

# **Distributed leadership for integration of information and communication technology (ICT) in schools**

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# What is this study about?

- \* Investigate how distributed leadership is enacted for technology implementation among three Singapore schools.
- \* Examine distributed leadership in these schools using the lens of Luhmann's systems theory

# Why was this study conducted?

- \* Growing interest in technology leadership (Hadjithoma-Garstka, 2011).
  - \* Important factor for effective integration of technology in schools (Anderson & Dexter, 2005)
- \* Current research focuses on school principals as the central figure in leading technology change (Tan, 2010).
- \* Research that discussed technology leadership from a distributed leadership viewpoint has been less informed (Bennett, 2008).

# Theoretical underpinnings



# Theoretical underpinnings

- \* “Heroic” notion of single leader bringing a school to success is deemed problematic (Spillane, 2005), particularly in the face of ICT integration in schools (Gurr, 2004).
- \* More realistic to have a multi-level leadership structure for technology integration (Dexter, 2008; Pulley & Sessa, 2001).
- \* Distributed leadership can be regarded as “a social distribution where the leadership function is stretched over the work of a number of individuals and the task is accomplished through the interaction of multiple leaders” (Spillane, Halverson, & Diamond, 2001, p. 20).

# Theoretical underpinnings

- \* Luhmann's systems theory
- \* A social system undergoes internal differentiation in order to deal with changes in its environment
- \* “only complexity can reduce complexity” (Luhmann, 1995, p. 26)

# 3 forms of differentiation (Luhmann, 1995)

## segmentation Small identical units

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- Differentiates into similar units to fulfill identical functions continually.
- Does not provide new or alternative ways to meet the environment challenges

## stratification Form hierarchies

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- Vertical differentiation according to power and prestige
- Each subsystem works on a particular and distinct function in the system.
- Subunits operate independently; effectiveness limited by its place in the hierarchy.

## functional Form functional subunits that are inter-related

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- Divided into unequal subsystems specialising in different functions.
- Subunits form a complex network; interdependence & communication are essential

# Empirical studies

- \* Yuen, Law, and Wong (2003) found that
  - \* Schools, in advanced stage of ICT integration and strong ICT cultural characteristics, adopted a multiple leadership strategy
  - \* No explanation for why this happened
- \* Tubin (2007) characterized schools implementing ICT initiatives by systems differentiation.
  - \* Brief attempt to associate leadership styles with each form of differentiation
  - \* Focuses on heroic model of leadership



# Research Questions

- \* In what ways are distributed leadership for integration of technology practised in three Singapore schools?
- \* What types of systems differentiation strategy, if any, do the schools adopt for technology integration?

# Methods

- \* Case study
- \* Part of a nationwide 5-year longitudinal study involving annual survey of 110 schools and tracking of development of 12 schools.

	Scale and Complexity of ICT integration
<b>School A</b>	<ul style="list-style-type: none"><li>• An elementary co-ed school</li><li>• A typical Singapore school in terms of ICT integration</li></ul>
<b>School B</b>	<ul style="list-style-type: none"><li>• A Secondary co-ed school</li><li>• LeadICT@School: Recognised for specific ICT projects</li></ul>
<b>School C</b>	<ul style="list-style-type: none"><li>• Secondary Girls' school</li><li>• FutureSchool@Singapore: Recognised for school-wide integration of ICT</li></ul>

# Data Collection - Survey

- \* Survey administered to 7390 students in 2010
  - \* 7 items on the use of ICT for self-directed learning (Cronbach  $\alpha=.843$ ); and
  - \* 5 items on the use of ICT for collaborative learning (Cronbach  $\alpha=.878$ )
  - \* Likert scale of 1 to 6 (1 for “Not at all” and 6 for “All the time”)

# Data Collection & Analysis – Case Study

- \* Interview with Principals and HoD ICT
- \* Focus-group interview with 6-8 teachers
- \* Guided by open-structured questions to invite the participants to comment on the school ICT implementation.
- \* Interviews were audio-recorded and transcribed.
  - \* Analysed and coded the transcripts for sources of leadership distribution and functions.
  - \* Identified possible differences among the three cases and examined these differentiation based on our analytical framework.

