

## **Understanding the Role of a Head of Department of Information and Communication Technology in Singapore**

**Loke Heng Wang**

National Institute of Education, Nanyang Technological University, Singapore

### **Abstract**

The Head of Department (HOD) of Information and Communication Technology (ICT) plays a significant role in the ICT implementation in school. Although the roles assigned to HOD ICT are generally known, it is essential to know how such roles are carried out in practice. This study investigates the roles of a HOD ICT in a primary school in Singapore. Using a case study approach, the research employed the face-to-face interview method to explore the participant's experiences. It is found that the HOD ICT wore many hats and played multiple roles – planner, curriculum leader, and manager. Contrary to literature, the technician role was not assumed by the HOD ICT in this study. This research also identifies some challenges faced by HOD ICT in implementing ICT in school.

**Keywords:** HOD ICT, roles, primary school, Singapore

**\* Corresponding author.**

[lokeheng.wang@nie.edu.sg](mailto:lokeheng.wang@nie.edu.sg)

## INTRODUCTION AND PROBLEM

During the past two decades, there has been an increasing interest in and attention to the use of ICT in education. The emergence of the knowledge economy has also brought education systems around the world to implement master plans on ICT in education (Pelgrum & Anderson, 1999; Yuen, Law, & Wong, 2003). In Singapore, the Ministry of Education has implemented three master plans for ICT in Education spanning from 1997 to 2014. These master plans focused on developing collaborative, problem-solving, and thinking skills through the use of technology and constructivist pedagogy (Teo & Ting, 2010). These master plans entailed large spending on physical and human resources in Singaporean schools that revealed the importance placed by the Singapore's Ministry of Education to prepare students for the knowledge economy. Such prominence demanded schools to effectively organize and manage these resources and to strategically plan for future developments. Traditionally these responsibilities were placed in the hands of the ICT coordinator (Strudler & Herrington, 2008). Earlier studies (Drury, 1995; McKenna, Brady, Bates, Brick, & Drury, 1993) noted that the role of the ICT coordinator was seen primarily technical in nature, with the responsibility for maintaining equipment. In recent studies, the ICT coordinator continues to function dominantly in the role of technician (Devolder, Vanderlinde, van Braak, & Tondeur, 2010; McGarr & McDonagh, 2013). Other roles include ICT coordinators as a policy maker (Marcovitz, 2000), leader (Lai & Pratt, 2004), and change agent (Strudler, 1994). In Singapore, ICT coordinators are, in most cases, formal positions given the title HOD ICT. The terms 'ICT coordinator' and 'HOD ICT' are used interchangeably in this article. At present little is known about the roles and duties of HOD ICT in Singapore. This study focuses on investigating the role of a HOD ICT in Singapore and examining her responsibilities. It also explores the demands she faces with in carrying out her role. This case study helps to build understanding of how a HOD ICT functions. It collects data from a face-to-face interview with the HOD ICT.

The study aims to answer two key research questions:

- (1) What is the current role of a HOD ICT in a primary school in Singapore?
- (2) What are the factors that impinge on the role of the HOD ICT?

## LITERATURE REVIEW

The roles of an ICT coordinator can be classified by four main categories. Firstly, the role of an ICT coordinator is primarily technical in nature. It includes dealing with 'nuts and bolts' activities such as repairing equipment, ordering, and installing software and hardware (British Educational Communications and Technology Agency, 2002; Lobos, 2008; Marcovitz, 1998, 2000), and managing the school network and website (Lai & Pratt, 2004). More recently, similar conclusions are drawn on that ICT coordinators still function dominantly in the role of technician (Devolder, Vanderlinde, van Braak, & Tondeur, 2010; McGarr & McDonagh, 2013). Elsewhere in Australia and Hong Kong, ICT coordinators are frequently treated as technical support staff (Skues & Cunningham, 2013; Yuen & Lee 2000). Such a focus on technical support makes the role of ICT coordinator less appealing. McGarr and McDonagh (2013) argued that an ICT coordinator is not a sought-after position. Technical support is a major obstacle that reduces the effectiveness of ICT coordinators and ICT implementation in school (Lai, Trewern, & Pratt, 2002; Rodríguez-Miranda, Pozuelos-Estrada, & León-Jariego, 2014).

