IT in Education e-Leadership Series: Findings on the case study re: Impact of e-learning in schools cum sharing of good school practice

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Outline

- Conceptual framework of the three-year case study
- Instrument deployed for the research
- New learning and teaching changes brought by e-learning
- Data analysis
- Success factors and good school practice for the development of e-learning
- Challenges
- Recommendations
- Conclusion

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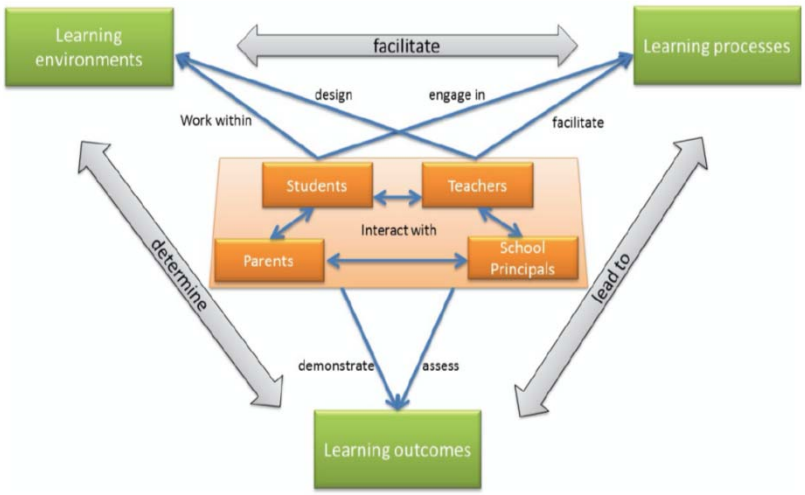
Conceptual framework of the research



Source: The LEPO model (Adapted from Phillips, McNaught and Kennedy 2011 with modifications)

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Research instrument deployed

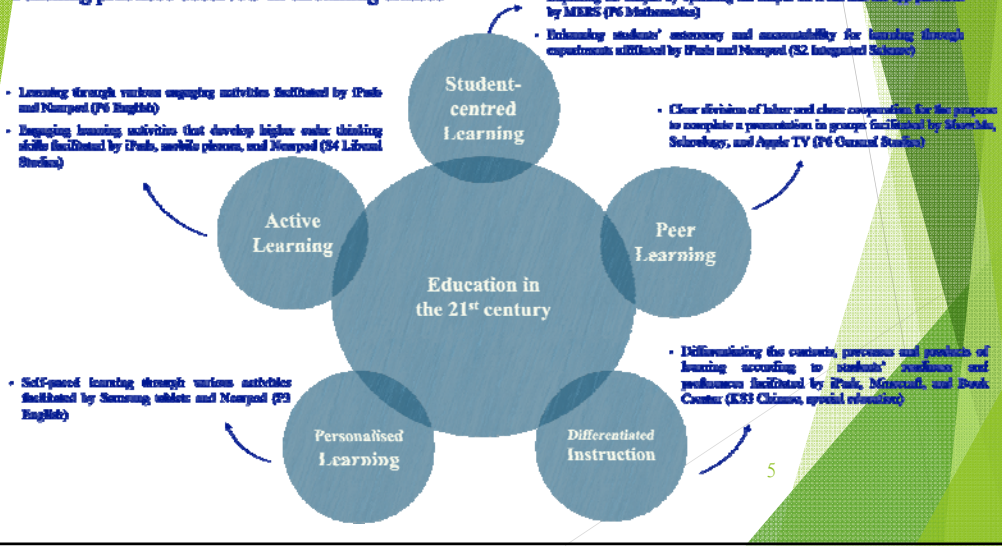
Year	Instrument	Focus
1	• School visits • Focus groups • Interviews • Class observations	• Generating an overall understanding of the 14 case schools in terms of their LE, LP and LO
2	• School visits • Focus groups • Interviews • Class observations • Surveys (with school management, teachers and parents) • Student worksheets • Specific studies on students' test scores and examination results	• Investigating success factors for practising e-learning in schools • Analysing strategies to enhance the process of learning and teaching and yield in good learning outcomes • Looking for more evidence explaining the impact/changes of LO brought by e-learning
3	• School visits • Focus groups • Class observations • Surveys (with school management and teachers) • Student worksheets • Checklists on schools' usage of e-resources and e-textbooks, if applicable	• Keeping track of the changes from various LE aspects • Looking for more evidence to examine the impact/changes of LP and LO