# Results

School (# respondents)	Use of ICT for self-directed learning mean scores (std dev)	Use of ICT for collaborative learning mean scores (std dev)
School A (62)	3.34 (1.17)	3.93 (1.29)
School B (68)	3.64 (1.00)	4.10 (1.09)
School C (77)	3.91 (1.13)	4.55 (1.08)
	<ul style="list-style-type: none"><li>• Sig differences, <math>F(2,204)=4.550</math>, <math>p=.012</math></li><li>• School C &gt; School A (<math>p=.008</math>)</li></ul>	<ul style="list-style-type: none"><li>• Sig differences, <math>F(2,204)=5.468</math>, <math>p=.005</math></li><li>• School C &gt; School A (<math>p=.005</math>)</li></ul>

# Findings – School A

- \* HoD ICT was the key driver to communicate ICT goals and initiatives to the teaching staff.
- \* She made decisions about the foci for technology integration, revolving around the types of technology tools to be used.
- \* Basically this year was for them to use interactive whiteboard and then after that it's the Microsoft Excel. And... a refresher of the LMS... these three that I've focused on. Also because I didn't want to focus on too many things. Because no point training on too many things and nothing is being transferred... they don't use it.

# Findings – School A

- \* She introduced several new ICT tools to the teachers
  - \* I shared with them Webspiration collaboration mindmapping tool online... then I told them... let's integrate this into our curriculum... and they started and it blends in well... I see that happening, it's like spreading, it's taking roots now.