Secondly, ICT coordinators support teachers in teaching and learning, and train them in the area of ICT and its use in the classroom. Marcovitz (1998, 2000) reported that ICT coordinators support other teachers' use of ICT and highlighted their great importance in providing 'support by walking around' to respond to the immediate needs of the teachers. In a similar vein, ICT coordinators guide ICT teaching and learning in school (Hancock, 1990; Lucock & Underwood, 2001). This resonates with Reilly (1999) who maintained that ICT coordinators should be curriculum leaders. To further help teachers in teaching and learning, Lim (2007) recommended that schools develop a framework where

the HOD ICT could work collaboratively with teachers to design ICT-mediated lessons, and share ICT resources and lesson plans. Despite the prominence of ICT coordinators playing a reassuring role, Somekh, Barnes, Triggs, Sutherland, Passey, Holtand et al. (2001) contended that this area usually receives little attention as these coordinators are needed to provide technical support. There has been a call for more pedagogical support for ICT coordinators to coordinate and support the adoption of ICT (Lim, 2007; Lim & Khine, 2006; Moallem, Mory,&Rizzo, 1996; Tondeur, van Keer, van Braak, &Valcke, 2008).

Besides supporting teachers in teaching and learning, ICT coordinators also deliver training to other teachers (British Educational Communications and Technology Agency, 2002; Marcovitz, 1998, 2000). A study done in Singapore by Lim & Khine (2006) found that schools employ the buddy system where experienced teachers are paired off with beginning teachers to help them integrate ICT into the lessons meaningfully .However, according to Lai and Pratt (2004), ICT coordinators spend the least time on ‘leading professional development’, including giving courses (e.g., skills related training courses) and performing helpdesk functions (e.g., helping the staff during and after school).

Thirdly, ICT coordinators are seen as leaders. In the United Kingdom, ICT coordinators in school are regarded as leaders. In any successful school, “it is almost exclusively due to the strong leadership of the head teacher and ICT coordinator” (OFSETD 2002, para 13). In a study in the United States, Ronnkvist, Dexter & Anderson (2000) also suggested that technology coordinators should have leadership and administrative capacities.

The role of an ICT coordinator includes establishing and articulating vision (Frazier and Bailey, 2004; Wisconsin Department of Instruction, n.d.). Sugar and Holloman (2009) affirmed that as leaders within a school setting, the technology coordinators need to get buy-in and support from school administrators that are crucial in elevating those technology coordinators to school leadership roles. The researchers claimed that technology coordinators need to seek out ways to advance and support the school’s vision.

Lastly, ICT coordinators are planners. Marcovitz (1998) described the role of an ICT coordinator as a ‘policy maker’ who plans the use of ICT at the school level. More recently, Vanderlinde, van Braak and Hermans (2009) contended that the role as a planner could contribute to educational change, because the tasks create opportunities for the ICT coordinator to act as a facilitator of change. However, such a planner role is not frequently assumed by ICT coordinators compared with the technical role (Devolder, Vanderlinde, van Braak, & Tondeur, 2010).

Several studies included budgetary and resource allocation as part of the planning role of ICT coordinators. Devolder, Vanderlinde, van Braak and Tondeur (2010) defined the role of budgeter as “the expending and administering of an ICT budget in function of the development and optimization of ICT integration in the school” (p. 1654). Lai and Pratt (2004) argued that the coordinators are responsible for purchasing hardware, software, and engage in software selection and evaluation.

Over the years, ICT coordinators have played many diverse roles. Their roles evolved with times. However, how such roles are perceived and carried out in practice by HOD ICT in the Singapore context has received little concern. Given the lack of research into the roles of ICT coordinator in a primary school setting, there is a clear need for more exploration in this area.

## **METHOD**

This research employed a case study design using face-to-face interview to explore the views of a HOD ICT. The case study approach was adopted as an empirical inquiry that investigates a contemporary phenomenon within its real-life context (Yin, 1994 & 2002). The study allowed the development of holistic ‘thick description’ (Geertz, 1973), thereby extending the understanding of how the HOD ICT interpreted her experience and what happened to her.

