
Title	An investigation of the impact of instructional leadership practices and school culture on staff performance in Singapore schools
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EDUCATION RESEARCH FUNDING PROGRAMME

PROJECT CLOSURE REPORT



An Investigation Of The Impact Of Instructional Leadership Practices And School Culture On Staff Performance In Singapore Schools

By

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EXECUTIVE SUMMARY

INTRODUCTION/BACKGROUND

This study investigates the impact of Instructional Leadership practices and School Culture on staff performance in Singapore schools. It is one of the three collaborative research projects drawn from a programmatic study. The programmatic study itself builds on the previous MOE funded baseline study on school leadership and organization change (OER CD 3/10).

STATEMENT OF PROBLEMS

The purpose of this study on Instructional Leadership and School Culture is to investigate the nature, causes and consequences of the constructs and variables and how interrelated factors involving teacher and organizational capacities in Singapore's context might affect teaching effectiveness and ultimately affect student learning. The study also aims to address the gaps in the knowledge base of Singapore school leaders' practices in affecting staff and organizational capacity.

PURPOSE OF STUDY

The research questions include:

1. How are Singapore principals perceived of their instructional leadership practices?
2. How is school culture perceived by teachers?
3. What are the relationships between instructional leadership and teacher outcomes?
4. What are the relationships between school culture and teacher outcomes?
5. What are the relationships between instructional leadership and school culture?

PARTICIPANTS

(i) Questionnaire survey

A total of 58 school leaders, 225 key personnel, 468 teachers participated in the questionnaire survey and were represented in all zones (north, south east and west), levels (primary schools only), and school type (Government and Government-aided only).

(ii) Focus Group Discussions (FGDs)

From the sample of schools identified for the questionnaire survey in STAGE ONE, a convenience sample of 20 Principals and Vice-Principals, 30 Key Personnel and 40 Teachers were invited to participate in FGDs. For each school selected, the school through a representative assisted in identifying the participants for the FGD. The sample of respondents is representative of the different age groups and work experience. A total of 8 FGD sessions were conducted in the period 17 Aug to 9 Nov 2016 in 6 schools.

METHODOLOGY / DESIGN

This study uses the survey design and data is collected using rating scales and questionnaires.

Instrumentation

(i) Rating Scales

Part A of the main instrument is a section collecting the demographic data. Part B consists of nine main rating scales with the sub scales. Data for (a) to (b) is collected in the STAGE ONE studies.

- a. Instructional leadership (LSO_IL)
- d. School culture (LSO_SC)

Sampling procedure

(i) Sampling for Questionnaire survey

The sample is a representative one of all Singapore schools. As such, ALL school Principals and academic Vice-Principals from government and government-aided schools have been invited to participate in the study. As for Key Personnel and Teachers, stratified random sampling will be used where the stratification was by (i) cluster, (ii) school type and (ii) level. All zones (north, south east and west), levels (primary schools only), and school type (Government and Government-aided only) are to be represented. All surveys were done online via Qualtrics.

(ii) Sampling for Focus Group Discussions (FGDs)

From the sample of schools identified for the questionnaire survey in STAGE ONE, a convenience sample of 20 Principals and Vice-Principals, 30 Key Personnel and 40 Teachers were invited to participate in FGDs. In total, there are about 20 FGDs comprising 4 to 6 participants in each session. For each school selected, the school through a representative assisted in identifying the participants for the FGD. The sample of respondents is representative of the different age groups and work experience.

Analysis

(i) Rating Scale Analysis

Rating scale is calibrated using Rasch analysis which puts all respondents on to one common scale of measure. This enables comparisons to be made of perception measures across different groups of individuals. The validation of the instruments was done by way of examining the fit statistics, person and item separation reliabilities and residuals. From the calibrated person measures of the various variables and the dimensions, further parametric statistical analyses were performed for hypotheses testing (e.g., t-tests, one-way ANOVAs with post hoc tests and correlations). We also be examined the Rasch Wright (Distribution) maps to have a better understanding of how individuals measure on each rating scale variable.

(ii) Focus group Discussions (FGDs)

Data analysis and interpretation is iterative and supplemented with investigators memos. The initial stage of open coding followed the procedures laid down by Strauss and Corbin (1990). The open codes were then systematically identified and grouped into categories and themes (Punch, 2005). This procedure involved strategies for meaning making such as triangulation, sifting for patterns, comparing, contrasting and sorting gross categories (Fetterman, 1989; Miles & Huberman, 1994). Broad patterns were then generated from the identified themes and categories and their relationships and interrelationships sought. Moderation and standardization of the coding scheme were achieved through frequent and regular team meetings with team members. These meetings involved frequent cross-checking, identifying and code-forming procedures (Merriam, 2002).

FINDINGS / RESULTS

Research Question 1: How are Singapore principals perceived of their instructional leadership practices?

The overall means and standard deviations of the four dimensions of instructional leadership were calculated, as shown in Table 2 (Appendix A). As can be seen in Table 2, the highest mean score was on the dimension of “aligning teaching practices to school vision” (mean = 3.57, SD = 3.06). This is followed by dimensions of “developing a positive climate for teaching and learning” (mean = 3.16, SD = 2.81) and “promoting professional development” (mean = 3.05, SD = 2.99). The lowest mean score was on the “leading curriculum and teaching” dimension.

The questionnaire survey reveals that Singapore principals are generally perceived of their instructional leadership practices in the following order of relevance: “aligning teaching practices to school vision”, “developing a positive climate for teaching and learning”, “promoting professional development” and “leading curriculum and teaching”. During the FGDs however, participants argued for an important role of school leaders in “leading curriculum and teaching” and many saw “aligning teaching practices to school vision” and “developing a positive climate for teaching and learning” as embedded within school leaders’ role in “leading curriculum and teaching”.

A common response from participants in explaining incongruence is teachers’ perceptions of school leaders and their work. Perceptions, according to these teachers, could be subjective as the works carried out by school leaders in leading curriculum and teaching could be indirect and not seen by teachers who usually do not work closely with school leaders as compared to key personnel. In addition, school leaders might have been perceived to play a less active role due to shared responsibility in leading curriculum and teaching with key personnel.

Research Question 2: How is school culture perceived by teachers?

As can be seen in Table 6 (Appendix A), the highest mean score was on the dimension of “collegiality” (mean = 4.53, SD = 3.17). This is followed by dimensions of “task orientation” (mean = 1.95, SD = 2.12), “people orientation” (mean = 1.18, SD = 2.89), “strong versus weak nurturance” (mean = 1.04, SD = 1.43), “high versus low holistic development emphasis” (mean = .57, SD = 1.04), and “high versus low hierarchy” (mean = .47, SD = 1.25). The lowest mean score was on the “independence” dimension.

In general, the study reveals that Singapore teachers perceived school culture in the following order of relevance: “collegiality”, “task orientation”, “people orientation”, “strong versus weak nurturance”, “high versus low holistic development emphasis”, “high versus low hierarchy” and “independence”.

Research Question 3: What are the relationships between instructional leadership and teacher outcomes?

All results of instructional leadership dimensions and teacher outcomes were found to be significant at $p < .01$ level (2-tailed), as presented in Table 10 (Appendix A). The data further suggested the positive correlation between all instructional leadership dimensions and teacher outcomes. More specifically, the dimension of “developing a positive climate for teaching and learning” had the largest correlation with teacher outcomes. The largest correlation was with “teachers’ job satisfaction” (Pearson’s r value of .61) and followed by “pedagogical competency” (Pearson’s r value of .46). “Promoting professional

development” dimension had the second largest correlation with teacher outcomes. The largest correlation was with “teachers’ job satisfaction” (Pearson’s r value of .52) and followed by “teacher engagement in the school” (Pearson’s r value of .45). The other two instructional leadership dimensions have weaker correlation with teacher outcomes. “Aligning teaching practices to school vision” had the weakest correlation of (Pearson’s r value of .20) with “assessment competency” and (Pearson’s r value of .27) with “knowledge on student learning”. “Leading curriculum and teaching” dimension had the weakest correlation of (Pearson’s r value of .20) with “assessment competency” and (Pearson’s r value of .26) with “knowledge on student learning”.

To improve teacher outcomes, with the objective of improving teaching and learning outcomes, school leaders generally need to emphasize “developing a positive climate for teaching and learning” and “promoting professional development” in their instructional leadership practices.

Research Question 4: What are the relationships between school culture and teacher outcomes?