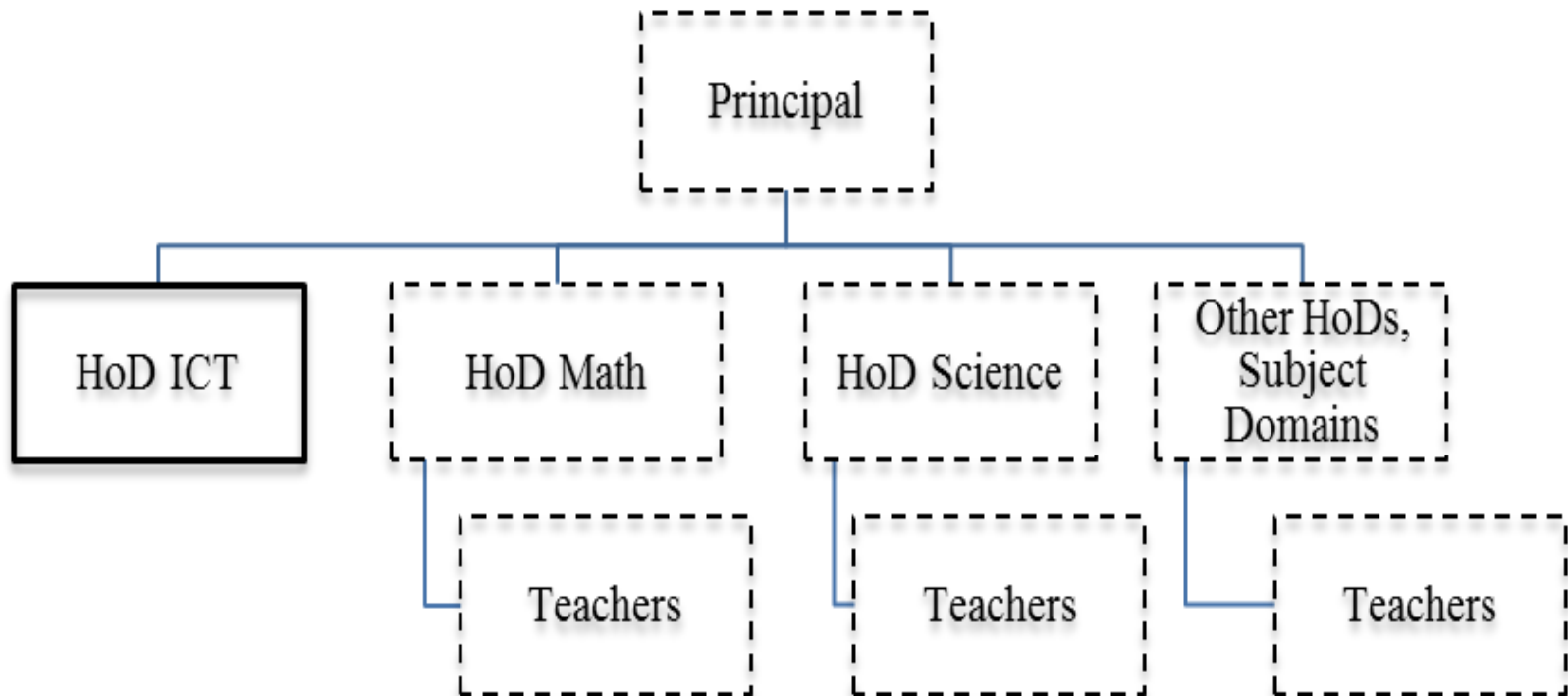
# Findings – School A

- \* The HoD ICT directed the training for her teachers.
  - \* I started up this small team of teachers who do training for the rest of the teachers... for example like... the new system... they call it the... iConnect... each of us take a section. And then we ourselves will train our own staff. So right now it's what we're going to do for the new WES portal, the Vshare portal... we'll learn it, we'll do it in our own class and then we'll share it and train the teachers individually.



# Findings

- \* School A: Top-down leadership



# Findings - School B

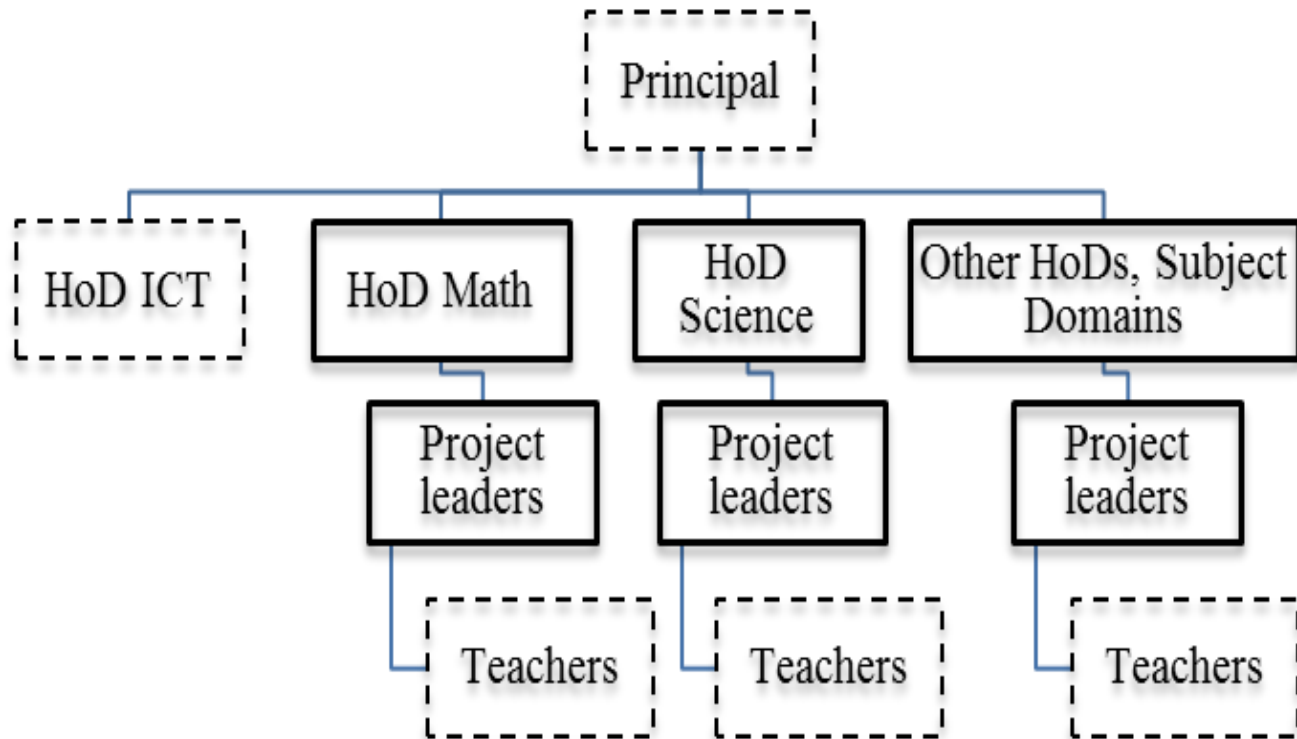
- \* Department-based ICT experimentation as part of a nationwide initiative called “TLLM (Teach-Less Learn-More) Ignite”
- \* Teachers from various departments initiated Action Research projects.

