Lions College

A Research for investigating

the readiness of a school to adopt mobile learning technologies to unleash the learning power suggested by

"The Fourth Strategy on Information Technology in Education" consultation document

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Table of Content

Chapter 5: Result and Finding

Chapter 6: Discussion & Suggestions

Chapter 7: Conclusion

Reference
Appendix

Chapter 1 : Background

As the Education Bureau of Hong Kong is launching a "Support Scheme for e-Learning in Schools" for 100 public sector schools in April 2014 with funding to enhance their WiFi infrastructure to cater for the need of using e-textbooks and e-learning resources in class, the subject of applying Mobile Devices with wireless connectivity in daily school operations is getting more important than ever. We believe that a good preparation is essential for our school to get success in the coming Mobile Learning revolution, thus a research for investigating our readiness for adopting the technologies is valuable for planning purpose.

(1.1) Support Scheme for e-Learning in Schools (WIFI100)

As stated in the website of the *Education Bureau of the Government of the Hong Kong Special Administrative Region*, the WIFI 100 Scheme (2014)[1] aims at providing 100 public sector schools with funding to enhance their WiFi infrastructure to cater for the need of using e-textbooks and e-learning resources in class. The funding will also allow schools to acquire mobile computing devices sufficient for use in class by students. With the resources and support from the EDB, both pedagogical and technical, the schools will act as *change agent* to achieve the following missions, such as :

1. Working with *service providers* to build up the necessary infrastructure conducive to the use of e-textbooks and e-learning resources in class;

2. Acting as test bed for the *infrastructure* build-up process and other value-added service;

3. Establishing *pedagogical use* of e-textbooks and e-learning resources and to build an intra-school community of practice to facilitate whole-school adoption of e-textbooks and e-learning resources and hence e-learning; and

4. *Sharing* with other schools the lessons learnt, including setup of relevant community of practice among teachers.

Though WIFI 100 is only an pilot scheme, the suggested procedure for successful implementation of mobile technologies in school environment indicates the following important aspects for a school to look at :

Hardwares, including a suitable network infrastructure being provided by a vendor with very good communication with servicing school such that it could understand their needs thoroughly.

Software, including suitable forms of applications of e-textbooks and e-learning resources , with the support of a suitable network infrastructure and also aids of mobile computing devices, to transform the teaching.

Culture, including the policy to lead the progress of application of technologies in daily teaching and classroom environment and also the practice to share any successful experience among participating teachers.

Therefore it is necessary for our school to look at these issues in an objective way such that we could know how to communicate well with the vendor to establish a suitable network (hardware); communicate well with the teachers to implement the lessons with technologies in an practical and efficient way (software); communicate well with the management to plan a suitable path for the adoption of technologies (Culture) and finally communicate well with the students and their parents to understand their expectations, such that our work can fulfill their needs.

(1.2) The Fourth Strategy on Information Technology in Education (ITE4)

As stated in the consultation document of *"The Fourth Strategy on Information Technology in Education (ITE4)"* in 2015, by the *Education Bureau of the Government of the Hong Kong Special Administrative Region*, [2] the strategy is formulated to unleash the learning power of all our students to learn and to excel through realising the potential of IT in enhancing interactive learning and teaching experiences. The suggested strategy includes 6 practical actions:

Action 1 : *Enhancing schools' IT infrastructure and re-engineering the operation mode*

Action 2 : *Enhancing the quality of e-learning resources*

Action 3 : *Renewing curriculum, transforming pedagogical and assessment practices*

Action 4 : *Building professional leadership, capacity and communities of practice*

Action 5 : *Involving parents, stakeholders and community*

Action 6 : *Sustaining a coherent development of IT in Education*

These suggested actions should have been well formulated in a macroscopic perspective and going to be a guideline to bridge over the technology application and daily teaching in classrooms of Hong Kong primary and secondary schools in near future. We would like to consider this as a general direction for the workout, but it has to be fine-tuned to suit an individual school in their own case before the action plan is going to be carried out. Here are some of the practical considerations:

For Action 1, what will be the right scale of the *wireless network* to be established? Will there be any relation to the IT development plan of a school ? What kind of *mobile devices* are going to be used? What will be ownership model of the devices to be adopted in an individual school with consideration of their different family backgrounds of students? What will be the management model of the network in order to be both cost and performance efficient ?