In general, school culture dimensions and teacher outcomes were found to be significant at $p < .01$ level (2-tailed) and at $p < .05$ level (2-tailed). The data further suggested that “high versus low hierarchy” and “task orientation” were found to be have some non-significant correlation with teacher outcomes. “Strong versus weak nurturance” dimension had the largest effect on teacher outcomes. The largest effect was on “teachers’ job satisfaction” (Pearson’s r value of .59) and followed by “teacher engagement” (Pearson’s r value of .54). “People orientation” dimension had the second largest effect on teacher outcomes. The largest effect was on “teachers’ job satisfaction (Pearson’s r value of .50) and followed by “teacher engagement” (Pearson’s r value of .48). “Task orientation” had the weakest effect on teacher outcomes. The weakest non-significant effect was on “curriculum content competency” (Pearson’s r value of .07, $p = .12$) and followed by “knowledge on student learning” (Pearson’s r value of .09, $p = .06$).

The findings suggest that in general, school leaders can possibly achieve greater teacher outcomes through promoting nurturance and people orientation in the school.

Research Question 5: What are the relationships between instructional leadership and school culture?

Pearson correlation was calculated between variables on instructional leadership dimensions and school culture. In general, instructional leadership and school culture were found to be significant at $p < .01$ level (2-tailed) and at $p < .05$ level (2-tailed), as presented in Table 12 (Appendix A). The data further suggested the correlation between all instructional leadership dimensions and school culture. More specifically, the dimension of “developing a positive climate for teaching and learning” had the largest correlation with school culture. The largest correlation was with “strong versus weak nurturance” (Pearson’s r value of .60) and followed by “people orientation” (Pearson’s r value of .56). “Promoting professional development” dimension had the second largest correlation with school culture. The largest correlation was with “strong versus weak nurturance” (Pearson’s r value of .57) and followed by “people orientation” (Pearson’s r value of .55).

CONTRIBUTIONS

Incorporated findings in teaching the following courses:
LEP 212 Network Leadership
EdD830 Educational Leadership
MEM804 Supervisory Leadership and Curriculum Design
MEM807 Principalship

A study of participants' perceptions of Singapore principals' instructional leadership practices and the nuances on the ground— can help provide clues for such an understanding of stakeholders' perceptions. This in turn needs to be read by policymakers to help them review and refine policies relating to leadership for learning, and hence enabling better practices of leadership at the school level. In addition, the findings will add value to existing practitioner practices pertaining to collective learning contexts that take place in schools. The findings from the study will help both school leaders and teachers make timely informed decisions on effective leadership practices that support collective learning within school organizations. Finally, the findings from the research study will close the gaps in the international knowledge base on leadership for learning – specifically on the construct, contexts and effects, on top of adding an Asian slant towards the knowledge base.

CONCLUSION

This study revealed the criticality of teacher buy-in to the success and sustenance of any instructional change as teachers listed clarity in direction, good communication, observed improvement in student outcomes, successes of colleagues and support from the principal as major reasons for their buy-in. The challenge with teacher resistance to change is also a common reality, particularly veteran teachers. Interesting insight: Challenging to encourage veteran teachers to engage in PD activities or to innovate-change of mindsets.

The following model of reciprocal principal leadership effects in Figure 1, which shows reciprocal influence of the variables (e.g. principal leadership, school capacity, teacher development, change in instructional practices and student learning), both directly and indirectly, over time (Hallinger and Heck, 2010; Marsh and Craven, 2006).

For the purpose of the study, reciprocal influence in the model can be understood in the following ways: First, the concept of a mutually-influencing system suggests that principal leadership will impact teacher development and vice versa. Second, direct and indirect feedback loops suggest the existence of both direct and indirect effects of principal leadership on teacher development and vice versa. This model accentuates the coexistence of centrifugal (i.e. a top-down approach) and centripetal (i.e. a bottom-up approach) forces in the school and also supports Hallinger and Heck's (2010) proposition of principal leadership as an adaptive process.

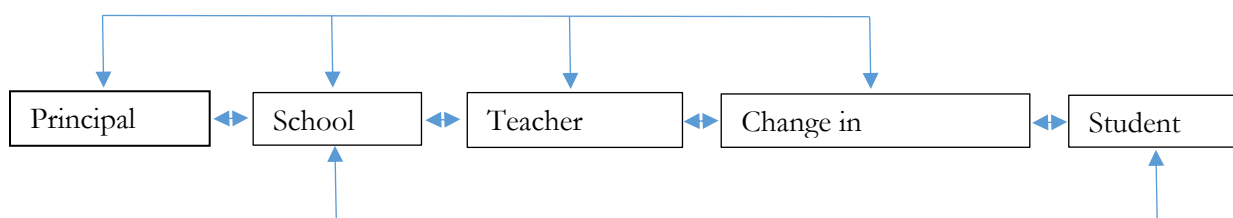


Figure 1: Reciprocal principal leadership effects

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KEYWORDS

Instructional Leadership; Capacity Development ; School Culture;

An Investigation Of The Impact Of Instructional Leadership Practices And School Culture On Staff Performance In Singapore Schools

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INTRODUCTION/BACKGROUND

This study investigates the impact of Instructional Leadership practices and School Culture on staff performance in Singapore schools. It is one of the three collaborative research projects drawn from a programmatic study. The programmatic study itself builds on the previous MOE funded baseline study on school leadership and organization change (OER CD 3/10).

STATEMENT OF PROBLEMS (I.E., JUSTIFICATION FOR THE STUDY)

The purpose of this study on Instructional Leadership and School Culture is to investigate the nature, causes and consequences of the constructs and variables and how interrelated factors

involving teacher and organizational capacities in Singapore's context might affect teaching effectiveness and ultimately affect student learning. The study also aims to address the gaps in the knowledge base of Singapore school leaders' practices in affecting staff and organizational capacity.

PURPOSE OF STUDY (INCLUDING RESEARCH QUESTIONS AND/OR OBJECTIVES)

The research questions include:

1. How are Singapore principals perceived of their instructional leadership practices?
2. How is school culture perceived by teachers?
3. What are the relationships between instructional leadership and teacher outcomes?
4. What are the relationships between school culture and teacher outcomes?
5. What are the relationships between instructional leadership and school culture?

The objectives of the study are:

1. Provide a robust and comprehensive system-wide empirical knowledge base on leaders' and leadership practices that will strengthen NIE's capacity to better prepare and improve the quality and professionalism of leaders (and teachers) in the school system, and inform MOE policy going forward.
2. Indicate ways in which school leadership and organizational improvement can best influence the embedding of new 21st century pedagogies, learning approaches and forms of assessment in increasingly diverse school contexts in Singapore in future.

PARTICIPANTS

- (i) Sampling for Questionnaire survey

A total of 58 school leaders, 225 key personnel, 468 teachers participated in the questionnaire survey and were represented in all zones (north, south east and west), levels (primary schools only), and school type (Government and Government-aided only).

(ii) Sampling for Focus Group Discussions (FGDs)

From the sample of schools identified for the questionnaire survey in STAGE ONE, a convenience sample of 20 Principals and Vice-Principals, 30 Key Personnel and 40 Teachers were invited to participate in FGDs. For each school selected, the school through a representative assisted in identifying the participants for the FGD. The sample of respondents is representative of the different age groups and work experience. A total of 8 FGD sessions were conducted in the period 17 Aug to 9 Nov 2016 in 6 schools.

METHODOLOGY/DESIGN

Research design

This study uses the survey design and data is collected using rating scales and questionnaires. The key variables pertinent to school leaders (Principals, Vice-principals and Key Personnel) and teachers are:

- Instructional Leadership (Alignment to School Vision; Conducive Environment; Promoting Professional Development; Leading in Teaching and Learning)
- School Culture (Collegiality vs Independence; High vs Low Hierarchy; Strong vs Weak Nurturance; High vs Low Academic Emphasis; People vs Task orientation)
- Teachers and Organizational Capacity (Teacher competencies; Job satisfaction; Commitment; Leadership engagement; Leadership effectiveness; Capacity building; Culture building)

Instrumentation

(i) Rating Scales

Part A of the main instrument is a section collecting the demographic data. Part B consists of nine main rating scales with the sub scales. Data for (a) to (b) is collected in the STAGE ONE studies.

a. Instructional leadership (LSO_IL)

b. School culture (LSO_SC)

Each rating scale has about 8 items and some items are deliberately phrased negatively. This is a useful feature to check for respondents who may misfit. Responding is by selecting a category that “best” fits their perceptions. All rating scales resulted in each respondent getting a measure on each of the variables, in logits. The instruments are developed by the research team based on our previously funded Leadership and Organizational Change (LOC) research project and literature. The respondents are asked to check one of the following responses in surveys: ‘1=Strongly disagree’; ‘2=Disagree’; ‘3=Neutral’; ‘4=Agree’; or ‘5=Strongly agree’. All rating scales are validated using Rasch analysis. Prior to this, the instruments for school leaders, KP and teachers have been pilot tested to strengthen validity using mainly members of the research team, ELDC and a selected group of school principals, KP and teachers. This is to alleviate the burden on school personnel in the piloting process.