New learning and teaching changes brought by e-learning

1. Golden opportunity to rethink pedagogy

References: Bonwell, C. C., & Eison, J. A. 1991; Dewey, J. 1924; ONeil and McMahon 2005; Topping 2005; Lu 2004 ; Tomlinson 1999

Teaching practices observed in eLearning classes



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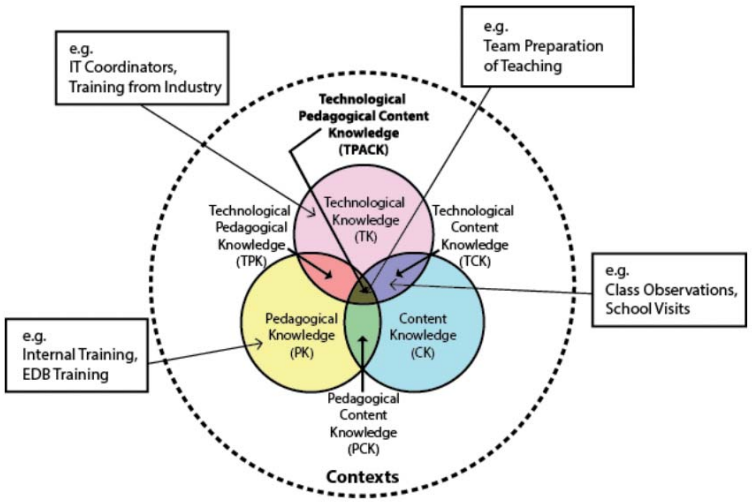
2. New professional training needs for teachers



The TPACK model (Adapted from TPACK © 2012 by tpack.org)

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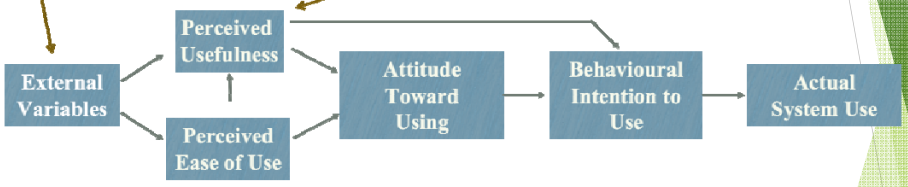
3. School management practices to enhance teachers' acceptance

Reference: Davis, F. D. 1986

Schools' practices affecting eLearning acceptance

- *Consistent goals*
- *Even better infrastructure, devices, and applications*
- *Revised modes of implementation & refined organization and allocation of resources*
- *Smarter utilization of eResources*
- *Diversified teaching demonstrations & showcases*



- *More consolidated tactics for professional training and support*
- *More systematic adoption of teaching and learning management systems*
- *ePortfolio*
- *Seeking partnerships*

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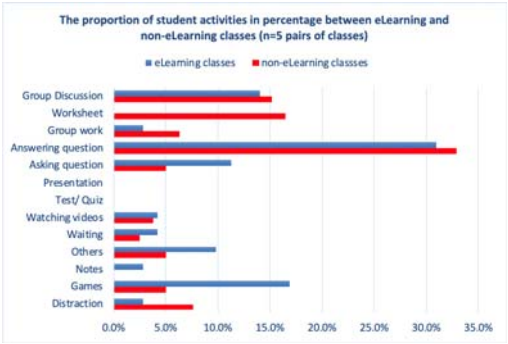
Data Analysis:

1. Class observations of e-learning practices



Students in e-learning classes were:
- playing more games; and
- asking more questions.

Teachers in e-learning classes were:
- giving less lectures; and
- spending more time to follow up and guide students' work.

- More student-oriented activities occurred in e-learning classes than in non-e-learning classes.