In selecting the participant, the strategy chosen was based on the concept of purposeful sampling, with the aim ‘to maximize information, not facilitate generalization (Lincoln & Guba, 1985, p.202). The advantage of selecting one participant was that the author is able to conduct an in-depth interview

for data collection. The participant chosen for this study, Alice (pseudonym), was selected based on reports of her leadership in high level ICT integration into school programmes.

The HOD ICT, Alice, female, age 35, had 10 years of teaching experience in a primary school in the Western part of Singapore. She had been the HOD ICT in the school for 2.5 years. As a middle level leader, she attended a 4-month formal training to expand her roles beyond her department and to take on direct leadership for teaching and learning, specifically in the area of ICT for the school.

In line with the research questions, the interview questions were developed to explore 2 key areas, namely (1) Key duties and responsibilities, and (2) Key challenges. The interview questions included what the HOD ICT did when she took on the new role, what her typical day was like and what the challenges were to her. These questions were explored to provide a comprehensive picture of her current duties and to reveal factors that impacted her roles. The semi-structured interview was conducted by the author. The interview was audio-recorded with permission and later transcribed verbatim.

The transcribed interview was subject to thematic analysis to the 2 key research questions guiding the study. Thematic analysis is ‘a method for identifying, analysing, and reporting patterns within data’ (Braun & Clarke, 2006, p.79). The transcript was read repeatedly before the extracts were organized into meaningful categories. These extracts were then initially coded by patterns and potential themes. The results of the thematic analysis identified 3 broad themes on the roles and 3 broad themes on the challenges that are described in the Findings section.

## **FINDINGS**

### **Role of the HOD ICT**

#### *As a planner*

The HOD ICT, Alice, had great influence over planning and formulating plans for the school. When she took on this new position in 2011, she reviewed the school existing plans with her colleagues. Alice commented:

*My role then was to review the school plans to be aligned to the school vision and the ministry’s directions. The plan was reviewed and refined collaboratively with teachers and other Heads of Department where we scan the external and internal environment so as to stay relevant especially when technology is fast evolving and to align with the ministry’s ICT goals.*

#### *As a curriculum leader*

Alice viewed herself as a curriculum leader, like the other HODs in charge of English, Mathematics, and Science. She added that she had to take a wide range of activities as she had to look into infusing ICT into all subject areas while the other HODs had to look into solely one subject area. Hence, Alice’s work included working with other HODs to integrate ICT into the curriculum.

The HOD ICT regarded herself to be developing and providing the teachers with the necessary pedagogical support. Alice established a platform where the teachers were given time during the curriculum to redesign lessons to harness ICT. Alice noted:

*To equip teachers, I conducted training to develop our teachers’ competencies in redesigning their current lesson to one that infuses ICT to better their teaching and learning.*

To handhold teachers in designing ICT-enriched lessons, the school launched an ICT mentorship scheme where a few ICT mentors were identified to drive the implementation of ICT. These ICT mentors helped to level up the capacity of other teachers to develop quality ICT-enabled lessons.

Various structures were put in place by Alice to ensure effective implementation of the ICT plans. Physical infrastructure was enhanced to support teaching and learning. She worked with the IT consultant from the Ministry of Education to set up a reliable wireless network. In addition, Alice initiated a project of installing four computers in every classroom to increase pupils' usage and provided opportunities for those without computers at home to have access to them.

#### *As a Manager*

Alice also managed financial resources. She developed, implemented, and reviewed a budget plan to allocate financial resources to maintain and improve ICT resources. She indicated that her funds to run ICT-related processes and programmes in the school mainly came from the Ministry of Education. She had to monitor the optimal use of funds to the purchase of hardware, software, and payroll of the Technical Assistant and IT trainer. As part of her duty, she had to look into verifying and settling bills to the external agency as the computers and laptops in the school were on a lease basis.

Besides managing financial resources, the HOD ICT indicated that she had to work collaboratively with the Technical Assistant and IT trainer to ensure that the school ICT programmes ran smoothly. She added that the Ministry of Education provided two positions to schools to support in the ICT implementation. The main job of the Technical Assistant was to assist the HOD ICT in handling, managing, and maintaining computer hardware and software, and providing technical support. On a typical day, the Technical Assistant would approach Alice to discuss hardware matters such as faulty projectors and computers that required approval for repair. Additionally, the Technical Assistant would provide technical assistance to teachers and students.