Sampling procedure

(i) Sampling for Questionnaire survey

The sample is a representative one of all Singapore schools. As such, ALL school Principals and academic Vice-Principals from government and government-aided schools have been invited to participate in the study. As for Key Personnel and Teachers, stratified random sampling will be used where the stratification was by (i) cluster, (ii) school type and (ii) level. All zones (north, south east and west), levels (primary schools only), and school type (Government and Government-aided only) are to be represented. All surveys were done online via Qualtrics.

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From the sample of schools identified for the questionnaire survey in STAGE ONE, a convenience sample of 20 Principals and Vice-Principals, 30 Key Personnel and 40 Teachers were invited to participate in FGDs. In total, there are about 20 FGDs comprising 4 to 6 participants in each

session. For each school selected, the school through a representative assisted in identifying the participants for the FGD. The sample of respondents is representative of the different age groups and work experience.

Analysis

(i) Rating Scale Analysis

There is a need to ensure that any comparisons of the perceptions measures are not contaminated by scaling problems and problems of non-linearity of the raw responses (Wright, 1992, 1993a, 1993b). For this reason the rating scale is calibrated using Rasch analysis which puts all respondents on to one common scale of measure. This enables comparisons to be made of perception measures across different groups of individuals. No rating scale data collected from respondents should be assumed to be 'clean' data as there is always the likelihood of items not fitting the construct being investigated and of respondents 'misbehaving' during responding, rendering them misfitting. The validation of the instruments was done by way of examining the fit statistics, person and item separation reliabilities and residuals. From the calibrated person measures of the various variables and the dimensions, further parametric statistical analyses were performed for hypotheses testing (e.g., t-tests, one-way ANOVAs with post hoc tests and correlations). We also examined the Rasch Wright (Distribution) maps to have a better understanding of how individuals measure on each rating scale variable.

(ii) Focus group Discussions (FGDs)

Data analysis and interpretation is iterative, that is, conducted simultaneously with data collection from FGDs, and supplemented with investigators memos. Several techniques were employed to gain trustworthiness and authenticity during the analytical process (Guba & Lincoln, 1994). The initial stage of open coding followed the procedures laid down by Strauss and Corbin (1990). The open codes were then systematically identified and grouped into categories and themes (Punch, 2005). This procedure involved strategies for meaning making such as triangulation, sifting for patterns, comparing,

contrasting and sorting gross categories (Fetterman, 1989; Miles & Huberman, 1994). Broad patterns were then generated from the identified themes and categories and their relationships and interrelationships sought. This analytic induction process ensures that leadership perceptions were carefully read and sorted, combined, and re-sorted until a coherent coding scheme was developed. Moderation and standardization of the coding scheme were achieved through frequent and regular team meetings with team members. These meetings involved frequent cross-checking, identifying and code-forming procedures (Merriam, 2002).

FINDINGS / RESULTS

Research Question 1: How are Singapore principals perceived of their instructional leadership practices?

The four dimensions in instructional leadership include Aligning Teaching Practices to School Vision; Leading Curriculum and Teaching; Developing a Positive Climate for Teaching and Learning; Promoting Professional Development.

The overall means and standard deviations of the four dimensions of instructional leadership were calculated, as shown in Table 2 (Appendix A). As can be seen in Table 2, the highest mean score was on the dimension of “aligning teaching practices to school vision” (mean = 3.57, SD = 3.06). This is followed by dimensions of “developing a positive climate for teaching and learning” (mean = 3.16, SD = 2.81) and “promoting professional development” (mean = 3.05, SD = 2.99). The lowest mean score was on the “leading curriculum and teaching” dimension.

Findings from the FGDs further supported the above results. In general, participants perceived “aligning teaching practices to school vision” as an integral part of strategic planning carried out by school principals. Generally developed via schoolwide deliberation, school leaders are responsible for

communicating the school vision to the school community. Besides, they play a critical role in taking measures to ensure alignment of teaching practices to school vision mainly through curricular review (departmental, teaching level and individual class reviews) and teacher professional development (structured mentoring programme, intra and inter-school collaborations). Curricular alignment is perceived as critical in ensuring coherence and attaining efficiency to address in teachers' heavy workload.

Besides, participants understood "developing a positive climate for teaching and learning" broadly in terms of tangible and intangible resources made available by the school leaders. Based on their personal experiences, participants reveal an appreciation for tangibles resources such as care by the school leaders for their well-being (for example, a vice principal took over a teacher's class when she went on urgent leave) and formal recognition to commend teachers' work. Additionally, teachers appreciate school leaders' funding for school improvement projects which will improve teaching and learning outcomes. On intangible resources, most teachers appreciate transparency and open communication from their school leaders on both personnel and school matters. In particular, teachers articulate an appreciation for school leaders who promote teachers' feedback through open-door policy and dialogue sessions. Such a school climate, according to teachers, encourage curricular innovation among teachers.

Research Question 2: How is school culture perceived by teachers?

The seven dimensions in school culture include Collegiality; Independence; High versus Low Hierarchy; High versus Low Holistic Development; Emphasis on People Orientation; Emphasis on Task Orientation; Strong versus Weak Nurturance.

As can be seen in Table 6 (Appendix A), the highest mean score was on the dimension of "collegiality" (mean = 4.53, SD = 3.17). This is followed by dimensions of "task orientation" (mean = 1.95, SD = 2.12), "people orientation" (mean = 1.18, SD = 2.89), "strong versus weak nurturance"

(mean = 1.04, SD = 1.43), “high versus low holistic development emphasis” (mean = .57, SD = 1.04), and “high versus low hierarchy” (mean = .47, SD = 1.25). The lowest mean score was on the “independence” dimension.

Findings from the FGDs further supported the above results. In general, collegiality in the school is valued and structures developed to promote collegiality include creating conditions to promote staff collaboration, building collaborative teams, holding activities to enhance collegiality (staff welfare and bonding activities) and establishing an open school culture which supports innovation among staff.

“Task orientation” is important for teachers to achieve efficiency, particularly in schools whose effective functioning depend on people orientation. A few teachers highlighted the importance of good relationships in the school helps in positing task orientation in a positive light.

“People orientation” is unpacked as consultation with staff on school matters and staff needs. “Nurturance” as giving staff recognition for their efforts such as internal awards (the best beginning teacher or most IT savvy star).

Student holistic development is promoted in most schools via an active role of school leaders in conducting values talk to students personally and leveraging on teachable moments. Motivation behind student holistic development stemmed from the desire for a positive learning environment for students and zonal awards as “student holistic development” is aligned to the ministry’s direction. As with other curricular initiatives, participants appreciated that “student holistic development” can be implemented in a collegial and non-threatening school environment and teachers supported through professional development.

Research Question 3: What are the relationships between instructional leadership and teacher outcomes?

Pearson correlation was calculated between variables in instructional leadership dimensions (Aligning Teaching Practices to School Vision; Leading Curriculum and Teaching; Developing a Positive Climate for Teaching and Learning; Promoting Professional Development) and teacher outcomes (Curriculum Content Competency; Pedagogical Competency; Assessment Competency; Knowledge on Student Learning; Teacher Engagement in the School).

All results of instructional leadership dimensions and teacher outcomes were found to be significant at $p < .01$ level (2-tailed), as presented in Table 10 (Appendix A). The data further suggested the positive correlation between all instructional leadership dimensions and teacher outcomes. More specifically, the dimension of “developing a positive climate for teaching and learning” had the largest correlation with teacher outcomes. The largest correlation was with “teachers’ job satisfaction” (Pearson’s r value of .61) and followed by “pedagogical competency” (Pearson’s r value of .46). “Promoting professional development” dimension had the second largest correlation with teacher outcomes. The largest correlation was with “teachers’ job satisfaction” (Pearson’s r value of .52) and followed by “teacher engagement in the school” (Pearson’s r value of .45). The other two instructional leadership dimensions have weaker correlation with teacher outcomes. “Aligning teaching practices to school vision” had the weakest correlation of (Pearson’s r value of .20) with “assessment competency” and (Pearson’s r value of .27) with “knowledge on student learning”. “Leading curriculum and teaching” dimension had the weakest correlation of (Pearson’s r value of .20) with “assessment competency” and (Pearson’s r value of .26) with “knowledge on student learning”.