For Action 2, what kind of e-textbooks and e-learning resources are now available in the market? Can they be used to substitute or to assist the use traditional textbooks? What will be the attitude of students and parents towards the use of

these resources? If the e-learning resources presents on the market cannot fulfill the needs of our teacher, will they have the ability or time to author suitable materials?

For Action 3, do our teachers understand the potential of new *pedagogical approach* with the aid of suitable e-learning resources?
What kind of *pedagogical approach* of using e-learning resources are practical and can be managed by our teachers? What will be the key steps of progress of the adoption of technologies and what is the suitable pace to carry it out ?

For Action 4, what kind of professional development are mostly needed by our teachers ? What kind of sharing should be promoted to help our teachers to catch the steps of technologies ?

For Action 5, What will be the attitude of parents towards the use of mobile computing technologies? Given with the economic and education background of them, will they authorise our school to use the technology extensively, or more communication and understanding is needed ?

For Action 6, *a* microscopic view of *coherent development of IT in Education* in our own school is important as well to formulate the change of culture, rather than just an introduction of new equipments, so how to promote the understanding of the capability and potential of the technologies, and hence the change brought with it, is the core challenge of our school to implement the action plan successfully.

To answer all the above stated questions, we choose to have a study among different stakeholders of our school to understand the situation though a more scientific approach. We would also like to share our approach with other schools in Hong Kong if it the study is completed.

(1.3) Tablets in the Classroom - A Practical Guide to Planning and Deploying Large-Scale Tablet Initiatives

As mentioned in the *Planning and Strategy* section of a widely accepted oversea guide book "*Tablets in the Classroom - A Practical Guide to Planning and Deploying Large-Scale Tablet Initiatives*", by Center for Digital Education with support from AT&T [3], the checklist for assessing the readiness of individual school towards tablets deployments includes:

- Assess culture and capabilities.
- Develop goals and objectives.
- Assess technology infrastructure
- Create programs and timelines.

Here, it emphasised on *"Examining existing culture and capabilities provides a clear understanding of your district and schools' strengths, weaknesses, opportunities and threats, making it easier to determine the steps needed to achieve goals."* We would like our study to serve the purpose of *examining existing culture and capabilities* and *assessing our technology infrastructure*. By knowing our strengths and weaknesses, we could be able to *develop goals and objectives* which are in practical and manageable sense and must be achievable by our teachers and students, step by step, with a suitable timeline and combination of programs to get all the pieces in place and create an integrated system finally.

Chapter 2 : Objectives of the Study

(2.1) Major Objectives:

Here are the major objectives of our study :

1. Find out potential benefits to students if mobile learning technologies are being adopted.

2. To develop a tool set to understand the current situation of a school in terms of readiness to adopt mobile technologies such that the potential benefits could be gained.

3. Giving suggestions to our school, supported with the finding on the investigation to improve our readiness for adopting new mobile technologies.

As suggested in the previous chapter, by accessing technology infrastructure, knowing the culture and capabilities of our teachers and students, we could have a more thorough understanding of our current situation and hence meeting the objectives of the study, so naturally the study profile should focus on 3 aspects : Hardware, Software and Culture.

(2.2) Profiles to be reviewed:

Here is the detailed profile to be reviewed :

- **Hardware - Facilities Related**

    - Connectivity - Bandwidth and Standards of System
    - Power Issues - Battery Life / Charging Method
    - Physical Size Issues of devices - Appropriate Screen Size / Delivery
    - Power of devices - Memory Size and Operating System Choices of devices
    - Storage - Content Servers / Cloud Storage / Capacity Issues
    - Device Management - Setup / restore / backup / syncing of device
    - Network Management - Authentication Method / Subnetting Method

- **Software & Pedagogy - Teachers Related**

  - Multimedia teaching materials
  - Providing Situated Learning activities / engaging students to learning activities
  - Provide continuous learning experience / social media interactions
  - Provide rewarding learning experience / successful demonstration by students
  - Provide learning opportunities outside classroom

- **Culture - Students**

  - Time management Issue
  - Online Habit : Time / Interaction / sites /
  - Content Viewing Habit
  - Output / Writing Habit

- **Culture - Parents**

  - Device Ownership Issue
  - Financial Issue
  - Problems arose
  - Expectations

- **Culture - Policies**

  - Current state and expectations to apply m-learning & elearning in different KLAs
  - Financial Issues on purchase and continuous support of facilities
  - Moral Issues & Mobile Device Policies for students
  - Copyright & Privacy Issues for staffs and students
  - Staff Training needs
  - Student Training needs

Some of the facts of the above profile can be found directly by document review and interviews with technical staffs. Some other facts are hidden and could only be viewed roughly and indirectly by doing survey with related stakeholders.