# Findings - School B

- \* The Maths department is involved in this... project. So they are exploring using tablet PCs for learning of graphs. So last year we've already had action research project on... that is one strand.
- \* For the science department... we are using ICT and reflection on the board... Students after every lesson... everyday will reflect... we split them into different groups, one group will reflect and post it up on notice board what they have learnt today, what are some of the things they have thought about, what do they feel about the lesson, is there any questions they want to ask about the lesson that was taught. Another group will do it on the blog. They will just post up their reflections on the blog... and the third group will do the reflective journal with no audience, that means they will just write inside their 'My Reflective Journal' book, and then they will just submit to the teacher. So we are testing for any effects... (Teacher, School B)

# Findings – School B

- \* School B: Segmentation distribution



# Findings – School C

- \* The principal and vice-principals examined the key MOE initiatives or directions and they did the envisioning exercise.
- \* The ICT department has 4 IT directors with different functions: staff development, student development, infrastructure and special projects.
  - \* For ICT plans... it's a combination of... IT plans from... all the different departments... at the same time... I will have all the four different IT directors overseeing things like staff development, student development, infrastructure as well as special projects. Again they would have their own ICT plans, which I will incorporate inside my entire plan. (HoD ICT, School C)

# Findings – School C

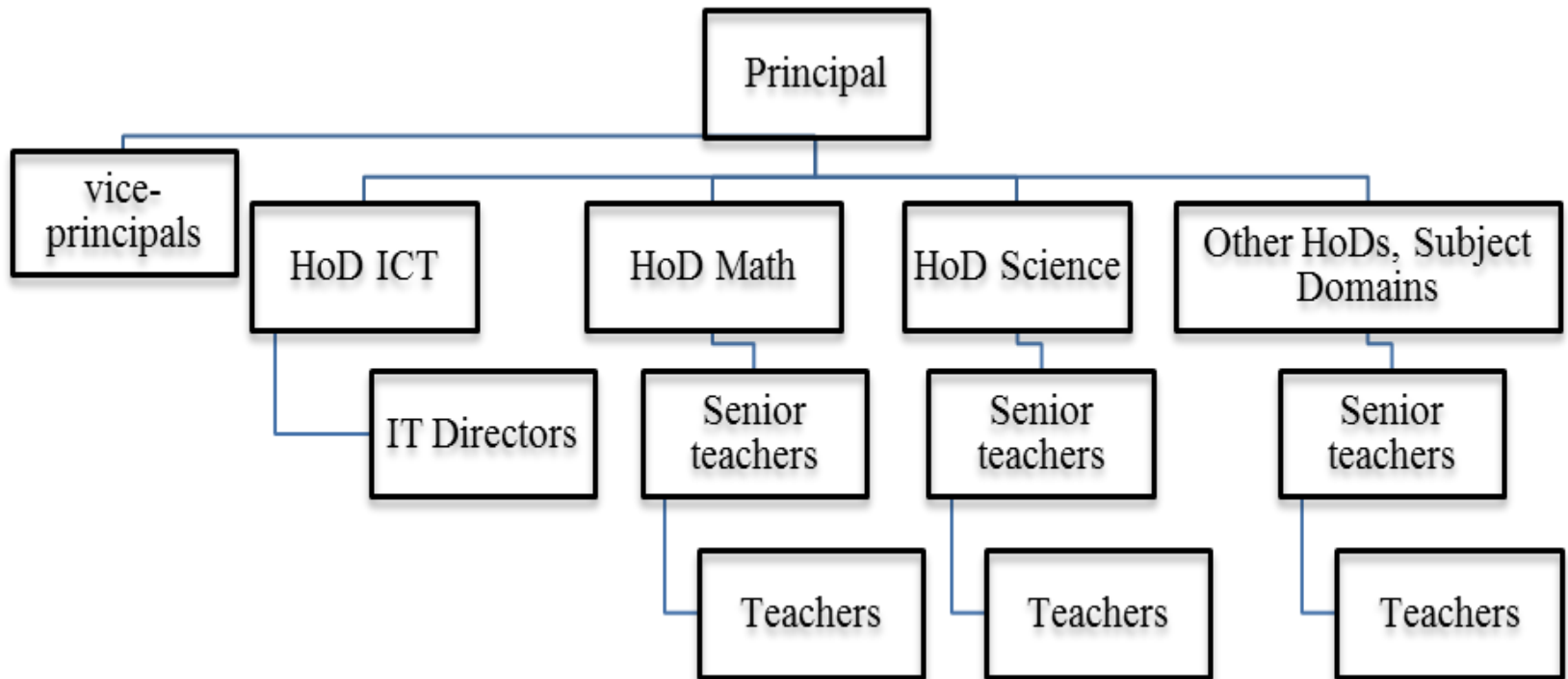
- \* Other Subject Heads of Department provided individual department plans for ICT integration.
- \* Expert teachers such as senior teachers were involved in the planning of key ICT programmes.
- \* A senior teacher... he's being supported by two key departments, the PCCG department and the IT department... we work very closely, the three of us, and in terms of so-called the cyber wellness plan that we've put in place for the school, it's at different levels. For example for the technology side, IT department, we have integrated into our lower secondary computer education programme alright so in Sec 1 and Sec 2, students will be going through computer education programme and a lot of projects it ties in with this cyber wellness.  
(HoD ICT, School C)