Alice was pleased that the Ministry of Education supported all schools with an IT trainer. The IT trainer's job was to teach students ICT knowledge, skills, and values that were spelt out in the ministry's baseline ICT standards. The trainer scheduled classes to the computer laboratory where she taught specific knowledge, skills, and values. Reflecting on the role of the IT trainer, Alice noted:

This makes the work easier for teachers as they do not need teach the IT skills and their focus should be on tapping on the ICT skills which pupils have learnt to teach concepts. Teachers can therefore focus on teaching the curriculum through the use of technology.

### **CHALLENGES TO EFFECTIVE LEADERSHIP**

This study found that the HOD ICT faced some obstacles that had impinged on her effectiveness in carrying her role in the school.

#### **Workload issues**

As a HOD ICT, Alice was responsible for teaching duties, managing resources, and other ICT non-related administrative duties. The following comments illustrated her challenging role:

*I have to teach and attend to pupils' social emotional issues like any other teachers and HOD. When the Technical Assistant has problems relating to hardware matters, we would usually discuss face to face and even through group chat. IT Trainer would also approach me when she has problems scheduling classes to attend ICT Baseline standards lesson... She would also inform me the difficulties pupils face when she conducts lessons.*

With regard to the administrative duties, Alice shared that she had to plan relief schedules for the teachers who were absent for school. As a daily routine, she would sometimes spend as long as an hour on it if there were many absentees.

On top of that, her situation was worsened when she did not have any departmental members to work directly with in carrying out the ICT plans. Although the school had ICT mentors, they belonged to the English, Mathematics, Science, and Mother Tongue departments. She added that it made work slightly more difficult for her.

### **Priority issues**

The school-wide integration of ICT into the curriculum was progressing slowly due to the beliefs held by some teachers on the importance of incorporating ICT into their lessons. Alice pointed out that teachers had a mindset of wanting to complete the syllabus for English, Mathematics, Science, and Mother Tongue – subjects which were examinable. Alice lamented:

*Integrating ICT into the curriculum does not take the front seat especially so when national highstake examination is of great importance. Teachers often don't see it as a priority to integrate ICT into their lessons, although they see its relevance. It is something that they can wait. Trying to move the school in this aspect can sometimes demotivate one.*

### **The need to further improve on infrastructure**

Alice was thankful for the physical infrastructure support given by the ministry. However, she believed that the current infrastructure could be further improved to better support teaching and learning. Alice explained the need to improve on the physical infrastructure:

*I would think that a hassle-free classroom installed with all the necessary technology would encourage teachers to integrate ICT into their daily teaching. For example, a response system could be installed in each class for teachers could get immediate feedback from pupils on their learning. This is one of the effective strategies for Assessment for Learning.*

The HOD ICT acknowledged the merits of the ICT baseline standards developed by the ministry. However, she lamented that she found it difficult to incorporate ICT baseline standards lesson into the formal curriculum as no curriculum time was set aside purely to teach ICT skills. Often, she had to use the curriculum time of other subjects to teach the ICT baseline standards lessons to the pupils.

Alice described her dilemma:

*There is a wide gap between reality and desired outcomes...Although I tried my best to integrate the baseline standards lesson into the curriculum, I find it challenging as I had to 'borrow' periods from teachers. It is pertinent that the pupils are taught the ICT skills so that teachers could build on them to further tap on technology to enhance pupils' competencies and learning.*

## **DISCUSSION**

This study aimed to identify the role assumed by the HOD ICT in a primary school and to explore the factors that impinged on the role of the HOD ICT. These findings add to the current literature on the roles of HOD ICT in three different respects.

Firstly, this study highlighted that the HOD ICT played multiple roles: planner, curriculum leader, and manager. The role of a planner is consistent with the view that an ICT coordinator plans, develop,

facilitate, and monitor the ICT vision and ICT policy (Lai, Trewern & Prattt, 2002; Rodríguez-Miranda, Pozuelos-Estrada, & León-Jariego, 2014; Sugar & Holloman, 2009). This is further supported by Vanderlinde, van Braak, and Hermans (2009) who argued that the role of planner could contribute to educational change as the tasks performed by ICT coordinators will create opportunities for them to act as facilitators of change. Yet, the findings in Devolder, Vanderlinde, van Braak, and Tondeur (2010) showed that a planner role is not frequently assumed by ICT coordinators compared with the technical role.

