaching and learning were present in some research results (Dinham, 2005). However, the dynamics of educational organisations require competent and robust leadership figures, although those competent and robust categories are not similar across organisations in many regions. Furthermore, Kingdon and Muzammil (2013) reviewing the dynamics of educational organisations, they view the governance of educational organisations demanding fair rewards, appropriate incentives, and professional development opportunities. Attempts that give teachers the opportunity to achieve competitive advantage in themselves can be accountable for their transparent and accountable performance to leaders, parents, communities, and other stakeholders (Kingdon and Muzammil, 2013).

To achieve competitive advantage, teachers need space, not only serve as the recipient of instruction only. Kingdon and Muzammil (2013) offer teachers a political and legislative space through their representatives from teacher organisations. This situation gives teachers a bargaining position to develop their professionalism. From the standpoint of leadership and management education, the concept does not have to be fully adopted. However, the essence of teacher's space can be translated into teacher empowerment by their competencies and competitive advantages, and in turn, will have implications for students' academic performance and national education performance. However, the most significant challenge for developing an educational organisation is the natural state of the organisation and the ability and willingness of the organisation to change or shift to a new culture (Garrison and Vaughan, 2013). While leadership is seen as a significant factor contributing to the success of an organisation (Adserias et al., 2017). From the view of these experts, leadership and organisation are an integral part, and the integration of these two variables is mutually influencing and interdependent. Previous research has suggested that the best style of leadership and organisational design is by the natural characteristics of the individual and his organisation (Garrison

and Vaughan, 2013). This concept is known as a contingency approach, both in leadership models and in organisational design (Gregoire and Arendt, 2014). The transformations, shifts, and dynamics of educational organisations have brought updating practice and science in the field of educational management leading to best practices of the leadership style of educational organisations. Nevertheless, the findings of leadership studies and educational organisations remain to be tested further to ensure conformity with their implementation in different regions. The concept of principal leadership and its relation to the school capacity will be discussed further.

2.2 Principal leadership and school capacity

Owens (2004) argues that current leadership is increasingly understood as a group function that occurs only when two or more people interact. Thus, leaders deliberately seek to influence the behaviour of their subordinates, instead of communicating by giving orders that end in obedience. Recent studies show that instead of being strict and decisive, effective leadership is highly interpersonal, engaging, and working with individuals or teams to improve teaching and learning on an ongoing basis (Dinham, 2005). Leader interaction with subordinates in the leadership model above certainly has more value than the interaction in the technical aspects of administration, management, and decision making.

The study by Bossert et al. (1982) has found that there is no single leadership style in management education suitable for all schools, so school leader must find the form and structure of leadership that is best suited to the situation in their respective schools. Various tests in quantitative studies related to school effectiveness reveal that each different principal behaviour has different effects on different organisational characteristics. These findings confirm a contingent approach to organisational effectiveness occurring in current leadership theory (Hallinger et al., 1996). Based on those studies, to achieve good school governance leaders need a good understanding of human nature if they want to lead effectively, especially in educational organisations which depend on collaboration, trust, and shared goals (Dinham, 2005). Thus, the involvement of all stakeholders, especially teachers, principals, and school supervisors is seen as an essential aspect of educational leadership. Concepts such as "shared vision", "mission", "empowerment", "trust", "value", "engagement", "commitment", "community learning" and "ownership" are increasingly recognised as essential factors of educational leadership to achieve effectiveness so they able to improve the success of education (Dinham, 2005).

The findings of this study pursue the concept of principal leadership that has developed in the study of educational organisations, and also mediate the idea of instructional leadership and transformational. Principal leadership takes the centre stage between instructional and transformational leadership disputes. The characteristics of educational organisations view this position. Although transformational leadership can create a fundamental and future goal within the organisation, the model does not have an explicit focus on teaching and learning. Meanwhile, instructional leadership emphasises the technical core of teaching, curriculum, and assessment that provides direction and affects the day-to-day activities of teachers and students at school (Marks and Printy, 2003). Transformational leadership builds organisational capacity while instructional leadership builds individual and collective competencies, and instructional-shared leadership, in specific leadership functions used by many people working in collaboration (Firestone and Martinez, 2007; Printy et al., 2010).

Therefore, an educational organisation leader ideally should be agile and spontaneously using a useful leadership model according to circumstances and times. Principals should be able to become transformational leaders when they seek to gain a higher level of commitment from all school personnel in developing organisational capacity for school improvement, while when collaborating with teachers to achieve organisational goals in support of teaching and learning activities, the principal must be able to act as instructional leaders (Marks and Printy, 2003).

Furthermore, in respect of principal leadership, Sergiovanni (2001) views that principal presence does not automatically produce the required direction provided. Therefore, specific energy to arrive at the right settings is still needed. Initial concern on the concept of principal leadership is expanding leadership to include other leaders such as vice principals, department heads and teachers themselves (Busher and Harris, 2000; Ayres et al., 2000). The focus of attention is transferred from leader to leadership by prioritising the importance of delegation, collaboration, trust, and empowerment in school management, so it is realised that the concept of leadership basically is formal, distributive and it indicates that every teacher is a potential leader (Dinham, 2005; Harris et al., 2007).

The study by Leithwood and Riehl (2003) found that there are at least three important aspects of the principal leadership: (1) setting direction, that is, successful leadership can create a sense of a sense of purpose within the organisation by developing a shared vision, consensus on relevant short-term goals, and high expectations for colleagues; (2) developing people, providing support for individual co-initiative ideas and initiatives, providing intellectual stimulation (for example, reflecting on existing practices, assuming appropriate assumptions, and considering new practices) and walk the talk modelling; and (3) redesigning decentralisation, which builds collaborative school culture, creates structures to encourage participation in decision making, and builds productive relationships with parents and wider community. Successful principal models in different countries have demonstrated a collaborative culture boost by distributing leadership, developing broad-based governance structures, de-privatising teaching practices, and constructing participation as a tradition of values rather than something to improve.

In addition to the key aspects of establishing the ideal principal leadership, it is equally important to investigate the variations in the impact of leadership on the organisation. Because the main goals of maximising leadership style for the organisation are in the order, they could work better and more effectively. Performance indicators of a school, in general, are viewed often from student's achievement. Meanwhile, the leadership of school leader does not appear to be in direct contact with students. However, student achievement is achieved by maximising organisational functions, while school leader's leadership is a key instrument for maximising the functioning of the organisation (Li et al., 2016; Harris, 2004).

School leader has a major impact on how school resources are acquired and managed (Bossert et al., 1982; Cuban, 1988). Management of school resources will have implications for school capacity building. Interestingly, research shows that school leaders have different abilities to gain access to resources, channel them to school priorities, and employ them efficiently and fairly (see Bossert et al., 1982; Chiu and Walker, 2007). In fact, leadership skill is a key to school capacity developing, and school capacity will only increase if school leader's developed programs are coherent for students and staff, focused, and sustainable (King and Newmann, 2001). Experts study shows that to develop school capacity sustainably, school leaders must be able to manage the resources they have.