To improve teacher outcomes, with the objective of improving teaching and learning outcomes, school leaders particularly need to emphasize “developing a positive climate for teaching and learning” and “promoting professional development” in their instructional leadership practices.

FGD participants highlighted the direct impact of promoting school climate and teacher professional development on teacher competencies from improved morale and greater willingness of teachers to contribute to the school. They also share the likelihood of more frequent and richer curricular sharing and discussion sessions among teachers. Additionally, the direct impact of promoting teacher professional development on teacher competencies can be understood in terms of school leaders' emphasis on levelling up every teacher and promoting the space for curricular innovation and sharing.

Most participants articulated the effects of school leaders promoting school climate and teacher professional development on teacher job satisfaction as moderated mainly by positive student outcomes such as observations of improved behaviour and academic results and school leaders' support (i.e. resource allocation) in holistic education and curricular innovation. Other sources of satisfaction include initiatives by school leaders that made teachers feel appreciated such as improved staff welfare (i.e. more formal and informal lunch gatherings), time-off (i.e. to appreciate Primary 6 teachers for giving remediation during the September holiday) and award to formally recognize teachers for their efforts.

Explanations to the effects of school leaders promoting school climate and teacher professional development on teacher engagement include improved motivation among teachers from good relationship among colleagues and support from school leaders.

Research Question 4: What are the relationships between school culture and teacher outcomes?

As presented in Table 11 (Appendix A). Pearson correlation was calculated between variables on school culture dimensions and teacher outcomes.

In general, school culture dimensions and teacher outcomes were found to be significant at $p < .01$ level (2-tailed) and at $p < .05$ level (2-tailed). The data further suggested that “high versus low hierarchy” and “task orientation” were found to have some non-significant correlation with teacher outcomes. “Strong versus weak nurturance” dimension had the largest effect on teacher outcomes. The largest effect was on “teachers’ job satisfaction” (Pearson’s r value of .59) and followed by “teacher engagement” (Pearson’s r value of .54). “People orientation” dimension had the second largest effect on teacher outcomes. The largest effect was on “teachers’ job satisfaction (Pearson’s r value of .50) and followed by “teacher engagement” (Pearson’s r value of .48). “Task orientation” had the weakest effect on teacher outcomes. The weakest non-significant effect was on “curriculum content competency” (Pearson’s r value of .07, $p = .12$) and followed by “knowledge on student learning” (Pearson’s r value of .09, $p = .06$).

The findings suggest school leaders can possibly achieve greater teacher outcomes through promoting nurturance and people orientation in the school. FGD findings revealed that most teachers perceived teaching as a nurturing career, with high level of nurturance in the work environment which emphasized people development. In their discussions, teachers unpacked “people orientation” as consultation with staff on school matters and staff needs; “nurturance” as giving staff recognition for their efforts such as internal awards (the best beginning teacher or most IT savvy star).

Research Question 5: What are the relationships between instructional leadership and school culture?

Pearson correlation was calculated between variables on instructional leadership dimensions and school culture. In general, instructional leadership and school culture were found to be significant at $p < .01$ level (2-tailed) and at $p < .05$ level (2-tailed), as presented in Table 12 (Appendix A). The data further suggested the correlation between all instructional leadership dimensions and school

culture. More specifically, the dimension of “developing a positive climate for teaching and learning” had the largest correlation with school culture. The largest correlation was with “strong versus weak nurturance” (Pearson’s r value of .60) and followed by “people orientation” (Pearson’s r value of .56). “Promoting professional development” dimension had the second largest correlation with school culture. The largest correlation was with “strong versus weak nurturance” (Pearson’s r value of .57) and followed by “people orientation” (Pearson’s r value of .55).

In general, school leaders develop positive climate for teaching and learning through providing both tangible and intangible resources. Almost all the FGD participants articulated a greater appreciation for intangible resources such as an emphasis on teacher professional development instead of appraisal, openness, trust, and security (having a non-threatening and “no-blame” culture). Many highlighted an appreciation for the space for curricular innovation. On tangible resources, many participants surfaced the importance of staff welfare and formal recognition.

Participants articulated school leaders’ role in promoting professional development through setting, communicating and driving goals for teacher learning. Assisted by the School Staff Developer in schoolwide professional development, school leaders provide structures, for example, through operationalizing the school vision into teacher professional development activities and instructional programmes, with varied degrees of consultation from key personnel and teachers. Dialogues sessions, in particular, have been highlighted by participants to facilitate communication and feedback to school leaders on career and professional development matters. To support collaboration among educators, school leaders build collaborative teams within the school and create climatic conditions that will promote and sustain the collaborations. Collaborative teams, generally formed based on academic subject, academic level or instructional interest, are popularly implemented through professional development practices such as Professional Learning Communities. Many identified peer-learning as an important characteristic of Professional Learning Communities through which teachers normalize

open classrooms, lesson observations, reflections and feedback from colleagues as critical to their professional learning.

Participants articulated that principals create climatic conditions to promote and sustain collaborations within the school by providing resources, both tangible and intangible. Most school leaders adopted a consultative approach in deployment and teacher professional development and many teachers perceived that they can influence school leaders on personnel and professional development matters. To encourage teacher professional development, many principals protected professional development time by scheduling professional development activities within curriculum hours. Most principals disseminated professional development activities to teachers through key personnel and most participants highlighted an appreciation of a school culture supportive of learning for developmental instead of appraisal purpose.

In addition, school leaders structured mentoring programmes to ensure continued support to all teachers throughout their teaching career. Mentors are thoughtfully selected based on the following criteria: position in the school organizational chart, experience in the teaching level and subject, instructional competency and interpersonal factors and their main responsibility gravitate towards ensuring classroom instructional competency of their mentees. Multiple levels of mentoring, a mentoring practice based on the premise of mentoring as several events with different levels of mentoring which require a different type of mentor with different types of skills and knowledge, is popularly practised and has resulted in dual identity of most teachers as both a mentor and mentee.

CONTRIBUTIONS OF STUDY

A study of participants' perceptions of Singapore principals' instructional leadership practices and the nuances on the ground— can help provide clues for such an understanding of stakeholders' perceptions. This in turn needs to be read by policymakers to help them review and refine policies

relating to leadership for learning, and hence enabling better practices of leadership at the school level. In addition, the findings will add value to existing practitioner practices pertaining to collective learning contexts that take place in schools. The findings from the study will help both school leaders and teachers make timely informed decisions on effective leadership practices that support collective learning within school organizations. Finally, the findings from the research study will close the gaps in the international knowledge base on leadership for learning – specifically on the construct, contexts and effects, on top of adding an Asian slant towards the knowledge base.

CONCLUSION

This study investigates the impact of Instructional Leadership practices and School Culture on staff performance in Singapore schools. Two inter-related themes of the Singapore school principals' multi-faceted role are derived from the study.

1. Critical role of teachers as the curriculum gate-keeper. Their voices must be heard for buy-in, ownership, commitment and sustainability for real and meaningful works to be done at the school (theme of conference).
2. A need to reinvent/ revamp teacher professional development in Singapore. Necessity of reciprocal principal leadership

This study revealed the criticality of teacher buy-in to the success and sustenance of any instructional change as teachers listed clarity in direction, good communication, observed improvement in student outcomes, successes of colleagues and support from the principal as major reasons for their buy-in. The challenge with teacher resistance to change is also a common reality, particularly veteran teachers. Interesting insight: Challenging to encourage veteran teachers to engage in PD activities or to innovate- change of mindsets.

Due to the teacher buy-in as a pre-requisite to sustainable instructional change, the study calls for the principal to participate in instructional change as leader, learner, or both to have a better sense of “the ground” in order to effectively address the challenges.

In order to make more sense of the exhibited leadership, we propose a model of reciprocal principal leadership effects in Figure 1, which shows reciprocal influence of the variables (e.g. principal leadership, school capacity, teacher development, change in instructional practices and student learning), both directly and indirectly, over time (Hallinger and Heck, 2010; Marsh and Craven, 2006).