Chapter 3 : Models & Definitions

In this chapter, we would like to review some learning theories and standards, such that we could reorganize the key concepts related to the pedagogical issue of e-learning and mobile learning, and hence form a theoretical framework guiding us to design the questionnaire for the survey.

Theoretical Framework related to e-learning :

(3.1) Basic Framework of analysis : TPACK (2005)

Technological Pedagogical Content Knowledge (TPACK) [6] is a framework to describe how three categories of knowledge, namely *Technological Knowledge* (TK), *Pedagogical Knowledge* (PK) and *Content Knowledge* (CK) interact with each other, and being used by a teacher for teaching practice in a technology enhanced learning environment.

The TPACK framework suggests that for effective technology enhanced teaching practice to be successful, it requires good integration between three components: Technology (TK), Pedagogy (PK), and Content (CK). The TPACK framework then further highlights complex relationships that exist between content, pedagogy and technology knowledge areas, and further categorized these relationships as Pedagogical Content Knowledge (PCK) , Technological Content Knowledge (TCK) , Technological Pedagogical Knowledge (TPK) and ultimately Technological Pedagogical Content Knowledge (TPCK).

If a teacher is capable of negotiating these relationships, he/she is expected to teach efficiently (expertise of technology expert), effectively (expertise of a pedagogical expert) and accurately (expertise of a disciplinary expert).
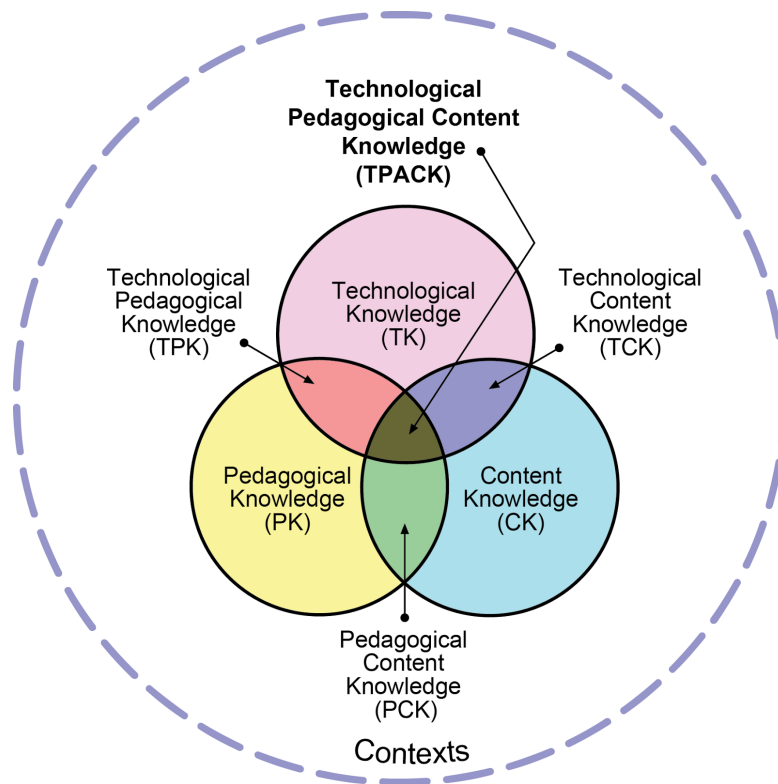
Relationships in TPACK framework

- TK , PK, CK (Fundamental Knowledge Domains)
- TPK, TCK (Disciplinary and Pedagogical Technologies)
- PCK (Traditional ways of Learning & Teaching)
- TPCK (Technologically enabled Learning & Teaching)

Therefore it may be a useful organizational structure for defining what it is that teachers need to know to integrate technology effectively (Archambault & Crippen, 2009). This idea of pedagogical content knowledge (PCK) was first described by Lee Shulman (Shulman 1986) and TPACK builds on those core ideas through the inclusion of technology.