Yakavets et al. (2015) found that capacity building strategies are necessary if schools want to innovate in all aspects. These findings are in line with the inside view that focuses on developing the capacity of schools to transform themselves into a supportive environment for teacher learning and change (Sleegers et al., 2010). Furthermore, the study by Gray et al. (1999) found that capacity-building schools tended to develop more sustainably than schools that only took tactical approaches. These studies indicate that the development of school capacity will keep the organisation in an actual position to be ready for challenges, so schools continue to make sustainable improvements. This study shows that school capacity building cannot arise naturally without the vision and actions of the leader. School capacity is certainly a strategic aspect of a leader's role.

Previous research has revealed that school capacity consists of various aspects that exist within the school. School capacity variable is naturally shaped by the various composite variables associated with the school enforcement. Heck and Hallinger (2009) reveal that school capacity is seen as a school condition consisting of several features such as communication, trust, quality of student support, ongoing focus on improvement, and teacher's professional capacity. Furthermore, Cosner (2009) suggests that school capacity is reflected in a collection of organisational resources that interact naturally, to support school-wide reform, teacher change, and ultimately improved student learning. Meanwhile, Newmann et al. (2000) affirm that school capacity can be reviewed from school's ability to improve student achievement and teacher capacity, strengthen the school professional community, maintain the coherence of school programs, principal leadership, and quality of technical resources. These composite variables certainly have different dominance associated with their role in reshaping the ideal school capacity. Also, leadership roles of principals and teachers also determine whether the capacity of the school will be able to achieve its ideal position or not.

Based on studies that scholars have conducted in schools, organisational conditions – including leadership – are considered the main levers of school capacity to turn into more productive and as a prerequisite for linking the professional development of principals and teachers with school development (Thoonen et al., 2012; King and Newman, 2001; Leithwood, 1992; Barth, 1990; Saphier and King, 1985). Nevertheless, Tran et al. (2018) argue the concept of leadership that is globally accepted also requires adaptation according to the cultural context of a particular school area. Also, the relationship between principal leadership and school capacity regarding educational reform has not been adequately explored (Yakavets et al., 2015). From the research of these experts, it is necessary to find the dominant factors of principal leadership and school capacity, in order for the strategies undertaken in leadership roles can work well and have an impact on the main factors of school capacity.

3 Research method

This study uses teachers from 3 (three) districts in North Sumatra as research sample with random sampling technique. The research was conducted by questionnaire-assisted survey method. The collection of survey data was conducted when the teachers are attending training activities organised by North Sumatra education board. The questionnaires were given to each teacher by informing them that the questionnaires could be filled out voluntarily and the results of this study would be beneficial for improving school governance in North Sumatra and providing new insights for education

science. From 500 questionnaires distributed, the study has collected 352 responses. Appropriate for research objectives, after all the responses were collected, the tabulation and analysis of research data using canonical correlation were performed. The canonical correlation was chosen because also it is able to analyse the relationship between two sets of variables, and also able to identify which variates had a major contribution in forming a set of variables (Hair et al., 2010). The demographic sample is tabulated in Table 1. More than 50% of the sample is teachers who have the range of age between 31 and 40. It indicates the experienced teacher is a dominant respondent on the collected data. Furthermore, the male is dominated sample which distributed in the gender category, and dominant part of the sample has a bachelor degree in their educational background.

Table 1 Demographic sample

Descriptions		*Amount*	*Percentage*
Age	1. 21–30 years	32	9.09%
	2. 31–40 years	205	58.24%
	3. 41–50 years	115	32.67%
Gender	1. Male	44	12.39%
	2. Female	308	87.61%
Education	1. Bachelor	215	61.08%
	2. Master	137	38.92%
Region	1. Tebing Tinggi	113	32.10%
	2. Kisaran	128	36.36%
	3. Labuhan Batu	111	31.54%

The questionnaires in this study was adapted from Li et al. (2016), which previously adapted Walker and Ko's (2011) principal leadership instruments with some changes to suit their research needs and then adapted the school capacity instruments of Leithwood and Jantzi's (2000) on organisational conditions. Researchers adapted Li et al.'s instrument model by adjusting the question items distributed with using 5-Likert scale (strongly disagree, disagree, neutral, agree, strongly agree) to capture teachers' perceptions of principal leadership and organisational capacity

4 Result

The results of significance testing on the canonical equation model shows that from the seven canonical equations produced at the research output, the first three equations have good significance. But the first equation shows canonical correlation figure and F-statistics as the best. Therefore, data analyses in this study were focused only on testing the first canonical function. Furthermore, to test the canonical equations separately, a multivariate significance test was conducted simultaneously by reviewing Pillai's trace test results, Hosteling's trace, Wilk's lambda, and Roy's gcr. The results of this test show the first canonical equations were taken collectively, and statistically significant at 0.01 level. The results of canonical correlation analysis can be reviewed in Table 3.

Table 2 Correlation matrix

	PL1	*PL2*	*PL3*	*PL4*	*PL5*	*PL6*	*PL7*	*SC1*	*SC2*	*SC3*	*SC4*	*SC5*	*SC6*	*SC7*	*SC8*
PL1	1	0.584	0.504	0.461	0.448	0.424	0.470	0.442	0.411	0.446	0.059	0.364	0.388	0.103	0.479
PL2	0.584	1	0.506	0.489	0.532	0.496	0.494	0.412	0.417	0.461	–0.048	0.299	0.416	0.005	0.460
PL3	0.504	0.506	1	0.491	0.509	0.615	0.428	0.488	0.461	0.483	0.048	0.396	0.366	0.045	0.381
PL4	0.461	0.489	0.491	1	0.540	0.567	0.495	0.468	0.461	0.500	–0.002	0.306	0.471	0.011	0.433
PL5	0.448	0.532	0.509	0.540	1	0.559	0.554	0.455	0.494	0.514	0.140	0.386	0.427	0.133	0.508
PL6	0.424	0.496	**0.615**	0.567	0.559	1	0.581	0.582	0.596	0.583	0.014	0.368	0.452	0.129	0.456
PL7	0.470	0.494	0.428	0.495	0.554	0.581	1	0.553	0.540	0.548	0.076	0.439	0.490	0.138	0.570
SC1	0.442	0.412	0.488	0.468	0.455	0.582	0.553	1	0.714	**0.730**	0.025	0.453	0.494	0.107	0.514
SC2	0.411	0.417	0.461	0.461	0.494	0.596	0.540	**0.714**	1	**0.725**	0.113	0.501	0.562	0.118	0.601
SC3	0.446	0.461	0.483	0.500	0.514	0.583	0.548	**0.730**	**0.725**	1	0.036	0.512	0.595	0.034	0.562
SC4	0.059	–0.048	0.048	–0.002	0.140	0.014	0.076	0.025	0.113	0.036	1	0.252	–0.008	0.466	0.155
SC5	0.364	0.299	0.396	0.306	0.386	0.368	0.439	0.453	0.501	0.512	0.252	1	0.528	0.214	0.495
SC6	0.388	0.416	0.366	0.471	0.427	0.452	0.490	0.494	0.562	0.595	–0.008	0.528	1	0.069	0.589
SC7	0.103	0.005	0.045	0.011	0.133	0.129	0.138	0.107	0.118	0.034	0.466	0.214	0.069	1	0.173
SC8	0.479	0.460	0.381	0.433	0.508	0.456	0.570	0.514	0.601	0.562	0.155	0.495	0.589	0.173	1