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(cont'd)

Category	No.	e-Learning practices	Mean	Group Mean	Range of Mean
Engagement (games)	17	Games - competition in groups	8.0	7.3	1.5
	13	Student presentation	7.7		
	16	Games - individual	7.0		
	14	Multi-media learning materials	6.5		
Students exploration	12	Object simulation	8.0	7.2	3.3
	15	Experiment simulation	8.0		
	25	Multi-media works by students	7.8		
	7	Students to make use of online tools for learning	7.7		
	1	Students to search information online	7.0		
	4	Students to visit a website	4.7		
Peer learning	20	Collaborative learning - same project for all groups	8.2	6.9	2.7
	18	Collaborative learning - roles differentiated within groups	7.7		
	24	Peer learning - understanding of peer's work	7.3		
	23	Peer learning - peer discussion	7.2		
	21	Peer learning - peer comment	6.8		
	22	Peer learning - design quiz questions for peers	6.7		
	26	Online learning community	5.8		
	19	Collaborative learning - one group one role/topic	5.5		

Student presentation

Games - competition in groups

Peer reviews

Object simulation

Experiment simulation

(cont'd)

Category	No.	e-Learning practices	Mean	Group Mean	Range of Mean
Teaching tools	9	Flipped classroom	8.0	6.8	2.7
	27	Teaching facilitation (teacher iPad airplay)	7.7		
	2	Inductive learning	7.3		
	6	PDF as e-textbook	6.3		
	10	Visualizing abstract knowledge facilitated by e-learning tools (e.g., gif)	6.3		
	3	Differentiated learning	5.3		
Teachers understand students' performance	11	Exercises in the classroom - MC questions	8.0	6.1	2.8
	8	Exercises in the e-textbook learning management system (e.g., eClass)	5.8		
	5	Open-ended questions	5.3		
	28	Students - submission facilitation	5.2		

- **There were various practices used by teachers to achieve different teaching purposes.**
- **The research panel considered more Interactive practices would be beneficial , e.g., students to learn better through playing games in groups.**

In-class exercises when applying the flipped classroom approach

Differentiated learning

Use of e-tools to facilitate learning and teaching

2. Student survey

Questions	Primary schools (n=402)		Secondary schools (n=199)	
	Mean	SD	Mean	SD
1. I like reading e-textbooks more than printed books.	3.15	1.23	3.47	1.07
2. e-Resources make me learn English more effectively.	3.58	0.97	3.58	0.90
3. e-Resources make me learn Chinese more effectively.	3.53	1.02	3.44	0.92
4. e-Resources make me learn Mandarin more effectively.	3.24	1.10	3.51	0.98
5. e-Learning makes me understand more different nations and cultures.	3.77	0.97	3.64	0.94
6. e-Learning makes me understand my own nation and culture better.	3.56	1.07	3.65	0.84
7. I am willing to cooperate with my classmates using ICT to solve problems. For example, I like communicate with my classmates via Blog, e-learning platforms (e.g., eClass) and WhatsApp.	3.70	1.07	3.90	0.80

- Both primary and secondary school students agreed slightly that e-learning could help them learn better in multiple ways (e.g., enhanced language skills and understood their culture better). [All mean scores were above 3]

(Cont'd)

Questions	Primary schools (n=402)		Secondary schools (n=199)	
	Mean	SD	Mean	SD
8. e-Learning makes me more creative (e.g., I have more innovative ideas or questions.)	3.58	0.97	3.70	0.84
9. Comparing to traditional teaching, e-learning makes me more proficient to apply what I have learned, e.g., to apply what I learned to the real life.	3.61	1.02	3.62	0.86
10. Comparing to traditional teaching, e-learning nurtures my problem-solving skills more effectively.	3.57	1.01	3.66	0.89
11. When I select my secondary school, I will prioritize the schools with e-learning.	2.76	1.07	n/a	n/a
12. I am willing to have lifelong learning with the assistance of e-learning.	n/a	n/a	3.65	0.88
13. Comparing to traditional teaching approaches, I learn better with e-learning.	n/a	n/a	3.63	0.85
14. I am able to search and select information online in order to complete exercises or reports.	n/a	n/a	3.83	0.80
15. I am interested in ICT, coding/programming, and robotics, thus I am willing to enhance my skills on STEM.	n/a	n/a	3.69	0.81
16. I want to have a job related to STEM after I graduate.	n/a	n/a	3.58	0.93
17. I prefer to search information online instead of asking my teachers when I have a question during the learning process.	n/a	n/a	3.56	0.90

- Secondary school students agreed slightly that e-learning could help them achieve higher order skills, e.g., IT skills, creativity, problem-solving and lifelong learning. [All means scores were above 3]