(3.2) PK Framework of Analysis : Bloom's Taxonomy of Learning Domains (1956 - 2000)

Bloom's taxonomy [7] is a set of three hierarchical lists used to classify educational learning objectives into levels of complexity and mastery. The three lists cover the learning objectives in *cognitive*, *affective* and *sensory* domains. The list of objectives in *cognitive domain* has been the primary focus of most traditional education and is frequently used to structure curriculum learning objectives, assessments and activities. We employ this as the core pedagogical knowledge (PK) model to analysis the order of thinking related to traditional learning activities we usually done with our students [8].

Basically, the cognitive domain (knowledge-based) on *Bloom's taxonomy consist of 6* hierarchical learning objectives (B1-B6) :

6 Cognitive Domain of *Bloom's taxonomy*

Level	Learning Objectives	Mental Activities
B1	Remember (Knowledge)	Recalling facts, terms, basic concepts,
B2	Understanding (Comprehension)	Understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions
B3	Applying (Application)	Solve problems in new situations by applying acquired knowledge, facts, techniques and rules.
B4	Analyzing (Analysis)	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations
B5	Creating (Synthesis)	Compile information together in a different way by combining elements in a new pattern
B6	Evaluating (Evaluation)	Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria

Here is an hierarchical view of the objectives , with relevant learning activities stated in the diagram.
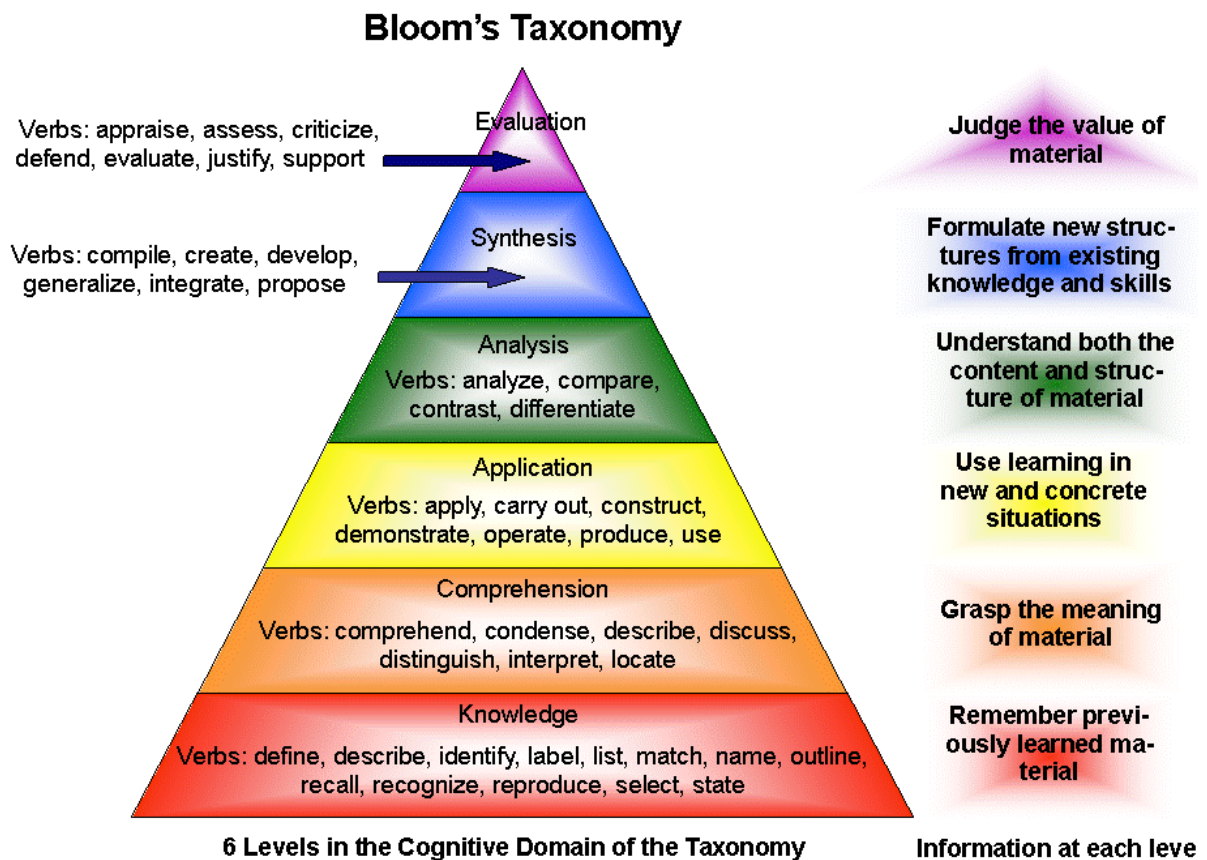
Bloom's Taxonomy

Chan C (2010) Assessment: Blooms' Taxonomy, Assessment Resources @HKU, University of Hong Kong [http://ar.cetl.hku.hk/large_class.htm]

Traditional education tends to design student learning activities based on this structure. If a learner's performance develops from simple to complex level up this hierarchy, the learner should have learned the topics in higher order sense in turns have more in-depth understanding of the issue. Often, traditional teachers have their mission in helping their students to climb up this pyramid.