Table 3 The results of canonical analysis

Measures of overall model fit for canonical correlation analysis				
Canonical function	*Canon correlation*	*Canonical R^2*	*F-statistics*	*Probability*
1	0.774	0.599	7.729	0.000
2	0.289	0.084	1.939	0.000
3	0.268	0.072	1.694	0.011
4	0.197	0.039	1.245	0.208
5	0.147	0.022	0.937	0.509
6	0.098	0.010	0.617	0.717
7	0.033	0.001	0.185	0.831
Multivariate test of significance				
Test Name		*Value*	*Approx. F*	*Sig. of F*
Pillai's trace		0.826	5.737	0.000
Hotelling's trace		1.737	10.403	0.000
Wilk's lambda		0.317	7.728	0.000
Roy's gcr		0.599		

Furthermore, to avoid misinterpretation of the results of canonical correlation, it is necessary to do redundancy analysis. This is to ensure that there are composites that may not extract a significant portion of the variance from the respective sets of variables (Hair et al., 2010). This can happen because Canonical R^2 will be represented to the shared variance of each composite. The index results can measure the ability of a set of independent variables in explaining the variation of the dependent variable.

The results of the redundancy analysis test, as presented in Table 4, show that the redundancy number of the set of dependent variables has an index of 0.287 and set of independent variables has an index of 0.334. The number of sets of dependent variables seems smaller. This might be because two of the eight composites owned by the independent variables have relatively small canonical loading. This indicates that both loadings are less obvious meaning to the canonical variables. Meanwhile, although a set of independent variables has a relatively larger redundancy index, three of the seven composites forming the canonical variables have a loading below 0.5. This makes the index redundancy index relatively moderate.

Table 5 presents standardised canonical weights for each canonical variate for both canonical variables. According to Hair et al. (2010), the tendency of canonical weights represents the contribution of relative composite towards variate. The canonical weights figure on the independent variate shows that PL 6: Quality Management (–0.297) and PL7: Instructional Leadership (–0.391) has the highest canonical weights. Furthermore, on variate dependent, it is known that SC1: Trust (–0.294); SC3: Alignment (–0.251); and SC8: Teacher Professional Learning (–0.318). However, according to the correlation matrix which is shown in Table 2, some composites indicate the presence of collinearity among variables in a variate, i.e. between PL3 with PL6 (0.615), SC1 with SC2 (0.714), SC1 with SC3 (7.30), and SC2 with SC3 (7.25) where all of those indicate moderately high correlation. Therefore, it is necessary to analyse the canonical loadings to maximise predictive objectives on the variate.

Table 4 Redundancy analysis for the first function

Variate	*Canonical loading*	*Canonical loading squared*	*Average loading squared*	*Canonical R^2*	*Redundancy index*
Dependent variables					
SC1: Trust	–0.849	0.721			
SC2: Communication	–0.844	0.713			
SC3: Alignment	–0.866	0.751			
SC4: Workload	–0.089	0.008			
SC5: Resource Capacity	–0.636	0.404	0.479	0.599	0.287
SC6: Support for Students	–0.736	0.542			
SC7: Cooperation	–0.179	0.032			
SC8: Teacher Professional Learning	–0.816	0.665			
Dependent variate		3.835			
Independent variables					
PL1: Strategic Management	–0.691	0.478			
PL2: Teacher Development	–0.675	0.456			
PL3: Staff Management	–0.686	0.470			
PL4: Resource Management	–0.714	0.510	0.557	0.599	0.334
PL5: External Communication	–0.753	0.567			
PL6: Quality Management	–0.831	0.691			
PL7: Instructional Leadership	–0.855	0.731			
Independent Variate		3.902			

Table 5 Canonical weights, loadings, and cross-loadings

Variate	*Canonical weights*	*Canonical loadings*	*Canonical cross-loadings*
Dependent Variables			
SC1: Trust	–0.294	–0.849	–0.657
SC2: Communication	–0.151	–0.844	–0.653
SC3: Alignment	–0.251	–0.866	–0.670
SC4: Workload	0.038	–0.089	–0.069
SC5: Resource Capacity	–0.071	–0.635	–0.491
SC6: Support for Students	–0.127	–0.735	–0.569
SC7: Cooperation	–0.059	–0.178	–0.138
SC8: Teacher Professional Learning	–0.318	–0.815	–0.631

Table 5 Canonical weights, loadings, and cross-loadings (continued)

Variate	*Canonical weights*	*Canonical loadings*	*Canonical cross-loadings*
	Independent Variables		
PL1: Strategic Management	–0.191	–0.691	–0.535
PL2: Teacher Development	–0.038	–0.675	–0.522
PL3: Staff Management	–0.079	–0.685	–0.530
PL4: Resource Management	–0.119	–0.714	–0.553
PL5: External Communication	–0.158	–0.753	–0.583
PL6: Quality Management	–0.297	–0.831	–0.643
PL7: Instructional Leadership	–0.391	–0.855	–0.662

Based on the canonical loading value, four of eight dependent variates have canonical loading >0.8, i.e. SC1, SC2, SC3, and SC 8, while SC5 and SC6 have moderate loading (>0.6), and the other two (SC4 and SC7) have canonical loading <0.4 which certainly cannot be considered as determinant of variate dependent. Then, on variate independent variables, PL6 and PL7 have the highest canonical loading (>0.8), while the other five variables have moderate loading (>0.6). Furthermore, the final issue in this interpretation is to review the number of cross-loadings (Hair et al., 2010). All independent and dependent variables show negative and direct relationship. The number of cross loading still shows that the variables that have the highest canonical loading are SC1, SC2, SC3, and SC8 for dependent variables and PL6 and PL7 for independent variate. From this finding, it is indicated that SC1, SC2, SC3, and SC 8 are key factors of dependent variate and PL6 and PL7 are key factors of independent variate.