A curriculum leader takes on more functions that include providing leadership not only in the area of ICT to ensure high quality teaching and learning, but also in providing curriculum support to teachers, and facilitating and enhancing the professional development of staff to implement ICT in the classroom. As reported in this study, the HOD ICT collaborated as a team with other HODs to establish and achieve school targets for the effective use of ICT in learning and teaching. The HOD ICT in this study also supported the teachers in implementing of ICT in the classroom and spearheaded in planning, organizing, and conducting training for teachers. This concurs with Devolder, Vanderlinde, van Braak, and Tondeur (2010) who defined such role as an educationalist.

Contrary to studies that highlighted the need for greater pedagogical leadership in school in terms of ICT (e.g. Lobos, 2008), this study found that the HOD ICT saw herself as a curriculum leader, interested in, and keen on working with the department heads of other disciplines to implement ICT use in the school. In addition, she was also enthusiastic about enhancing the teachers' capacity and competencies in the use of ICT in their lessons.

As a manager, the HOD ICT in this study handled financial and human resources. As a budgeter, she had to take charge of the ICT budget to optimize ICT integration in the school. This is compatible with the role identified by Devolder, Vanderlinde, van Braak, and Tondeur (2010) and Rodríguez-Miranda, Pozuelos-Estrada, and León-Jariego (2014). Alice was involved in managing and working with the two IT personnel to achieve ICT and school goals. She worked hand in hand with the full-time Technical Assistant to provide the school's overall technical support. To ensure that specific knowledge and skills were taught to pupils, the HOD ICT also worked with the IT trainer to plan for the whole school approach to be in line with the ministry's baseline ICT standards. Contrary to previous studies where the teaching of ICT skills was mainly in the hands of teachers or ICT coordinators, this study found that such a role was taken over by a full-time expert employed and stationed in the school.

Secondly, differing from several studies in which ICT coordinators were found to function dominantly in the role of technician (Devolder, Vanderlinde, van Braak, & Tondeur, 2010; Lai, Trewern, & Prattt, 2002; Lobos, 2008; McGarr & McDonagh, 2013; Rodríguez-Miranda, Pozuelos-Estrada, & León-Jariego, 2014; Sugar & Holloman, 2009), the HOD ICT in this study did not behave that way. In the Singapore context, technical problem-solving and other technical support lied with the full-time Technical Assistant employed by the school. The role of the HOD ICT was to work together with the Technical Assistant in providing technical support for the teachers and students. Appointing an expert in managing hardware and software, and providing the necessary technical support, permitted the HOD ICT to pay attention to her other roles and responsibilities. As reported by Lai, Trewern, and Pratt (2002), some schools had difficulties in hiring a technical support person with the required skills. McGarr and McDonagh (2013) supported the need for having technical support which could substantially change a role of ICT coordinator to the one where integrating technologies with teaching and learning becomes the core work of the ICT coordinator.

Thirdly, the findings of this study highlighted that the position of a HOD ICT could be challenging. The HOD ICT currently faced workload issues that concurred with the previous findings that ICT coordinators dedicated a lot of time in performing multiple roles (Devolder, Vanderlinde, van Braak, & Tondeur, 2010; Lai & Pratt, 2004; Lai, Trewern, & Pratt, 2002; McGarr & McDonagh, 2013; Somekh et al, 2001; Sugar & Holloman, 2009). Despite numerous roles that the ICT coordinators had to undertake, the HOD ICT in this study, just like their counterparts reported in research literature, performed teaching duties and administrative work (Lai, Trewern & Pratt, 2002;

McGarr & McDonagh, 2013). The heavy workload faced with by the ICT coordinators could impede their role in effective leadership.