(3.3) TPK Framework of Analysis : SAMR (2012)

As mentioned by Kathy Schrock in his article - *Turning SAMR into TECH: What models are good for* [11], SAMR developed by Ruben Puentedura, is a model for examining the evolution of technology integration in classrooms. This model focuses on the nature of tasks students are completing and its deviation from traditional classroom practices. It categorizes learning tasks into 4 levels of technology application (S1 - S4) as:

(S1) Substitution

In a substitution level, teachers or students are only using new technology tools to replace old ones, for instance, using Google Docs to replace Microsoft Word. the task (writing) is the same but the tools are different.

(S2) Augmentation

Though it is a different level, but we are still in the substitution mentality but this time with added functionalities. Again using the example of Google docs, instead of only writing a document and having to manually save it and share it with others, Google Docs provides extra services like auto saving, **auto syncing, and auto sharing** in the cloud.

(S3) Modification

This is the level where technology is being used more effectively not to do the same task using different tools but to redesign new parts of the task and transform students learning. An example of this is using the commenting service in Google Docs, for instance, to collaborate and share feedback on a given task.

(S4) Redefinition

Redefinition means that students use technology to create imperceptibly new tasks. An example of redefinition is "when students connect to a classroom across the world where they would each write a narrative of the same historical event using the chat and comment section to discuss the differences and then embed this in the class website".

4 Levels (S1-S4) of Tech Competency in SAMR

Level	SAMR Category	Role of Technology	Technology Competency
S1	Substitution	Tech as a direct tool substitute, with no function change	Enhancement Level
S2	Augmentation	Tech acts as a direct tool substitute, with functional improvement	
S3	Modification	Tech allows for significant task redesign	Transformation Level
S4	Redefinition	Tech allows for the creation of new tasks, previously inconceivable	

We employ SAMR as the core technology-pedagogy integration model (TPK) to fill up the gap. [10] The goal for a teacher is to construct a simple SAMR ladder that is coupled to Bloom's Revised Taxonomy. Teachers need to create tasks that are targeting on higher-order cognitive skills (Bloom's) as well as designing tasks that have more significant impact on student outcomes (SAMR) by utilizing relevant technologies. i.e. when the task moves from lower to upper levels of the taxonomy, it also climb up the ladder in SAMR model.

Association of SAMR(S1-4) and Bloom's Revised Taxonomy(B1-6)

SAMR		Bloom's taxonomy	
Transformation Level {ST}	(S4) Redefinition	(B6) Create	Refine their blog post into a short digital video project
	(S3) Modification	(B5) Evaluate	Select a subset of the reconstructed reasoning for further critique and/or development and explain this work with a blog.
		(B4) Analyze	Apply similar problem-solving approaches to non-standard questions and hence reconstruct the reasoning of the original authors.

Enhancement Level {SE}	(S2) Augmentation	(B3) Apply	Using a spreadsheet to visualize and explore the concepts in e-books and solve standard problems.
	(S1) Substitution	(B2) Understand	Gathering information online describing applications of statistical tools using bookmark aggregation services.
		(B1) Remember	Read e-books to acquire basic knowledge about statistical tools.

SAMR and Bloom's Taxonomy: Assembling the Puzzle by Ruben Puentedura

As you can see this approach could outlines a clear set of steps that guides the introduction of technology in classrooms. Though this association might not be necessary, the simple structure described above is well suited to beginning practitioners' needs.

(3.4) TK / TCK Framework of Analysis: ISTE Foundation Standards (1998)

[13] The ISTE Educational Technology Standards (formerly National Educational Technology Standards (NETS)) are a set of standards published by the International Society for Technology in Education (ISTE) for the purpose of leveraging the use of technology in K-12 education to enable students to learn effectively and live productively in an increasingly digital society.[12]

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ISTE Foundation Standards

These standards reflect fundamental concepts and skills for applying information technology in educational settings.