4.1 Validation and diagnosis

To test validity in canonical correlation analysis, this study used sensitivity analysis on sets of independent variables. Table 6 shows the results of the sensitivity test conducted by four times canonical correlation analysis test. The first test was done with the whole variable. Then in the second test is done by removing the PL1 variable (Strategic Management) from the analysis. Furthermore, the third test is done by removing the PL2 (Teacher Development) variable, and the fourth test is done by removing the PL3 variable (Staff Management) from the analysis. As shown in Table 5, the canonical loading in this study is stable and consistent in all three cases where one of the independent variables (PL1, PL2, PL3) has been removed.

4.2 Canonical figure from each regions

The Canonical Correlation coefficient shows a strong number from each region (TT: 0.786; K: 0.779; LB: 0.789) with a p-value <0.05. Furthermore, the F-value of Labuhan Batu Regency is greater than the other two regions, which F-value = 3.527, while Tebing Tinggi has F-value = 2.589 and Kisaran has F-value = 2.892. The F-value generally shows that the canonical model from Labuhan Batu Regency is fitter than the other two regions. The result of canonical correlation for each region is observable in Table 7.

Table 6 Sensitivity analysis

Variate	*Complete variate*	*Result after deletion of*		
		PL1	*PL2*	*PL3*
Canonical Correlation	0.774	0.768	0.775	0.774
Canonical Root	0.599	0.590	0.601	0.599
Dependent variables				
SC1: Trust	–0.849	–0.851	–0.852	–0.846
SC2: Communication	–0.844	–0.852	–0.846	–0.844
SC3: Alignment	–0.866	–0.871	–0.864	–0.864
SC4: Workload	–0.089	–0.077	–0.095	–0.086
SC5: Resource Capacity	–0.635	–0.628	–0.637	–0.626
SC6: Support for Students	–0.735	–0.743	–0.736	–0.740
SC7: Cooperation	–0.178	–0.159	–0.179	–0.178
SC8: Teacher Professional Learning	–0.815	–0.807	–0.814	–0.820
Shared Variance	0.479	0.479	0.480	0.478
Redundancy Index	0.287	0.283	0.288	0.287
Independent variables				
PL1: Strategic Management	–0.691	Omitted	–0.690	–0.691
PL2: Teacher Development	–0.675	–0.682	Omitted	–0.676
PL3: Staff Management	–0.685	–0.692	–0.685	Omitted
PL4: Resource Management	–0.714	–0.723	–0.713	–0.715
PL5: External Communication	–0.753	–0.759	–0.754	–0.755
PL6: Quality Management	–0.831	–0.840	–0.830	–0.830
PL7: Instructional Leadership	–0.855	–0.860	–0.855	–0.856
Shared Variance	0.557	0.581	0.574	0.573
Redundancy Index	0.334	0.343	0.345	0.343

Table 7 Measures of canonical correlation for each regions

Region	*Canon correlation*	*Canonical R^2*	*F-statistics*	*Probability*
Tebing Tinggi (TT)	0.786	0.619	2.589	0.000
Kisaran (K)	0.779	0.607	2.892	0.000
Labuhan Batu (LB)	0.798	0.636	3.527	0.000

Furthermore, to find out the critical dimensions of the Principal Leadership and School Capacity from each region, it is necessary to analyse canonical loading (Hair et al., 2010). The analysis results from each region, as presented in Table 5, show the results of the Tebing Tinggi and Kisaran are quite similar. However, a slight difference was shown by Labuhan Batu Regency. In Labuhan Batu Regency, high canonical loading figures (>0.8) are only owned by SC8 composite, while composites SC1, SC2, SC3 show moderate canonical numbers (>0.6), then SC5, SC6, and SC7 composites have low canonical loading (>0.4). Meanwhile, in Tebing Tinggi and Kisaran, composites SC1, SC2, and SC3 have the highest canonical loading (>0.8), while SC5, SC6, and SC8

composites show moderate canonical loading (>0.6), and SC4 and SC7 have very low canonical loading numbers (<0.4). This finding indicates that in Labuhan Batu the critical dimensions of the School Capacity set construct are Professional Teacher Learning (SC8) and followed by Trust (SC1), Communication (SC2), and Alignment (S3) dimensionsm which are also important because they have the moderate canonical loading. Meanwhile, Tebing Tinggi and Kisaran show that the critical dimensions of the School Capacity are Trust (SC1), Communication (SC2), and Alignment (SC3) followed by Resource Capacity (SC5), Support for Student (SC6), and Teacher Professional Learning (SC8) as other essential dimensions with moderate canonical loading. Specifically, the key dimensions of Labuhan Batu are different from Tebing Tinggi and Kisaran. But in general, the three regions have similar important dimensions categories.

The Principal Leadership construct of the three regions shows that the Instructional leadership (PL7) and Quality Management (PL8) dimensions have the highest canonical loading (>0.8), although specifically in Labuhan Batu composite Quality Management (PL6) still has moderate canonical loading (>0.6). Furthermore, in composites PL1, PL2, PL3, PL4, and PL5 showed canonical numbers moderate loading (>0.6) except in Labuhan Batu area which had low Canonical Loading on PL3 composites (<0.6). This result is in line with the findings in the full sample. Each region has very high canonical loading on Instructional Leadership (PL8) and Quality Management (PL7) composites. Even so, other composites must still be considered because they have a canonical value of loading which is also not low. Especially in Labuhan Batu, Instructional Leadership (PL8) is the only composite that has the highest canonical loading, and Staff Management (PL3) shows very low Canonical Loading numbers. This finding is interesting because it may be that the Labuhan Batu Instructional Leadership has been able to compensate for the managerial activities of the schools, especially in the activities of developing teacher professionalism concerning the development of school capacity (SC). Thus the teacher can work in a conducive atmosphere by believing that the instruction given by the principal is inseparable from the objective of increasing teacher professionalism.

Table 8 Canonical loading for each regions

Variate	*Canonical Loadings*		
	Tebing Tinggi	*Kisaran*	*Labuhan Batu*
Dependent variables			
SC1: Trust	0.879	0.877	–0.759
SC2: Communication	0.887	0.856	–0.728
SC3: Alignment	0.868	0.866	–0.776
SC4: Workload	0.036	0.059	–0.129
SC5: Resource Capacity	0.712	0.701	–0.431
SC6: Support for Students	0.770	0.760	–0.589
SC7: Cooperation	0.111	0.080	–0.424
SC8: Teacher Professional Learning	0.794	0.780	–0.855

Table 8 Canonical loading for each regions (continued)

Variate	*Canonical Loadings*		
	Tebing Tinggi	*Kisaran*	*Labuhan Batu*
Independent variables			
PL1: Strategic Management	0.695	0.705	–0.688
PL2: Teacher Development	0.636	0.657	–0.649
PL3: Staff Management	0.719	0.730	–0.496
PL4: Resource Management	0.763	0.738	–0.624
PL5: External Communication	0.752	0.741	–0.731
PL6: Quality Management	0.823	0.837	–0.784
PL7: Instructional Leadership	0.889	0.858	–0.842

5 Discussion

Canonical correlation analysis is generally used for two main purposes, namely (1) identifying dimensions between dependent and independent variable groups; and (2) maximising the relationship between these dimensions (Hair et al., 2010). From a managerial point of view, this allows researchers to understand the structure of different sets of variables as variables related to dependency relationships (Hair et al., 2010). These things are undoubtedly linear with the aim of this study. First, the results indicate there are three canonical equations which show a significant relationship between the two canonical variables. However, the first equation shows the best significance number and the highest F-statistic number so that the focus of the analysis is only limited to the first equation.