For the purpose of the study, reciprocal influence in the model can be understood in the following ways: First, the concept of a mutually-influencing system suggests that principal leadership will impact teacher development and vice versa. Second, direct and indirect feedback loops suggest the existence of both direct and indirect effects of principal leadership on teacher development and vice versa. This model accentuates the coexistence of centrifugal (i.e. a top-down approach) and centripetal (i.e. a bottom-up approach) forces in the school and also supports Hallinger and Heck’s (2010) proposition of principal leadership as an adaptive process.

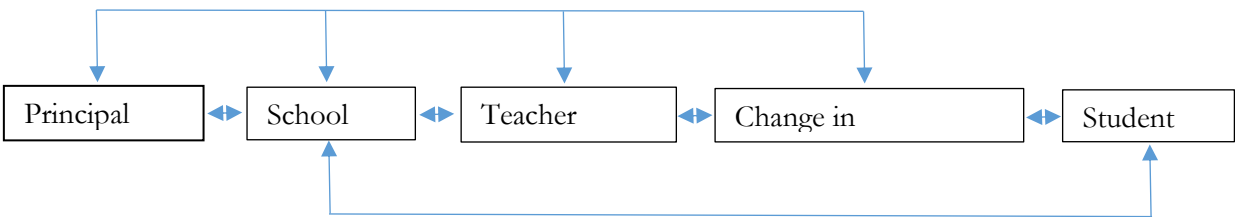


Figure 1: Reciprocal principal leadership effects

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APPENDIX

Appendix A

Results

How are Singapore principals perceived of their instructional leadership practices?

A summary of respondents' demographic information is shown in Table 1.

Table 1. Demographic Information of Respondents

		Teachers (n = 462)		Key Personnel (n = 224)	
		n	%	n	%
Gender	Male	99	21.4	56	25.0
	Female	363	78.6	168	75.0
Teaching experience	0-5	174	37.7	104	46.4
	6-10	103	22.3	63	28.1
	11-20	119	25.8	43	19.2
	21-30	50	10.8	12	5.4
	>31	16	3.5	2	0.9
Leadership position	Head of Department	-	-	55	24.6
	Subject / Level Head	-	-	169	75.4
	Teacher	462	100	-	-

The overall means and standard deviations of the four dimensions of instructional leadership were calculated, as shown in Table 2. As can be seen in Table 2, the highest mean score was on the dimension of “aligning teaching practices to school vision” (mean = 3.57, SD = 3.06). This is followed by dimensions of “developing a positive climate for teaching and learning (mean = 3.16, SD = 2.81) and “promoting

professional development” (mean = 3.05, SD = 2.99). The lowest mean score was on the “leading curriculum and teaching” dimension.

Table 2. Overall mean scores and standard deviations of the four dimensions of Instructional Leadership

Instructional Leadership Dimensions	Teacher (<i>n</i> = 462)					Key Personnel (<i>n</i> = 224)					Total (<i>n</i> = 686)				
	M	SD	Min	Max	Range	M	SD	Min	Max	Range	M	SD	Min	Max	Range
Aligning Teaching Practices to School Vision	3.35	3.03	-5.22	10.78	16.00	4.02	3.08	-4.69	10.78	15.47	3.57	3.06	-5.22	10.78	16.00
Leading Curriculum and Teaching	1.91	1.81	-4.64	8.36	13.00	2.36	1.96	-2.47	8.36	10.83	2.06	1.87	-4.64	8.36	13.00
Developing a Positive Climate for Teaching and Learning	2.87	2.77	-6.56	9.43	15.99	3.78	2.79	-2.64	9.43	12.07	3.16	2.81	-6.56	9.43	15.99
Promoting Professional Development	2.81	2.99	-7.48	9.91	17.39	3.55	2.95	-3.20	9.91	13.11	3.05	2.99	-7.48	9.91	17.39

Is there any significant difference in teachers' perceptions of instructional leadership practices with reference of leadership position?

As mentioned earlier, the respondents were key personnel (teachers with a formal leadership position) and teachers (those without a formal leadership position). Table 2 shows the instructional leadership scores rated by key personnel and teachers. To examine whether there was any statistically significant difference in teachers' perceptions with reference to their leadership position, a one-way ANOVA was run, as shown in Table 3. The results indicate significant differences in perception of instructional leadership dimensions among key personnel and teachers: the highest score was "aligning teaching practices to school vision", $F(1, 684) = 7.31, p = .007$, key personnel perceived higher (mean = 4.02) than the teachers (mean = 3.35). Followed by "developing a positive climate for teaching and learning", $F(1, 684) = 16.40, p < .001$, key personnel perceived higher (mean = 3.78) than the teachers (mean = 2.87); "promoting professional development", $F(1, 684) = 9.45, p = .002$, key personnel perceived higher (mean = 3.55) than the teachers (mean = 2.81), and "leading curriculum and teaching", $F(1, 684) = 8.88, p = .003$, key personnel perceived higher (mean = 2.36) than the teachers (mean = 1.91). In summary, teachers with formal leadership position perceived instructional leadership higher than the teachers without formal leadership position did.

Table 3. One-way ANOVA for instructional leadership scores and leadership position

Instructional Leadership Dimensions	Df	Mean Square	F	p
Aligning Teaching Practices to School Vision				
Between groups	1	68.018	7.307	.007
Within groups	684	9.308		
Leading Curriculum and Teaching				
Between groups	1	30.811	8.876	.003
Within groups	684	3.471		

Developing a Positive Climate for Teaching and Learning				
Between groups	1	126.536	16.403	.000
Within groups	684	7.714		
Promoting Professional Development				
Between groups	1	83.544	9.445	.002
Within groups	684	8.845		
Overall Instructional Leadership				
Between groups	1	1168.760	13.800	.000
Within groups	684	84.692		

Is there any significant difference in teachers' perceptions of instructional leadership practices with reference to their gender and teaching experience?

To find out whether there were any statistically significant differences in teachers' perceptions with regards to their gender and teaching experience, one-way ANOVA analyses were run. Table 4 and Table 5 show the results of these analyses.

As can be seen in Table 4, there was no significant effect of gender on the perceptions of key personnel and teachers of all instructional leadership dimensions. Results showed the non-significant effects of "aligning teaching practices to school vision", $F(1, 684) = .21, p = .65$; "leading curriculum and teaching", $F(1, 684) = .07, p = .79$; "developing a positive climate for teaching and learning", $F(1, 684) = .36, p = .55$; and "promoting professional development", $F(1, 684) = 1.78, p = .18$.

Table 4. One-way ANOVA results for Instructional Leadership score and gender

Instructional Leadership Dimensions	df	Mean Square	F	p
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Aligning Teaching Practices to School Vision				
Between groups	1	1.979	.210	.647
Within groups	684	9.405		
Leading Curriculum and Teaching				
Between groups	1	.240	.068	.794
Within groups	684	3.516		
Developing a Positive Climate for Teaching and Learning				
Between groups	1	2.861	.362	.547
Within groups	684	7.895		
Promoting Professional Development				
Between groups	1	15.878	1.775	.183
Within groups	684	8.944		
Overall Instructional Leadership				
Between groups	1	.157	.002	.966
Within groups	684	86.400		

As can be seen in Table 5, there was no significant effect of teaching experience on the perceptions of key personnel and teachers of all instructional leadership dimensions. Results showed the non-significant effects of “aligning teaching practices to school vision”, $F(4, 681) = .67, p = .61$; “leading curriculum and teaching”, $F(4, 681) = .91, p = .50$; “developing a positive climate for teaching and learning”, $F(4, 681) = .64, p = .64$; and “promoting professional development”, $F(4, 681) = .88, p = .47$.

Table 5. One-way ANOVA results for Instructional Leadership score and teaching experience

Instructional Leadership Dimensions	df	Mean Square	F	p
Aligning Teaching Practices to School Vision				

Between groups	4	6.348	.674	.610
Within groups	681	9.412		
Leading Curriculum and Teaching				
Between groups	4	3.188	.907	.459
Within groups	681	3.513		
Developing a Positive Climate for Teaching and Learning				
Between groups	4	5.035	.637	.636
Within groups	681	7.905		
Promoting Professional Development				
Between groups	4	7.913	.883	.474
Within groups	681	8.960		
Overall Instructional Leadership				
Between groups	4	82.505	.956	.431
Within groups	681	86.297		

In conclusion, there seems to be no statistically significant differences in respondents' perceptions of instructional leadership practices with reference to their gender and teaching experience

How is school culture perceived by teachers?