A. **Basic Computer/Technology Operations and Concepts.**
- Candidates will use computer systems to run software; to access, generate and manipulate data; and to publish results.
- They also will evaluate performance of hardware and software and apply basic troubleshooting strategies as needed.

B. **Personal and Professional Use of Technology.**
- Candidates will apply tools for their own professional growth and productivity.
- They will use technology in communicating, conducting research and solving problems. In addition,
- they will plan and participate in activities that encourage lifelong learning and will promote equitable, ethical and legal use of computer/technology resources.

C. **Application of Technology in Instruction.**
- Candidates will apply computers and related technologies to support instruction in their grade level and subject areas.
- They must plan and deliver instructional units that integrate a variety of software, applications and learning tools.
- Lessons developed must reflect effective grouping and assessment strategies for diverse populations.

International Society for Technology in Education, 1998.

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This standard suggests that if a teacher is going to teach with the aid of technology, he/she should meet certain degree of technology competency in the following area (I1 - I3) :
- (I1) Basic Computer / Technology Operations and Concepts (TK)
- (I2) Personal and Professional Use of Technology (TK)
  - professional tools (TK)
  - professional development with e communication (TK)
  - ethical and legal use of resources (TK)
- (I3) Application of Technology in Instruction
  - computer assisted instruction (TCK)
  - deliver instructional unit with help of software (TCK)
  - effective grouping and assessment strategies (TPK)

(3.5) Summary:

We employ the <u>ISTE</u> <u>standard</u> as a reference model, to account for the technological knowledge (TK) required for a teacher to teach with the aid of technologies.

Moreover, we could observe a trend of evolution in education. Analysing with the structure of the TPACK framework, in the past, traditional students are focusing on knowledge acquisition (CK) only by self-study; and then traditional schooling comes with the help of teacher's structural instruction (PK); and then when the technologies get ready, teachers can have improved presentation (TCK) and interaction (TPK) with students known as computer aided instruction (TPCK / mostly {SE}); and finally when the technologies become popular, teachers become facilitator (TPCK / mostly{ST}) enabling individual students to learn with their own interest and motivation. The focus is shifting and shows the direction of evolution.

Evolution of Learning
- Knowledge Acquisition with Self-study (CK) >
- Knowledge Acquisition with Teacher's Instruction (PK) >
- Knowledge Acquisition with Computer Aided Instruction (TPCK / {SE}) >
- Knowledge Construction with Facilitated Students Centered Learning (TPCK / {ST})

Chapter 4 : Method of Study

(4.1) Overview of Method of Study

1. To find out the **potential benefits** to students if mobile learning technologies are being adopted, firstly we would have Literature review and secondly, local cases will be studied to see how technologies integration with learning were achieved practically with appropriate pedagogies.

2. In order to develop a **tool set** to understand the **current situation** of a school in terms of readiness to adopt mobile technologies such that the potential benefits could be gained, we would like to understand the situation by focusing our investigation through a Technological Knowledge Perspective (TK) and Pedagogical Knowledge Perspective (PK).

   For the **Hardware** side (Network Infrastructure and Mobile Devices) of the picture (TK), we could understand the situation by interview with Technical Staffs to collect their views on facilities requirements;

   For the **Software** or Cultural Sides of the picture (TPK), we have designed appropriate questionnaires for various stakeholders such as teachers, students and parents, to understand their attitude and culture towards the application of technologies especially mobile related in learning. The survey is going to investigate

   (i) **Parents**' view on problems and expectation in adopting mobile devices in learning. (Limitation)
   (ii) **Students**' culture in learning with technologies; (TPK)
   (iii) **Teachers**' culture in teaching with technologies; (TPK,S1-4)

3. By analysing the data collected, a summary report on current situation and hence suggestions to school management on deployment of technologies in different KLAs will be given.

(4.2) Potential Benefits to Students

Modes of Learning and Potential Benefits:

When compared with traditional way of learning, [23] Mobile technologies support learning experiences that are collaborative, accessible, and integrated with the world beyond the classroom. The potential benefits, includes the following[20]:

- Flexibility of access (PB1):
    - Great for people on the go.
    - Anytime, anywhere access to content.

- Cater for individual difference (PB2):
    - Can enhance student-centered learning.
    - Support differentiation of student learning needs and personalized learning.