In testing the dominance of composite variables in the independent variables this study shows that Quality Management (PL6) and Instructional Leadership (PL7) as the most powerful composite. Meanwhile, Teacher Development (PL2) and Staff Management (PL3) are the weakest composites even though the loading numbers and cross-loading of these two variables still have a high loading weight (>0.6). These findings reinforce the study of Firestone and Martinez (2007), Marks and Printy (2003), and Leithwood and Riehl (2003). These studies found that instructional leadership styles, on the one hand, match educational organisations because educational leadership requires an explicit focus of direction with an emphasis on the core teaching, curriculum, and assessment to build teacher competencies both individually and collectively. On the other hand, however, transformational leadership styles are needed in sustainable organisational development through the development of a shared vision, collaborative culture, participatory culture, and broad-based governance structure.

The dominance of instructional leadership and Quality Management's composite indicates that teachers and subordinates in educational organisations are unlikely to lose instruction from leaders so that they can determine the direction of their work. Educational organisations need the influence of influential leaders to control organisational activities to focus on their goals (Horng and Loeb, 2010). Furthermore, teachers need a robust quality control system to maintain the quality of the teaching they

carry out daily (Blasé and Blasé, 1998). A robust quality control system makes the teacher able to know his weaknesses based on an evaluation conducted on himself, and he can also see how those weaknesses must be overcome. The result of this study indicates that principal can propose the problem-solving process to the teacher by providing an overview of the problem-solving that possibility did by the teacher and then offers an opportunity for the teacher to innovate it in the learning process (Blasé and Blasé, 1998; Murphy et al., 1982).

This study also found the role of Resource Management (PL4) and External Communication (PL5) in forming principal leadership. These findings are in line with the arguments of Chiu and Walker (2007), Bossert et al. (1982), and Cuban (1988) which state that principals must have the ability to gain access to resources, associate them according to school priorities, and employ them efficiently and fairly. Besides, the principal must also be able to open opportunities for collaboration with parents and external parties and maximise these resources in the interests of improving the quality of schools sustainably. Cooperation between schools and external parties can result in synergic collaboration between schools and stakeholders to achieve common goals, so school activities are more productive and competitive (Bossert et al., 1982; Chiu and Walker, 2007; Kingdon and Muzammil, 2013; Shattock, 2013). To be able to carry out various activities, Marks and Printy (2003) view that principals must be able to act as transformational leaders because transformational leadership can consider substantial governance reforms as a form of innovation in school management (Leithwood and Jantzi, 2000).

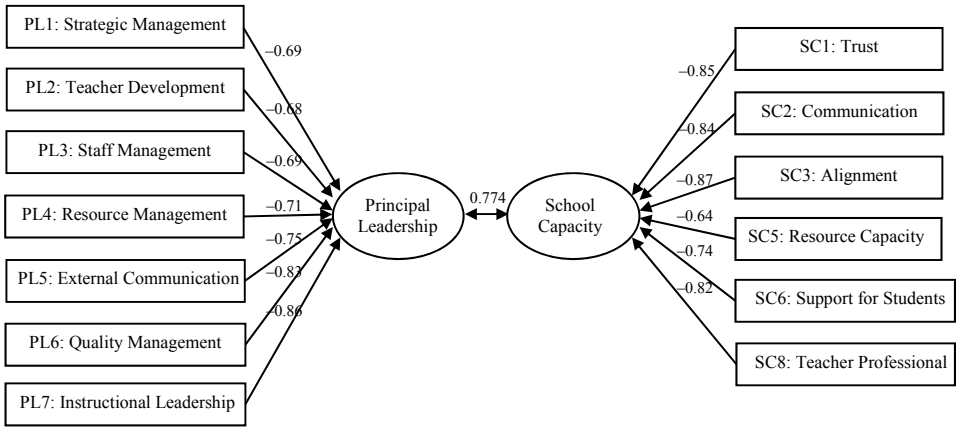
Furthermore, Strategic Management (PL1), Teacher Development (PL2), and Staff Management (PL3) do show the smallest loading numbers but still show considerable weight, so this aspect cannot be ignored. This finding reinforces the results of Leithwood and Riehl's (2003) research on the importance of developing humans and redesigning organisations in principal leadership. Leithwood and Riehl (2003) argue that principal leadership practices have been proven successful in various parts of the world and showed that a culture of collaboration is the key to these successes. Unlike the previous paragraph which studies collaboration with external parties, this section examines collaboration between internal parties. Collaboration can distribute leadership, develop broad-based governance, deprivatise teaching, and most importantly, construct participation as a value tradition. The values of collaboration in this study are distributed in the composite variables strategic management (PL1), Teacher Development (PL2), and Staff Management (PL3). Strategic management serves to equalise the perception of organisational members regarding school goals to achieve goal congruence (King and Newmann, 2001; Leithwood and Reihl, 2003). Meanwhile, teacher development serves to provide opportunities for teachers to develop themselves, determine the strategies they will use in achieving school goals, collaborate with other teachers to help realise their strategy, get coaching and mentoring to be able to innovate sustainably, and make teachers feel as assets for schools so that he has a sense of belonging to his institution. Also, management staff such as school principals, school supervisors, and vice principals functioned to control the distribution of competency-based tasks, provide reward and punishment according to fair teacher performance appraisal, provide feedback on teacher performance, resolve teacher complaints for all staff to achieve satisfaction work (Blasé and Blasé, 1998; Leithwood, 2016; Li et al., 2016).

In the dependent variable, two of the eight composite variables do not show proper loading, namely: Workload (SC4) and Cooperation (SC7). This finding indicates that workload (SC4) and Cooperation (SC7) are not the essential composites in school capacity variables in North Sumatra. Workloads in various situations are often encountered as obstacles in the execution of work for both business professionals and teachers, and even rarely results in stress (see Fox, 1993; Ragu-Nathan et al., 2008). So, it is understandable if the workload does not have a role in shaping school capacity. Furthermore, cooperation (SC7) does not appear as an essential factor in the characteristics of teachers in North Sumatra. The data of this study indicate that the teacher views the emotional connection between the teacher and the organisation as not having sufficient value in shaping school capacity.