The overall means and standard deviations of the seven dimensions of school culture were calculated, as shown in Table 6. As can be seen in Table 6, the highest mean score was on the dimension of "collegiality" (mean = 4.53, SD = 3.17). This is followed by dimensions of "task orientation" (mean = 1.95, SD = 2.12), "people orientation" (mean = 1.18, SD = 2.89), "strong versus weak nurturance" (mean = 1.04, SD = 1.43), "high versus low holistic development emphasis" (mean = .57, SD = 1.04), and "high versus low hierarchy" (mean = .47, SD = 1.25). The lowest mean score was on the "independence" dimension.

Table 6. Overall mean scores and standard deviations of the seven dimensions of School Culture

School Culture Dimensions	Teacher (<i>n</i> = 462)					Key Personnel (<i>n</i> = 224)					Total (<i>n</i> = 686)				
	M	SD	Min	Max	Range	M	SD	Min	Max	Range	M	SD	Min	Max	Range
Collegiality	4.41	3.24	- 5.29	10.12	15.41	4.77	3.00	-3.82	10.12	13.94	4.53	3.17	-5.29	10.12	15.41
Independence	-.50	2.01	- 7.43	6.51	13.94	-.85	2.12	-7.43	6.51	13.94	-.62	2.06	-7.43	6.51	13.94
High versus Low Hierarchy	.63	1.27	- 7.61	5.91	13.52	.14	1.14	-2.23	4.99	7.22	.47	1.25	-7.61	5.91	13.52
High versus Low Holistic Development Emphasis	.56	1.03	-5.24	3.99	9.23	.59	1.08	-2.59	3.99	6.58	.57	1.04	-5.24	3.99	9.23
People Orientation	.86	2.92	- 7.51	9.51	17.02	1.85	2.72	-7.51	9.51	17.02	1.18	2.89	-7.51	9.51	17.02
Task Orientation	2.18	2.18	- 6.39	9.23	15.62	1.49	1.91	-3.20	7.52	10.72	1.95	2.12	-6.39	9.23	15.62
Strong versus Weak Nurturance	.83	1.39	- 4.19	6.58	10.77	1.47	1.42	-2.05	7.97	10.02	1.04	1.43	-4.19	7.97	12.16

Is there any significant difference in teachers' perceptions of school culture with reference of leadership position?

Table 6 shows the school culture scores rated by key personnel and teachers. To examine whether there was any statistically significant difference in teachers' perceptions of school culture with reference to their leadership position, a one-way ANOVA was run, as shown in Table 7. In general, the results indicate significant differences in perception of school culture dimensions among key personnel and teachers, however "collegiality" and "high versus low holistic development emphasis" were found not significant. The highest score for the significant results was "task orientation", $F(1, 684) = 16.47, p < .001$, teachers perceived higher (mean = 2.18) than the key personnel (mean = 1.49). Followed by "people orientation", $F(1, 684) = 18.03, p < .001$, key personnel perceived higher (mean = 1.85) than the teachers (mean = .86); "strong versus weak nurturance", $F(1, 684) = 31.85, p < .001$, key personnel perceived higher (mean = 1.47) than the teachers (mean = .83); "high versus low hierarchy", $F(1, 684) = 24.58, p < .001$, teachers perceived higher (mean = .63) than the key personnel (mean = .14); and "independence", $F(1, 684) = 4.28, p = .04$, teachers perceived higher (mean = -.50) than the key personnel (mean = -.85). The highest score for the non-significant results was "collegiality", $F(1, 684) = 1.94, p = .16$, key personnel perceived higher (mean = 4.77) than the teachers (mean = 4.41). Followed by "high versus low holistic development emphasis", $F(1, 684) = .18, p = .67$, key personnel perceived higher (mean = .59) than the teachers (mean = .56).

Table 7. One-way ANOVA for school culture scores and leadership position

School Culture Dimensions	df	Mean Square	F	p
Collegiality				
Between groups	1	19.456	1.940	.164
Within groups	684	10.030		

Independence				
Between groups	1	18.009	4.283	.039
Within groups	684	4.205		
High versus Low Hierarchy				
Between groups	1	37.087	24.580	.000
Within groups	684	1.509		
High versus Low Holistic Development Emphasis				
Between groups	1	.197	.180	.671
Within groups	684	1.093		
People Orientation				
Between groups	1	147.096	18.033	.000
Within groups	684	8.157		
Task Orientation				
Between groups	1	72.099	16.470	.000
Within groups	684	4.377		
Strong versus Weak Nurturance				
Between groups	1	62.264	31.847	.000
Within groups	684	1.955		
Overall School Culture				
Between groups	1	36.591	.863	.353
Within groups	684	42.401		

Is there any significant difference in teachers' perceptions of school culture with reference to their gender and teaching experience?

To find out whether there were any statistically significant differences in teachers' perceptions of school culture with regards to their gender and teaching experience, one-way ANOVA analyses were run. Table 8 and Table 9 show the results of these analyses.

As can be seen in Table 8, generally there was no significant effect of gender on the perceptions of key personnel and teachers of school culture dimensions except for “high versus low holistic development emphasis”, $F(1, 684) = 4.28, p = .04$. Further results showed the non-significant effects of “collegiality”, $F(1, 684) = 1.73, p = .19$; “independence”, $F(1, 684) = .30, p = .58$; “high versus low hierarchy”, $F(1, 684) = .02, p = .88$; “people orientation”, $F(1, 684) = 2.32, p = .13$; “task orientation”, $F(1, 684) = 2.65, p = .10$; “strong versus weak nurturance”, $F(1, 684) = 1.75, p = .19$.

Table 8. One-way ANOVA results for School Culture score and gender

School Culture Dimensions	df	Mean Square	F	p
Collegiality				
Between groups	1	17.391	1.733	.188
Within groups	684	10.033		
Independence				
Between groups	1	1.271	.300	.584
Within groups	684	4.230		
High versus Low Hierarchy				
Between groups	1	.035	.022	.881
Within groups	684	1.563		
High versus Low Holistic Development Emphasis				
Between groups	1	4.651	4.282	.039
Within groups	684	1.086		
People Orientation				
Between groups	1	19.314	2.315	.129
Within groups	684	8.344		
Task Orientation				
Between groups	1	11.838	2.651	.104
Within groups	684	4.466		

Strong versus Weak Nurturance				
Between groups	1	3.573	1.751	.186
Within groups	684	2.041		
Overall School Culture				
Between groups	1	4.702	.111	.739
Within groups	684	42.447		

As can be seen in Table 9, results showed the significant effects of teaching experience on the perceptions of key personnel and teachers of school culture dimension for “collegiality”, $F(4, 681) = 2.56, p = .04$; “high versus low hierarchy”, $F(4, 681) = 2.53, p = .04$ and “task orientation”, $F(4, 681) = 8.17, p < .001$. Further results showed the non-significant effects of; “independence”, $F(4, 681) = .42, p = .80$; “high versus low holistic development emphasis”, $F(4, 681) = .39, p = .82$; “people orientation”, $F(4, 681) = .83, p = .51$ and “strong versus weak nurturance”, $F(4, 681) = .60, p = .66$.

Table 9. One-way ANOVA results for School Culture score and teaching experience

School Culture Dimensions	df	Mean Square	F	p
Collegiality				
Between groups	4	25.475	2.560	.038
Within groups	681	9.953		
Independence				
Between groups	4	1.773	.418	.796
Within groups	681	4.240		
High versus Low Hierarchy				
Between groups	4	3.905	2.525	.040
Within groups	681	1.547		
High versus Low Holistic Development Emphasis				
Between groups	4	.427	.390	.816

Within groups	681	1.095		
People Orientation				
Between groups	4	6.946	.830	.506
Within groups	681	8.368		
Task Orientation				
Between groups	4	35.116	8.173	.000
Within groups	681	4.296		
Strong versus Weak Nurturance				
Between groups	4	1.237	.604	.660
Within groups	681	2.048		
Overall School Culture				
Between groups	4	80.631	1.912	.107
Within groups	681	42.168		

What are the relationship between instructional leadership and teacher outcomes perceived by teachers?