## CONCLUSION

This study examined the roles of a HOD ICT in Singapore. The data collected found that in reality, the HOD ICT wore many hats and had to play multiple roles – planner, curriculum leader, and manager. Although her job was complex and demanding, the HOD ICT was enthusiastic about ICT use and showed a remarkable level of dedication in leading the school to integrate ICT into the curriculum. Contrary to literature, there was much to suggest that the technician role was not assumed by the HOD ICT in this study. This left the HOD ICT to dedicate her time to provide curriculum leadership and to steer the direction of ICT use in the school.

The findings in this study have significant implications for the school and a wider context for the Ministry of Education. If the challenges and demands of the HOD ICT are not taken truly, much of the resources that have already been put into hardware, software, infrastructure, and training, will not be fully capitalized upon. This can mean massive educational wastage of financial, physical, and human resources invested by the Ministry of Education. To lessen this impact, at the school level, much can be done at the school leadership level to potentially look into restructuring or relooking into the current school system to provide more support to the HOD ICT and develop a more clearly defined role for it.

## REFERENCES

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- British Educational Communications and Technology Agency. (2002). *Foundation Stage Education and ICT*. Coventry: Author.
- Devolder, A., Vanderlinde, J., van Braak, R., & Tondeur, J. (2010). Identifying multiple roles of ICT coordinators. *Computers & Education*, 55(4), 1651–1655.
- Drury, C. (1995). *Implementing change in education: The integration of information technology into Irish post-primary schools* (Unpublished master's thesis). University of Leicester, UK:
- Erickson, P.I., & Kaplan, Frazier, M., & Bailey, G. D. (2004). *The technology coordinator's handbook*. Eugene, OR: International Society for Technology in Education.
- Geertz, C. (1973). Thick description: Towards an interpretive theory of culture. In C. Geertz (Ed.), *The interpretation of cultures* (pp. 3-30). New York: Basic Books.
- Hancock, V.E. (1990, March). *Promoting secondary school computer use? A coordinator is the key*. Paper presented at the meeting of the International Conference on Technology and Education, Brussels, Belgium. Available from: <http://www.eric.ed.gov/PDFS/ED327143.pdf>
- Lai, K. W., & Pratt, K. (2004). Information and communication technology (ICT) in secondary schools: The roles of the computer coordinator. *British Journal of Educational Technology*, 35(4), 461–475.
- Lai, K.W., Trewern, A., & Pratt, K. (2002). Computer coordinator as change agents: Some New Zealand observations. *Journal of Technology and Teacher Education*, 10(4), 539–551.
- Lim, C. P. (2007). Effective integration of ICT in Singapore schools: Pedagogical and policy implications. *Educational Technology Research and Development*, 55(1), 83-116.
- Lim, C. P., & Khine, M. (2006). Managing teachers' barriers to ICT integration in Singapore schools. *Journal of Technology and Teacher Education*, 14(1), 97-125.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Beverly Hills, CA: Sage.
- Lobos, M. (2008, July). *The coordinator's dilemma: Between an electronic janitor and a pedagogical*