Trust (SC1), Communication (SC2), Alignment (SC3), and Professional Learning Teacher (SC8) have the most substantial loading so that it can be seen as a dominant factor in shaping school capacity. These findings reinforce the research of King and Newmann (2001), Sleegers et al. (2010), Heck and Hellinger (2009), and Cosner (2009) which generally reveal that school capacity will only increase if programs are held coherently for students and staff, focus, and sustainable. Meanwhile, these conditions can be achieved with Trust (SC1), Communication (SC2), Alignment (SC3), and Professional Learning Teachers (SC8) above. Trust (SC1) is a guarantee for teachers to give their dedication to schools while Communication (SC2) opens up opportunities for collaboration between staff and interaction between staff and leaders in discussing various improvements and sustainable development. In educational organisations, if the teacher has confidence in the leader or organisation where he works, then he will always improve his achievements and performance (Leithwood, 2016; Forsyth and Adams, 2014; Tschannen-Moran and Gareis, 2017). Furthermore, communication provides opportunities for sharing knowledge, experiences, alternative solutions, and quality learning practices between teachers and teachers and between leaders and teachers (Blasé and Blasé, 1999, 2000).

Finally, the results of this study indicate that various communications that have occurred will not produce benefits if there is no harmony both in the interaction between staff and staff and the interaction of staff and leaders. Various ideas that emerge from the results of communication and gain harmony will encourage the leadership of school principals and school organisations to be more effective if followed up with policy-making both formally and informally (Murphy et al., 1982). Follow-up of harmonised communication can be in the form of teacher professional development activities, development of quality control, the establishment of new regulations, new reward schemes, or the formation of a teacher community organised and facilitation by schools. The collection of resources that interact in school organisations ultimately naturally supports reforms throughout the school whose main impact is to improve the quality of student learning services (Blasé and Blasé, 1998; Cosner, 2009). In general, the results of this study are illustrated in Figure 1.

Figure 1 The Canonical model between principal leadership and school capacity



6 Conclusion and implication

This study aims to (1) testing the correlation of leadership principal model construct set and school capacity constructs set; (2) identify which variable that is most dominant in principal leadership construct model; and (3) identify which variable that is most dominant in school capacity construct. This study has found a significant relationship between principal leadership construct set and school capacity construct set. This finding implies adjusting leadership styles that school leaders can use to always developing school capacity. At the policy-making level, these findings can be used as a basis for determining the criteria that the prospective school leader must meet when applying to be a school leader. Furthermore, on principal leadership, Quality Management set construct (PL6) and Instructional Leadership (PL7) are found if they act as key predictors and followed by Resource Management (PL4) and External Communication (PL5). Furthermore, no less important to support the key predictor above is the strategic management variable (PL1), Teacher Development (PL2), and Staff Management (PL3).

These findings indicate the leadership pattern in an educational organisation, such as (1) school leader's leadership influencing school's capacity building can transfer its ideas (transformational) into the teacher's mind and produce targeted agendas; (2) school leader can establish cooperation with stakeholders from both internal and external schools; and (3) school leader can accommodate systematic problem solving and staff development with a strong managerial framework within an effective organisation. School leader can use the findings of this study as a basis for establishing various operational procedures in schools and building leadership characteristics that school staff can accept. These findings can also be used by policy makers both by the government and local governments in establishing school leader selection instrument so that the characteristics of the school leader needed can be controlled for the effectiveness of leadership across schools in Indonesia in general and in North Sumatra in particular.

The final findings of this study, on school capacity construct of Trust Variable (SC1), Communication (SC2), Alignment (SC3), and Teacher Professional Development (SC8) became key predictors in determining school capacity. These findings can be the basis of the school leader in determining the initial step in building school capacity. The school leader who can build school capacity will gain the trust of his staff and then build communication to find development idea (transformational). Furthermore, the school leader who is capable of making decisions that align with the needs of staff and school based on these ideas will develop the school capacity. The assumption constructed from the results of this study is the various decisions of the school leader that are in harmony with the teacher's professional development program (instructional) will be able to increase the capacity of the school in the learning activities.

From a policy-making perspective, it can lead to the school development that is under management responsibility on these determinants so that stagnant schools can turn to work better and more competitive. These various strategies can be the first step in school reform towards sustainable improvement to win the competition.

7 Limitation and further research

This study aims to find the most appropriate model in a particular area. Therefore, generalisation of the results of this study also requires a retest to find the most appropriate model. Also, the findings of this study are limited in explaining the causal relationships among variables. Further research can use experimental methods or participatory action research to examine the purity of causal relationships based on actual behaviour. The further research may increase the internal validity of these findings.

References

Adserias, R.P., Charleston, L.J. and Jackson, J.F. (2017) 'What style of leadership is best suited to direct organizational change to fuel institutional diversity in higher education?' *Race Ethnicity and Education*, Vol. 20, No. 3, pp.315–331.

Ayres, P.L., Sawyer, W. and Dinham, S. (2000) *Successful Senior Secondary Teaching*, Australian College of Education.

Barth, R.S. (1990) *Improving Schools from Within: Teachers, Parents, and Principals Can Make the Difference*, Jossey-Bass Inc., Publishers, USA.

Bell, L. (1991) 'Educational management: an agenda for the 1990s', *Educational Management & Administration*, Vol. 19, No. 3, pp.136–140.

Blasé, J. and Blasé, J. (1998) *Handbook of Instructional Leadership: How Really Good Principals Promote Teaching and Learning*, Corwin Press, Thousand Oaks, CA.

Blasé, J. and Blasé, J. (1999) 'Principals' instructional leadership and teacher development: teachers' perspectives', *Educational Administration Quarterly*, Vol. 35, No. 3, pp.349–378.

Blasé, J. and Blasé, J. (2000) 'Effective instructional leadership', *Journal of Educational Administration*, Vol. 38, No. 2, pp.130–141.

Bossert, S.T., Dwyer, D.C., Rowan, B. and Lee, G.V. (1982) 'The instructional management role of the principal', *Educational Administration Quarterly*, Vol. 18, No. 3, pp.34–64.

Bush, T. (1999) 'Crisis or crossroads? The discipline of educational management in the late 1990s', *Educational Management & Administration*, Vol. 27, No. 3, pp.239–252.

Bush, T. (2008) 'From management to leadership: semantic or meaningful change?' *Educational Management Administration & Leadership*, Vol. 36, No. 2, pp.271–288.

Bush, T. (2016) 'School leadership and management in England: the paradox of simultaneous centralisation and decentralisation', *Research in Educational Administration & Leadership*, Vol. 1, No. 1, pp.1–23.