Pearson correlation was calculated between variables on instructional leadership dimensions and teacher outcomes. All results of instructional leadership dimensions and teacher outcomes were found to be significant at $p < .01$ level (2-tailed), as presented in Table 10. The data further suggested the positive correlation between all instructional leadership dimensions and teacher outcomes. More specifically, the dimension of “developing a positive climate for teaching and learning” had the largest correlation with teacher outcomes. The largest correlation was with “teachers’ job satisfaction” (Pearson’s r value of .61) and followed by “pedagogical competency” (Pearson’s r value of .46). “Promoting professional development” dimension had the second largest correlation with teacher outcomes. The largest correlation was with “teachers’ job satisfaction” (Pearson’s r value of .52) and followed by “teacher engagement in the school” (Pearson’s r value of .45). The other two instructional leadership dimensions have weaker

correlation with teacher outcomes. “Aligning teaching practices to school vision” had the weakest correlation of (Pearson’s r value of .20) with “assessment competency” and (Pearson’s r value of .27) with “knowledge on student learning”. “Leading curriculum and teaching” dimension had the weakest correlation of (Pearson’s r value of .20) with “assessment competency” and (Pearson’s r value of .26) with “knowledge on student learning”.

Table 10. Results of Pearson Correlation Matrix of Instructional Leadership and Teacher Outcomes

Instructional Leadership Dimensions /Teacher Outcomes	Aligning Teaching Practices to School Vision	Leading Curriculum and Teaching	Developing a Positive Climate for Teaching and Learning	Promoting Professional Development	Curriculum Content Competency	Pedagogical Competency	Assessment Competency	Knowledge on Student Learning	Teacher Engagement in the School	Teachers' Job Satisfaction
Aligning Teaching Practices to School Vision	1	.664**	.602**	.644**	.347**	.365**	.199**	.265**	.347**	.403**
Leading Curriculum and Teaching	.664**	1	.631**	.713**	.313**	.349**	.199**	.256**	.364**	.444**
Developing a Positive Climate for Teaching and Learning	.602**	.631**	1	.710**	.433**	.457**	.300**	.333**	.456**	.611**
Promoting Professional Development	.644**	.713**	.710**	1	.393**	.425**	.295**	.304**	.445**	.516**
Curriculum Content Competency	.347**	.313**	.433**	.393**	1	.756**	.631**	.651**	.500**	.434**
Pedagogical Competency	.365**	.349**	.457**	.425**	.756**	1	.722**	.702**	.502**	.469**
Assessment Competency	.199**	.199**	.300**	.295**	.631**	.722**	1	.699**	.442**	.352**
Knowledge on Student Learning	.265**	.256**	.333**	.304**	.651**	.702**	.699**	1	.442**	.318**
Teacher Engagement in the School	.347**	.364**	.456**	.445**	.500**	.502**	.442**	.442**	1	.628**
Teachers' Job Satisfaction	.403**	.444**	.611**	.516**	.434**	.469**	.352**	.318**	.628**	1

Note. N = 462

**Correlation is significant at the level .01 (2-tailed)

What are the relationship between school culture and teacher outcomes perceived by teachers?

As presented in Table 11. Pearson correlation was calculated between variables on school culture dimensions and teacher outcomes. In general, school culture dimensions and teacher outcomes were found to be significant at $p < .01$ level (2-tailed) and at $p < .05$ level (2-tailed). The data further suggested that “high versus low hierarchy” and “task orientation” were found to be have some non-significant correlation with teacher outcomes. “Strong versus weak nurturance” dimension had the largest effect on teacher outcomes. The largest effect was on “teachers’ job satisfaction” (Pearson’s r value of .59) and followed by “teacher engagement” (Pearson’s r value of .54). “People orientation” dimension had the second largest effect on teacher outcomes. The largest effect was on “teachers’ job satisfaction (Pearson’s r value of .50) and followed by “teacher engagement” (Pearson’s r value of .48). “Task orientation” had the weakest effect on teacher outcomes. The weakest non-significant effect was on “curriculum content competency” (Pearson’s r value of .07, $p = .12$) and followed by “knowledge on student learning” (Pearson’s r value of .09, $p = .06$)

Table 11. Results of Pearson Correlation Matrix of School Culture and Teacher Outcomes

School Culture /Teacher Outcomes	Collegiality	Independence	High versus Low Hierarchy	High versus Low Holistic Development Emphasis	People Orientation	Task Orientation	Strong versus Weak Nurturance	Curriculum Content Competency	Pedagogical Competency	Assessment Competency	Knowledge on Student Learning	Teacher Engagement	Teachers' Job Satisfaction
Collegiality	1	-.489**	-.266**	.484**	.450**	.195**	.466**	.210**	.196**	.094*	.140**	.313**	.378**
Independence	-.489**	1	.253**	-.393**	-.267**	.044	-.407**	-.241**	-.202**	-.198**	-.209**	-.285**	-.265**
High versus Low Hierarchy	-.266**	.253**	1	-.331**	-.546**	.114*	-.510**	-.097*	-.050	-.006	-.035	-.422**	-.324**
High versus Low Holistic Development Emphasis	.484**	-.393**	-.331**	1	.395**	.090	.436**	.201**	.210**	.176**	.152**	.273**	.296**
People Orientation	.450**	-.267**	-.546**	.395**	1	.245**	.677**	.209**	.257**	.138**	.176**	.476**	.499**
Task Orientation	.195**	.044	.114*	.090	.245**	1	.077	.073	.151**	.109*	.088	.106*	.162**
Strong versus Weak Nurturance	.466**	-.407**	-.510**	.436**	.677**	.077	1	.329**	.319**	.245**	.252**	.537**	.585**
Curriculum Content Competency	.210**	-.241**	-.097*	.201**	.209**	.073	.329**	1	.756**	.631**	.651**	.500**	.434**
Pedagogical Competency	.196**	-.202**	-.050	.210**	.257**	.151**	.319**	.756**	1	.722**	.702**	.502**	.469**
Assessment Competency	.094*	-.198**	-.006	.176**	.138**	.109*	.245**	.631**	.722**	1	.699**	.442**	.352**
Knowledge on Student Learning	.140**	-.209**	-.035	.152**	.176**	.088	.252**	.651**	.702**	.699**	1	.442**	.318**
Teacher Engagement	.313**	-.285**	-.422**	.273**	.476**	.106*	.537**	.500**	.502**	.442**	.442**	1	.628**
Teachers' Job Satisfaction	.378**	-.265**	-.324**	.296**	.499**	.162**	.585**	.434**	.469**	.352**	.318**	.628**	1

Note. N = 462

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the level .01 (2-tailed)

What are the relationship between instructional leadership and school culture perceived by key personnel and teachers?

Pearson correlation was calculated between variables on instructional leadership dimensions and school culture. In general, instructional leadership and school culture were found to be significant at $p < .01$ level (2-tailed) and at $p < .05$ level (2-tailed), as presented in Table 12. The data further suggested the correlation between all instructional leadership dimensions and school culture. More specifically, the dimension of “developing a positive climate for teaching and learning” had the largest correlation with school culture. The largest correlation was with “strong versus weak nurturance” (Pearson’s r value of .60) and followed by “people orientation” (Pearson’s r value of .56). “Promoting professional development” dimension had the second largest correlation with school culture. The largest correlation was with “strong versus weak nurturance” (Pearson’s r value of .57) and followed by “people orientation” (Pearson’s r value of .55).

Table 12. Results of Pearson Correlation Matrix of Instructional leadership and School Culture

Instructional Leadership Dimensions /School Culture	Aligning Teaching Practices to School Vision	Leading Curriculum and Teaching	Developing a Positive Climate for Teaching and Learning	Promoting Professional Development	Collegiality	Independence	High versus Low Hierarchy	High versus Low Holistic Development Emphasis	People Orientation	Task Orientation	Strong versus Weak Nurturance
Aligning Teaching Practices to School Vision	1	.664**	.592**	.639**	.392**	-.256**	-.231**	.358**	.472**	.239**	.471**
Leading Curriculum and Teaching	.664**	1	.652**	.739**	.421**	-.216**	-.234**	.359**	.475**	.287**	.498**
Developing a Positive Climate for Teaching and Learning	.592**	.652**	1	.705**	.459**	-.302**	-.275**	.344**	.562**	.237**	.602**
Promoting Professional Development	.639**	.739**	.705**	1	.459**	-.286**	-.331**	.386**	.548**	.230**	.566**
Collegiality	.392**	.421**	.459**	.459**	1	-.464**	-.237**	.461**	.418**	.203**	.435**
Independence	-.256**	-.216**	-.302**	-.286**	-.464**	1	.226**	-.373**	-.282**	.039	-.404**
High versus Low Hierarchy	-.231**	-.234**	-.275**	-.331**	-.237**	.226**	1	-.294**	-.524**	.134**	-.468**
High versus Low Holistic Development Emphasis	.358**	.359**	.344**	.386**	.461**	-.373**	-.294**	1	.394**	.093*	.425**
People Orientation	.472**	.475**	.562**	.548**	.418**	-.282**	-.524**	.394**	1	.221**	.651**
Task Orientation	.239**	.287**	.237**	.230**	.203**	.039	.134**	.093*	.221**	1	.058
Strong versus Weak Nurturance	.471**	.498**	.602**	.566**	.435**	-.404**	-.468**	.425**	.651**	.058	1

Note. N = 686

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the level .01 (2-tailed)

IMPLICATIONS FOR PRACTICE

Implications for school leaders

As for practical contributions, the current study raises five implications for school leaders. First, the results in this study clearly indicate that teacher competences are strongly related to the school leaders' attention to developing teachers and school climate, instead of a focus on the direct management of classroom instruction. This finding suggests school leaders create opportunities and conditions for teachers' professional development that are built on teacher and school needs, and articulate expectations and encouragements for teachers in terms of continuous learning and teaching improvements.