3. Students' worksheet results

Priority values	Worksheet questions	Correct-answer rate (in percentage)		Difference (A-B)
		Responses of students in e-learning classes [A] (n=230)	Responses of students in non-e-learning classes [B] (n=74)	
Respects for others	A3, A5	52%*	49%*	3%
Responsibility	A1, B1, B3	79%*	67%*	12%
Integrity	A6	69%	59%	10%
Care for others	B2	67%	51%	16%

* The average correct-answer rate of the questions

- Students in e-learning classes understood priority values (e.g., responsibility) better than students in non-e-learning classes.

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(Cont'd)

School	Participants	Correct-answer rate (in percentage)	
		School year 16-17 (Second phase)	School year 17-18 (Third phase)
S3	Students (Class 5A) in school year 16-17 (n=36) vs the same students (Class 6A) in the school year 17-18 (n=37)	62%	70%
S7	Students (Class 2A) in school year 16-17 (n=21) vs the same students (Class 3A) in school year 17-18 (n=22)	32%	46%

- The same students in the e-learning classes performed better on the worksheets (which were used to assess their IT skills and literacy) in a year's time.

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4. Cross-case analysis

Areas	Themes	Significant results found*
An e-learning class vs a non-e-learning class	1. Comparison of English final exam results in P5	Y*
	2. Comparison of Maths final exam results in P4	Y*
	3. Comparison of science homework results in S2	Y*
	4. Comparison of Liberal Studies exam & essay results in S4	Y(on essay only)*
	5. Comparison of Maths test results in P5	N
	6. Comparison of Maths test results in P5	N
	7. Comparison of General Studies test results in P5	N
High-ability students vs low-ability students	Comparison of English test results in P3	N

*** With limitations as some teachers had adopted blended learning in between.**

- There was not much evidence showing the positive relationship between e-learning and examination/test results.

5. Interview analysis

- There were positive learning impacts and enhancements brought by e-learning.
- Various school stakeholders revealed:
  - efficiency for both learning and teaching was enhanced;
  - differentiated learning for students was enabled; and
  - student learning was taken place with multi-media materials to arouse students' motivation with better understanding as well as IT skills and literacy.

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(Cont'd)

- Significant changes were found in students':
  - learning motivation;
  - engagement in learning activities;
  - creativity;
  - readiness and capability for self-learning (self-directed learning);
  - communication with peers and students (collaborative learning); and
  - presentation skills.
- For teachers, they had:
  - acquired a paradigm shift from previous traditional teacher-centred learning and teaching to more student-centred model; and
  - developed a sharing culture of teaching pedagogies and materials through setting up a Community of Practice (CoP).

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Success factors and good school practice

- **Development of school's e-culture**
- **Establishment of school e-leadership**
- **e-Learning pedagogy rethink**
- **Parents' involvement**
- **Others**

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- **Development of school's e-culture**
  - School vision with innovations, including the development of students' 21st century skills through STEAM education and practice of e-learning across the curriculum;
  - Communications within school – with emphasis on both vertical and horizontal communications between the school management and teachers as well as among teachers; and
  - Teachers always shared to exchange their experiences, for example, through class observations, development of a school-based curriculum with e-learning pedagogies and e-resources as well as with the school community, such as at the Learning and Teaching Expo.
- **Establishment of school e-leadership**
  - Setting up a core team comprising the school head, deputy and subject panel heads/teachers for practising e-learning. At primary, PSM(CD) was leading the integration of e-learning into the school curriculum with the subject teachers.

- **e-Learning pedagogy rethink**
  - Teachers had adopted:
    - LMS to practise "Flipped Classroom" approach, help students build up their e-portfolios to record and track their learning progress and some teachers had an active use of the STAR platform for formative e-assessment;
    - Various e-learning contents and materials to encourage students learning to learn, for example, STEM education, including 3D printing activities, and participation in various competitions to develop students' higher order thinking skills, such as innovation with design thinking skills; eSchoolbag policy with ebooks/e-textbooks;
    - Some guidance practice (mainly incentive and award) to maintain student discipline in using mobile devices in class. Contingency materials are also prepared in case of hardware failure; and
    - Cultivation of students' ethical use of IT for prevention of, including cyber-bullying.