Busher, H. and Harris, A. (2000) *Subject Leadership and School Improvement*, Sage.

Caldwell, B.J. (1992) 'The principal as leader of the self-managing school in Australia', *Journal of Educational Administration*, Vol. 30, No. 3.

Cheng, Y.C. (1994) 'Principal's leadership as a critical factor for school performance: evidence from multi-levels of primary schools', *School Effectiveness and School Improvement*, Vol. 5, No. 3, pp.299–317.

Chiu, M. and Walker, A. (2007) 'Leadership for social justice in Hong Kong schools: addressing mechanisms of inequality', *Journal of Educational Administration*, Vol. 45, No. 6, pp.724–739.

Cosner, S. (2009) 'Building organizational capacity through trust', *Educational Administration Quarterly*, Vol. 45, No. 2, pp.248–291.

Cuban, L. (1988) *The Managerial Imperative and the Practice of Leadership in Schools*, Suny Press.

Dinham, S. (2005) 'Principal leadership for outstanding educational outcomes', *Journal of Educational Administration*, Vol. 43, No. 4, pp.338–356.

Firestone, W.A. and Martinez, M.C. (2007) 'Districts, teacher leaders, and distributed leadership: changing instructional practice', *Leadership and Policy in Schools*, Vol. 6, No. 1, pp.3–35.

Forsyth, P.B. and Adams, C.M. (2014) 'Organizational predictability, the school principal, and achievement', in Van Maele, D., Forsyth, P.B. and Van Houtte, M. (Eds): *Trust and School Life: The Influence of Trust on Learning, Teaching, Leading, and Bridging*, Springer, New York, pp.83–98.

Fox, E. (1993) 'Allocation of visual attention and anxiety', *Cognition and Emotion*, Vol. 7, No. 2, pp.207–215.

Garrison, D.R. and Vaughan, N.D. (2013) 'Institutional change and leadership associated with blended learning innovation: two case studies', *The Internet and Higher Education*, Vol. 18, pp.24–28.

Gray, J., Hopkins, D., Reynolds, D., Wilcox, B., Farrell, S. and Jesson, D. (1999) *Improving Schools: Performance and Potential*, Taylor and Francis Group, USA.

Gregoire, M.B. and Arendt, S.W. (2014) 'Leadership: reflections over the past 100 years', *Journal of the Academy of Nutrition and Dietetics*, Vol. 114, No. 5, pp.S10–S19.

Hair, Jr., J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis: A Global Perspective*, 7th ed., Pearson Prentice Hall, Upper Saddle River, NJ.

Hallinger, P., Bickman, L. and Davis, K. (1996) 'School context, principal leadership, and student reading achievement', *The Elementary School Journal*, Vol. 96, No. 5, pp.527–549.

Hallinger, P. and Heck, R.H. (2010) 'Collaborative leadership and school improvement: understanding the impact on school capacity and student learning', *School Leadership and Management*, Vol. 30, No. 2, pp.95–110.

Harris, A. (2004) 'Distributed leadership and school improvement', *Educational Management Administration & Leadership*, Vol. 32, No. 1, pp.11–24.

Harris, A., Leithwood, K., Day, C., Sammons, P. and Hopkins, D. (2007) 'Distributed leadership and organizational change: reviewing the evidence', *Journal of Educational Change*, Vol. 8, No. 4, pp.337–347.

Heck, R.H. (1993) 'School context, principal leadership, and achievement: the case of secondary schools in Singapore', *The Urban Review*, Vol. 25, No. 2, pp.151–166.

Heck, R.H. and Hallinger, P. (2009) 'Assessing the contribution of distributed leadership to school improvement and growth in math achievement', *American Educational Research Journal*, Vol. 46, No. 3, pp.659–689.

Hofstede, G. (1983) 'The cultural relativity of organizational practices and theories', *Journal of International Business Studies*, Vol. 14, No. 2, pp.75–89.

Horng, E. and Loeb, S. (2010) 'New thinking about instructional leadership', *Phi Delta Kappan*, Vol. 92, No. 3, pp.66–69.

King, M.B. and Newmann, F.M. (2001) 'Building school capacity through professional development: conceptual and empirical considerations', *International Journal of Educational Management*, Vol. 15, No. 2, pp.86–94.

Kingdon, G. and Muzammil, M. (2013) 'The school governance environment in Uttar Pradesh, India: implications for teacher accountability and effort', *The Journal of Development Studies*, Vol. 49, No. 2, pp.251–269.

Kleine-Kracht, S.P. (1993) 'Indirect instructional leadership: an administrator's choice', *Educational Administration Quarterly*, Vol. 29, No. 2, pp.187–212.

Leithwood, K.A. (1992) 'The principal's role in teacher development', *Teacher Development and Educational Change*, pp.86–103.

Leithwood, K. (2016) 'Department-head leadership for school improvement', *Leadership and Policy in Schools*, Vol. 15, No. 2, pp.117–140.

Leithwood, K. and Jantzi, D. (2000) 'The effects of transformational leadership on organizational conditions and student engagement with school', *Journal of Educational Administration*, Vol. 38, No. 2, pp.112–129.

Leithwood, K.A. and Riehl, C. (2003) *What We Know About Successful School Leadership*, National College for School Leadership, Nottingham.

Li, L., Hallinger, P. and Ko, J. (2016) 'Principal leadership and school capacity effects on teacher learning in Hong Kong', *International Journal of Educational Management*, Vol. 30, No. 1, pp.76–100.

Louis, K.S., Leithwood, K., Wahlstrom, K.L., Anderson, S.E., Michlin, M. and Mascall, B. (2010) 'Learning from leadership: Investigating the links to improved student learning', *Center for Applied Research and Educational Improvement/University of Minnesota and Ontario Institute for Studies in Education/University of Toronto*, Vol. 42.

Marks, H.M. and Printy, S.M. (2003) 'Principal leadership and school performance: an integration of transformational and instructional leadership', *Educational Administration Quarterly*, Vol. 39, No. 3, pp.370–397.

Murphy, J. and Hallinger, P. (1992) 'The principalship in an era of transformation', *Journal of Educational Administration*, Vol. 30, No. 3.

Murphy, J.F., Weil, M., Hallinger, P. and Mitman, A. (1982) 'Academic press: translating high expectations into school practices and classroom practices', *Educational Leadership*, Vol. 40, pp.22–26.

Newmann, F.M., King, M.B. and Youngs, P. (2000) 'Professional development that addresses school capacity: lessons from urban elementary schools', *American Journal of Education*, Vol. 108, No. 4, pp.259–299.

Owens, R.O. (2004) *Organizational Behavior in Education: Adaptive Leadership and School Reform*, 8th ed., Pearson, Boston, MA.