- leader*. Online submission, Paper presented at the Ninth Encuentro Internacional Educa, Zaragoza, Spain.
- Lucock, S., & Underwood, G. (2001). *The role of the ICT coordinator*. London: pfp publishing limited. Retrieved May 8, 2006, from <http://www.pfp-publishing.com/pdf/ict-co.pdf>
- Marcovitz, D. (1998, March). *Supporting technology in schools: The roles of computer coordinators. Technology and Teacher Education Annual*. Paper presented at the meeting of the Society for Information Technology and Teacher Education Conference, Washington, D.C., pp. 1041–1045. Available from: <http://www.loyola.edu/edudept/facstaff/marcovitz/MarcovitzSITE98.pdf>.
- Marcovitz, D. (2000). The roles of computer coordinators in supporting technology in schools. *Journal of Technology and Teacher Education*, 8(3), 259–273.
- McGarr, O., & McDonagh, A. (2013) Examining the role of the ICT coordinator in Irish post-primary schools. *Technology, Pedagogy and Education*, 22(2), 267-282.
- McKenna, P., Brady, M., Bates, P., Brick, J., & Drury, C. (1993). *New information technology in the Irish school system*. Luxembourg: Office for Official Publications (EC).
- Moallem, M., Mory, E., & Rizzo, S. (1996). *Technology resource teachers: Is this a new role for instructional technologist?* (ERIC Document Reproduction Service No. ED397 823).
- OFSTED. (2002, June). *ICT in schools: Effect of government initiatives: Implementation in primary schools and effect on literacy*. Office for Standards in Education: London, UK.
- Pelgrum, W. J., & Anderson, R. E. (Eds). (1999). *ICT and the emerging paradigm for lifelong learning: A worldwide educational assessment of infrastructure, goals and practices*. International Association for the Evaluation of Educational Achievement.
- Reilly, R. (1999). The technology coordinator: Curriculum leader or electronic janitor? *MultiMedia School Magazine*, 6(3), 38–41.
- Rodriguez-Miranda, F. P., Pozuelos-Estra, F. J., & Leon-Jariego, J. C. (2014). The role of ICT coordinator: Priority and time dedicated to professional functions. *Computers & Education*, 72, 262-270.
- Ronkvist, A. M., Dexter, S. L., & Anderson, R. E. (2000). *Technology support: Its depth, breadth, and impact in America's schools*. Teaching, Learning and Computing: 1998 National Survey, Report #5. Center for Research on Information Technology and Organizations, University of California, Irvine and University of Minnesota, USA. Retrieved 5 March 2007, from [http://www.crito.uci.edu/tlc/findings/technology-support/report\\_5.pdf](http://www.crito.uci.edu/tlc/findings/technology-support/report_5.pdf).
- Skues, J. L., & Cunningham, E. G. (2013). The role of e-learning coaches in Australian secondary schools. *Journal of Computer Assisted Learning*, 29(2), 179–187.
- Somekh, B., Barnes, S., Triggs, P., Sutherland, R., Passey, D., Holt, H., et al. (2001). *NGfL pathfinders: Preliminary report on the roll-out of the NGfL programme in ten pathfinder LEAs*. Coventry: British Educational Communications and Technology Agency.
- Strudler, N. B. (1994). *The role of school-based technology coordinators as change agents in elementary school programs: A follow-up study* (ERIC Document Reproduction Service No. ED381 139).
- Strudler, N. B., & Herrington, D. (2008). Quality support for ICT in schools. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* (pp. 579–596). New York, NY: Springer.
- Sugar, W., & Holloman, H. (2009). Technology leaders wanted: Acknowledging the leadership role of technology coordinator. *Techtrends*, 53(6), 66-74.
- Tondeur, J., van Keer, H., van Braak, J., & Valcke, M. (2008). ICT integration in the classroom: Challenging the potential of a school policy. *Computers & Education*, 51(1), 212–223.
- Teo, Y. H., & Ting, B. H. (2010). Singapore Education ICT Masterplans (1997-2014). In C. S. Chai & Q. Wang (Eds.), *ICT for self-directed and collaborative learning* (pp. 2-14). Singapore: Pearson.
- Vanderlinde, R., van Braak, J., & Hermans, R. (2009). Educational technology on a turning point: Curriculum implementation in Flanders and challenges for schools. *Educational Technology*

- Research and Development*, 57(4), 573–584.
- Wisconsin Department of Instruction (n. d.). *Teacher education program approval and licenses*. Retrieved February 3, 2009, from <http://dpi.wi.gov/tepd/pe34.html>
- Yin, R. K. (1994). *Case study research: Design and methods* (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.
- Yin, R. K. (2002). *Case study research: Design and methods* (3<sup>rd</sup> ed.). Newbury Park, CA: Sage.
- Yuen, H. K., & Lee, Y. (2000). Technology adoption model. In N. Law et al. (Eds), *Changing classrooms and changing schools: A study of good practices in using ICT in Hong Kong schools* (pp. 125-138). Hong Kong: University of Hong Kong.
- Yuen, H. K., Law, N., & Wong, K.C. (2003). ICT implementation and school leadership. *Journal of Educational Administration*, 41(2), 158-170.

## **BIODATA**

**Dr Wang Loke Heng** is currently working at the Learning Sciences and Technologies Academic Group at the Nanyang Technological University (NTU), National Institute of Education (NIE), Singapore. He received his BA and MEd from the university and PhD from the University of Melbourne, Australia.