# Findings – School C

- \* Teachers had the autonomy to design and implement their own ICT pedagogical practices.
- \* HoD ICT: A “bottom up” approach “where our teachers ranging from our e-coaches to the... staff... they will be the ones who’s coming up with ideas. From there we actually embrace it.”
- \* Every half a year, we have our staff seminar and... we have discussions about how are you using IT, introduce to them new IT tools and we also ask them to share, discuss, plan a lesson together and it is that constant communication, discussion of concerns, bouncing ideas off one another that is making it more ingrained in them, making them realise more possibilities... (P, School C)

# School C

## \* School C: Functional Differentiation





# Summary of Findings

	Scale and Complexity of ICT integration	Distributed leadership	Differentiation Strategy
School A	<ul style="list-style-type: none"> <li>Least successful in achieving technology-related outcomes</li> </ul>	<ul style="list-style-type: none"> <li>Leadership resides mainly in one person (HoD ICT)</li> </ul>	<ul style="list-style-type: none"> <li>Standard leadership configuration</li> </ul>
School B	<ul style="list-style-type: none"> <li>LeadICT@School</li> <li>Recognition for experimentation of specific ICT projects</li> </ul>	<ul style="list-style-type: none"> <li>Distributed at two levels</li> <li>HoDs Subject domains + Project leaders</li> </ul>	<ul style="list-style-type: none"> <li>Segmentation differentiation, Identical and independent subunits with similar functions</li> </ul>
School C	<ul style="list-style-type: none"> <li>FutureSchool@Singapore</li> <li>School-wide integration</li> <li>Most successful</li> </ul>	<ul style="list-style-type: none"> <li>Distributed at more than three levels</li> <li>Whole-school approach</li> </ul>	<ul style="list-style-type: none"> <li>Functional differentiation,</li> <li>Unequal subunits with different and specialised functions</li> </ul>

# Discussions

- \* Tubin (2007) focused on explaining the relationship between school's communication and the differentiation strategy.
- \* Attempt to associate individual leadership style (heroic model) and the type of differentiation
- \* This study examined distributed leadership
- \* School principals were not the (only) leader in ICT integration

# Discussions

- \* Yuen, Law, and Wong (2003) found school culture and stage of ICT integration related to distributed leadership practice
- \* Similar finding, the school with best IT integration outcomes also practised distributed leadership
- \* Further characterisation and explanation in terms of system theory

# Our preliminary explanation

- \* A school that engages in holistic and school-wide ICT integration is likely to encounter complex changes.
  - \* Trigger reaction mechanism that is systemic in nature.
  - \* Form new units that are more focused in their functions
  - \* Generate a need to coordinate these functional units
  - \* A inter-dependency among the units.
- \* Complexity prevents a leader from providing direction and supervising at the level of functionally different sub-units
  - \* Higher degree of empowerment at sub-level
  - \* Distributed leadership

# Future Studies

- \* Probe deeper into how sub-units communicate and work with one another
- \* Examine the outcome of inter-dependency among the sub-units

# Implications - practitioners

- \* For school-wide implementation, strategize for systems differentiation and how sub-units could communicate with one another
- \* Sensitized to different systems differentiation strategies and the strengths and limitations of each approach.

# Implications - researchers

- \* Unit of analysis
- \* Foci of investigation – in addition to outcomes, the processes, including communications among leaders
- \* Systems theory as a theoretical lens to examine leadership enactment