Second, the study demonstrates that aligning teaching practices to school vision appeared to be the core practice of instructional leadership in Singapore because school leaders were reported to perform this dimension most frequently. Nevertheless, this practice seemed not to have the strongest effects on teacher competences that are linked to instructional quality (e.g., Hattie, 2009; Hill, Rowan, & Ball, 2005; Kleickmann et al., 2013). For clarification, this is not to imply that Singapore school leaders should make fewer efforts on this leadership task, since it may contribute to improved student learning through the other pathways (Hallinger & Murphy, 2013).

Third, since teaching experience was a significant predictor of three out of four dimensions of teacher competence, it reinforces the common sense that experienced teachers seem to have stronger knowledge on pedagogy, assessment, and student learning, as compared with junior colleagues. Perhaps it is helpful that school leaders encourage these experienced teachers to mentor novice teachers in both formal and informal ways.

Fourth, the role of school principals in teacher professional development enacted through organizing structures, establishing and promoting internal and external networks, channeling resources and ensuring strategic alignment, is indeed a complex one that requires principals to recognize teachers as partners, acknowledging their professionalism and capitalizing on their knowledge and skills (Darling-Hammond, 1988; Rowan, 1990). Evidently, the findings showed principal leadership in facilitating teachers' exercise of initiative and responsibility in instructional matters (Glanz and Neville, 1997; Senge *et al.*, 2000). This study supports Borko and Putnam's (1995) study, which suggests teacher empowerment through professional development activities that provide opportunities to acquire richer knowledge of subject matter, pedagogy, and subject-specific pedagogy. Teacher ownership requires positioning teachers as the discretionary curriculum gate-keeper (Thornton, 2001) who could influence principals by shaping the goals and cultures of their schools. Consequently, teachers gained greater legitimacy as leaders (Smylie and Denny, 1990).

Fifth, school leaders must consider sharing instructional leadership. Shared instructional leadership is "an inclusive concept, compatible with competent and empowered teachers" (Marks and Printy, 2003, pp. 374). It involves active collaboration and shared ownership of principal and teachers on curriculum, instruction, and assessment, and has greater relevance than conventional instructional leadership, which is critiqued to be hierarchical and procedural, and dependent on docile followers (Marks and Printy, 2003; Sheppard, 1996).

CONCLUSION

The following conclusions from the study from the findings and discussions are:

Instructional Leadership dimension of professional development was positively associated with people-oriented and task-oriented school culture. However, only people-oriented school culture was in turn positively associated with teacher engagement and job satisfaction. The findings suggest that in general, school leaders can possibly achieve greater teacher outcomes through promoting nurturance and people orientation in the school.

Second, most teachers perceived teaching as a nurturing career with high level of nurturance in the work environment that emphasized people development. Almost all the focus group discussion participants articulated a greater appreciation for intangible resources such as an emphasis on teacher professional development instead of appraisal, openness, trust, and security (having a non-threatening and no blame culture).

Third, the study revealed that to support collaboration among educators, school leaders build collaborative teams within the school, create a positive climate that promotes, and sustain collaborations.

Fourth, many teachers identified peer-learning (collaborative teams) through which teachers normalize open classrooms, lesson observations, reflections and feedback from colleagues as critical to professional learning and innovative curriculum and pedagogy development.

The summary of the findings for the five research questions are represented in Figure 2.

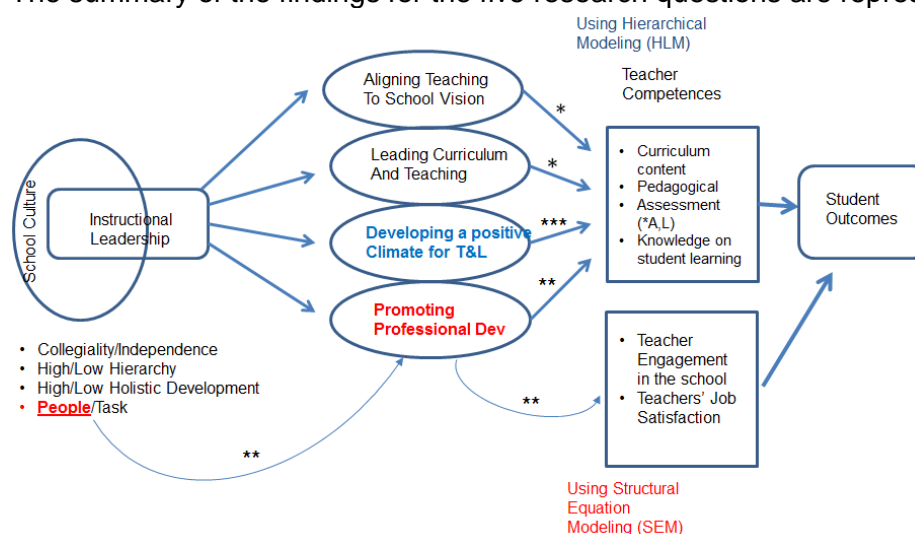


Figure 2: School Culture and Instructional Leadership Relationship Effects on Teacher Competencies and Teacher Outcomes.

Figure 2 shows the extent of the relationships between school culture, instructional leadership and teacher outcomes (teacher competencies, engagement and job satisfaction).

The study also proposes a model of reciprocal principal leadership effects in Figure 1. The figure which shows reciprocal influence of the variables (e.g. principal leadership, school capacity, teacher development, change in instructional practices and student learning), both directly and indirectly, over time (Hallinger and Heck, 2010; Marsh and Craven, 2006).

For the purpose of the study, reciprocal influence in the model can be understood in the following ways: First, the concept of a mutually-influencing system suggests that principal leadership will impact teacher development and vice versa. Second, direct and indirect feedback loops suggest the existence of both direct and indirect effects of principal leadership on teacher development and vice versa. This model accentuates the coexistence of centrifugal (i.e. a top-down approach) and centripetal (i.e. a bottom-up approach) forces in the school and also supports Hallinger and Heck's (2010) proposition of principal leadership as an adaptive process.

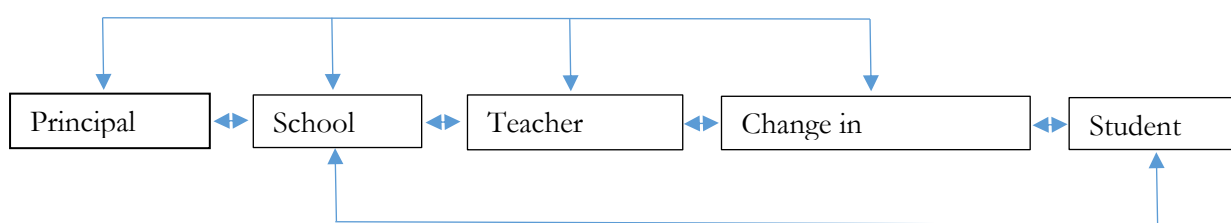


Figure 1: Reciprocal principal leadership effects

Finally, the study acknowledges a limitation pertaining to generalizability. The study took place during a very busy year for all schools in Singapore. In terms of sample size, the number of primary schools that participated in the study is 28 out of 185 primary schools. While it would have been desirable to include more primary schools, the Ministry of Education granted limited access to the primary schools because schools were involved in various national programmes during the research period. Nevertheless, the schools were representatives of the four zones (north, south, east and west) and represented government and government aided schools. Therefore, the study has limitation in claiming generalizability due to the small sample size.