Printy, S., Marks, H. and Bowers, A. (2010) 'Integrated leadership: How principals and teachers share transformational and instructional influences', *Journal of Social Leadership*, Vol. 19, No. 5.

Ragu-Nathan, T.S., Tarafdar, M., Ragu-Nathan, B.S. and Tu, Q. (2008) 'The consequences of technostress for end users in organizations: conceptual development and empirical validation', *Information Systems Research*, Vol. 19, No. 4, pp.417–433.

Saphier, J. and King, M. (1985) 'Good seeds grow in strong cultures', *Educational Leadership*, Vol. 42, No. 6, pp.67–74.

Sergiovanni, T.J. (2001) *The Principalship: A Reflective Practice Perspective*, Allyn & Bacon/Longman Publishing, a Pearson Education Company, Massachusetts.

Shattock, M. (2013) 'University governance, leadership and management in a decade of diversification and uncertainty', *Higher Education Quarterly*, Vol. 67, No. 3, pp.217–233.

Sleegers, P.J.C., Leithwood, K., Peterson, P., Baker, E. and McGaw, B. (2010) 'School development for teacher learning and change', *International Encyclopedia of Education*, pp.557–562.

Thoonen, E.E., Sleegers, P.J., Oort, F.J. and Peetsma, T.T. (2012) 'Building school-wide capacity for improvement: the role of leadership, school organizational conditions, and teacher factors', *School Effectiveness and School Improvement*, Vol. 23, No. 4, pp.441–460.

Tran, N.H., Hallinger, P. and Truong, T. (2018) 'The heart of school improvement: a multi-site case study of leadership for teacher learning in Vietnam', *School Leadership & Management*, Vol. 38, No. 1, pp.80–101.

Tschannen-Moran, M. and Gareis, C.R. (2017) 'Principals, trust, and cultivating vibrant schools', *How School Leaders Contribute to Student Success*, Springer, Cham, pp.153–174.

Wahlstrom, K.L. and Louis, K.S. (2008) 'How teachers experience principal leadership: the roles of professional community, trust, efficacy, and shared responsibility', *Educational Administration Quarterly*, Vol. 44, No. 4, pp.458–495.

Walker, A. and Ko, J. (2011) 'Principal leadership in an era of accountability: a perspective from the Hong Kong context', *School Leadership & Management*, Vol. 31, No. 4, pp.369–392.

Witziers, B., Bosker, R.J. and Krüger, M.L. (2003) 'Educational leadership and student achievement: the elusive search for an association', *Educational Administration Quarterly*, Vol. 39, No. 3, pp.398–425.

Yakavets, N., Frost, D. and Khoroshash, A. (2015) 'School leadership and capacity building in Kazakhstan', *International Journal of Leadership in Education*, Vol. 20, No. 3, pp.345–370.

Youngs, P. and King, M.B. (2002) 'Principal leadership for professional development to build school capacity', *Educational Administration Quarterly*, Vol. 38, No. 5, pp.643–670.

Appendix A: Content of Instrument

Principal Leadership

Strategic Management

1. Attempting to clarify the reasons for our school improvement
2. Having attention to the overall school objectives
3. Assisting the teachers in setting goals for teaching and learning
4. Integrating school priority agenda with government policy agenda

Teacher Development

1. Encourage school management team training
2. Developing a spirit of leadership among teachers
3. Promote a continuous professional development experiences for all staff
4. Using training and mentoring to improve the quality of teaching
5. Encourage staff to think about another aspect of learning beside of academic curriculum
6. Aligning staff professional development activities with school development

Staff Management

1. Assigning staff according to their abilities
2. Demonstrate an appreciation for the outstanding performance of the teacher
3. Providing feedback regarding teachers performance continuously
4. Giving a proper response regarding complaints among teachers
5. Improving performance assessment system

External Communication

1. Maintain a cooperative relationship with parents and school committee
2. Involving parents in efforts of school improvement
3. Develop strategies to promote schools in the community
4. Strengthening a professional network with the education community

Resource Development

1. Allocate resources strategically based on student needs
2. Demonstrate the ability to obtain additional resources for school
3. Utilising complementary staff for maximising the benefit of student learning
4. Exploring and providing resources to help teachers improve their teaching

Quality management

1. Building a structured quality assurance mechanism in schools.
2. Creating a culture of accountability among teachers.
3. After observing class activities, principals often giving a discussion and giving teachers an alternative solution to improve their teaching.
4. Using student assessment data to inform the school's strategic planning.
5. Regularly observe class activities.
6. Regularly observe student homework.

Instructional Leadership

1. Conducting school-based instructional projects.
2. Encourage staff to consider new ideas for their teaching.
3. Design steps to improve student learning.
4. Articulating high expectations regarding student academic achievement.

School Capacity

Trust

1. We do our task with competence and confidence.
2. We complete our task professionally
3. We have never tried to get profit by deceiving others.
4. We can honestly discuss the feelings, concerns, and pressures we have.

Communication

1. Meetings at our school are effective and efficient.
2. There are a number of meetings at our school.
3. We have information on time to complete our work.
4. Our leader always informs us about the latest issues regarding school development.

Alignment

1. Our strategy is formulated refers to our school's goals.
2. Our school's annual strategic plan is in line with our school's vision.
3. Our school protects teachers from external interference in their teaching.
4. We know the priorities that our school wants to achieve.
5. Our school tries to maintain a positive learning environment.

Resource Capacity

1. Teams in different subject compete for each other to get resources.
2. Teams in different subject compete for each other in performance.
3. The structure of our school is more complicated than other schools.
4. The structure of our school is inhibiting the implementation of useful innovations

Workload

1. The workload of teachers in this school is fair enough compared to teachers in other schools.
2. The amount of administrative work which required to the teachers in this school is not excessive.
3. We have an apparent distribution of task in our school.

Support for Students

1. The atmosphere in our school encourages students to learn.
2. Our school provides academic support activities for students.
3. Teachers have access to the teaching resources they need to do a good job.
4. Our school provides various extracurricular activities for students.

Cooperation

1. I would glad to spend the rest of my career in this organisation.
2. I feel as if this organisational problem is my problem.
3. I don't feel like as "family part" in my organisation.
4. I don't feel "emotionally bound" to this organisation.
5. This organisation has a lot of personal meaning for me.
6. I don't feel a strong sense of belonging to my organisation.

Teacher's Professional Learning

1. We provide and receive support from our colleagues to complete the task.
2. Teachers at our school regularly discuss possible ways to improve student performance.
3. Teachers are encouraged to develop and implement new practices.
4. We share our best practices with other colleagues.
5. There is an ongoing collaboration between the teachers in the same subject.
6. We can achieve it again by working in a small team.
7. There is an ongoing collaboration between teachers in the various subject.
8. School schedules provide sufficient time for collaborative teacher planning.