- **e-Learning pedagogy rethink**
  - The schools had:
    - Provided access and space by renovating the Library into a resource centre which was WiFi connected to facilitate students' collaborative and self-directed learning activities; and
    - Worked in partnership with the tertiary institutes for academic inputs and the industry for technical updates. For example, an innovative learning classroom (Innospace) was set up to encourage students to use technologies and applications of Science knowledge into astronomy; both teachers and students could develop their programming skills through the project: CoolThink at JC; some students had shared their inventions with the participants at the BETT Show held in UK and, teachers' joint online exchange programs with schools in Singapore and etc.

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- **Parents' involvement**
  - BYOD was adopted with parents being involved in setting up the acceptable user policy; and
  - Workshops were provided for parents on using the mobile devices, relevant software, as well as e-learning.
- **Others**
  - Some schools were active in developing school-based assessment platform in cluster(s) with use of the QEF; and
  - Adoption of flexible technical services provided by agency for more up-to-date Internet security.

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Challenges

- In the course of development, schools also met challenges.

For students, they

- had difficulties in handling the technology, e.g. their typing speed was slow when using tablets and sometimes they forgot their passwords;
- found it slow in turning the pages when using e-textbooks; and
- felt tired on using the devices for longer hours.

- For teachers, they had:
  - classroom management to maintain student discipline in using mobile devices, and handling unexpected technical problems;
  - spent more time e.g.for preparing teaching materials, developing pedagogy and testing the devices; and
  - the functions of some e-learning assessment tools they used (e.g. Apps and learning management systems) could not provide comprehensive, reliable, or quantitative evaluations on students' performance.

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Recommendations

- Promotion of BYOD in schools;
- Schools to provide guidance for teachers to select e-tools, e.g. Apps and LMS to sustain e-learning;
- Practice of e-assessment to match with the measurement of students' acquisition of the 21st century skills;
- Promotion of sharing culture among teachers and archiving of e-materials to lessen their workload; and
- Provision of PDPs on management skills for e-leaders, e.g. in setting up a core team for development of e-learning

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Conclusion

- ITE4 shared a lot of similarities with global practices on the development of e-learning to better support learning and teaching in schools;
- Teachers could set higher and more comprehensive learning goals for students to achieve and unleash their learning potentials with technology and multiple practices of the 21st century skills;
- To foster the organizational change arising from practising e-learning in schools, more professional development programmes for school management could be made available through workshops or online resources to support the empowerment of e-leadership;
- The range of e-resources covers more than the use of e-textbooks; and
- To consider gathering "big data", such as students' performances and their learning progress as well as archives of teachers' materials.

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References

- Bloom, Benjamin S. & David R. Krathwohl. (1956). *Taxonomy of Educational Objectives.* Handbook1: Cognitive domain. New York, Longmans.
- Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom. *ASHE-ERIC Higher Education Report No. 1*. Washington, DC.
- Davis, F. D. (1986). A technology acceptance model empirical testing new end-user information systems*: Theory and results*. Doctoral dissertation, Massachusetts Institute of Technology.
- Dewey, J. (1924). Democracy and Education. New York: MacMillan.
- Hong Kong Education Bureau. (2017). The School Curriculum Framework. Retrieved February 20, 2018, from http://www.edb.gov.hk/en/curriculum-development/renewal/framework.html.
- Hunter, J. (2015). *Technology integration and high possibility classrooms: Building from TPACK*. Routledge.
- Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)?. *Contemporary issues in technology and teacher education, 9*(1), 60-70.
- Lu, J. (2004). Personalized e-learning material recommender system. Proceedings of the 2nd International Conference on Information Technology for Application (pp. 374–379).
- O'Neill, G., & McMahon, T. (2005). Student-centred learning: What does it mean for students and lecturers? In B. O Neill, S. Moore, & B. McMullin (Eds)., Emerging issues in the practice of university learning and teaching (pp. 27–36). Dublin: All Ireland Society for Higher Education.
- Tomlinson, C.(1998). *The differentiated classroom: Responding to the needs of all learners.* Alexandria, VA: Association for Supervision and Curriculum Development.
- Topping, K. (2005). Trends in peer learning. *Educational Psychology, 25*(6), 631–645.

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Thank you
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