- Improved communication (PB3):
    - Can enhance interaction between and among students and instructors.
    - Facilitate collaboration through synchronous and asynchronous communication.

- Better Content (PB4):
    - Great for just-in-time training or review of content.
    - Can appeal to tech-savvy students because of the media-rich environment.
    - Reduce cultural and communication barriers between faculty and students by using communication channels that students like.

To make the transition, Naismith et al.[21] offered the following suggestions for adapting mobile learning to the six major modes of learning : (here mapped with likely level of technology integration in SAMR model namely {SE} - Enhancement level and {ST} - Transformation Level)

Teaching Modes and Potential Benefit

Modes of Learning	Mobile Devices	Major Benefit
Behaviorism (ML1) {SE}	Provide quick feedback and hence reinforcement can be facilitated through.	• Cater for individual difference (PB2)
Constructivism (ML2) {ST}	Enable immersive experiences by providing simulations or games.	• Cater for individual difference (PB2) • Better content (PB4)
Situated Learning (ML3) {ST}	Assist in authentic learning environments or "context-aware" environments, such as specially equipped museums.	• Cater for individual difference (PB2) • Better content (PB4)
Collaborative Learning (ML4) {ST}	Provide a handy additional means of communication and a portable means of electronic information gathering and sharing.	• Improved communication (PB3)
Informal Lifelong Learning (ML5) {ST}	Accompany users in their everyday experiences and become a convenient source of information or means of communication that assists with learning.	• Flexibility of access (PB1) • Improved communication (PB3) • Cater for individual difference (PB2)
Support & Coordination (ML6) {SE}	Provide just-in-time access to learning resources, news, information, planners, address books, calculators, and so forth.	• Flexibility of access (PB1) • Improved communication (PB3) • Better content (PB4)

Here are some local examples adopting above mentioned modes of learning (ML1-6) to make their transition in technology integration :

Case 1 : HKTA The Yuen Yuen Institute No.1 Secondary School (香港道教聯合會圓玄學院第一中學)

- HKTA The Yuen Yuen Institute No.1 Secondary School have conducted a M-learning pilot scheme named "Project Shing Mun" in one of their form 3 integrated technologies class, here was the details:

  - Applied QR code and Google Form in digitally based treasure hunt activity.(ML3){ST}

  - Applied Google Map in planning appropriate routes for a community investigation program.(ML6){SE}

  - Applied Mobile devices in surveying activities to learn trigonometry and probability.(ML6){SE}

  - Applied Mobile devices in measurement of PH value , oxygen level and flow speed of water in field trips with students.(ML6){SE}

Case 2 : True Light Middle School (香港真光中學)

- True Light Middle School have been conducting their lessons with ipads and building relevant teaching resources with macbooks. They have focused on the discussion and presentation of learning materials with their students producing e-materials like:

  - e-Publication creation with iBook (ML4){ST}

  - Record micro-lesson video to extend learning time (ML4){ST}

  - Collaborative Presentation with explain everything (ML4){ST}

Case 3 : Pui Ching Middle School (培正中學)

- Pui Ching Middle School has high reputation in technology integration with education. They are superior in terms of resources and experiences. Teachers have applied m-learning in a wide spectrum of applications such as:

  - Broadcast daily news cut with a Campus TV network during the class teacher period. Students will then be required to answer relevant questions in a quiz with the help of a web based learning platform. (ML1,6){SE}

- ○ Discover interesting plants in Pui Ching nature walk with the help of QR-Coded tags.(ML3){ST}

- ○ Mapping photos taken on the trail of a field trip with GPS (ML6) {SE}

- ○ Applying various education apps in English and Music lessons (ML1,2){SE}

- ○ Handwritten homework being captured with smartphones' camera for submission and archive purpose (ML1,6){SE}

- ○ Language Subjects : web-based reading, recite, recording of scripts on SoundCloud and Youtube, Presentation of them with Prezi (ML1,6){SE}

- ○ Mathematics：apply various apps such as: UPAD、GeoGebra、SketchPad Explorer 、iCross to assist stduents in understanding (ML6){SE} ; collect homework with assessment server (ML1,6){SE}

- ○ Science subjects : using the App "Nearpod" for Interactive learning (ML1,2){SE}

- ○ Project based learning : using "Popplet" for Mind Mapping exercise (ML4,6){ST}

Case 4 : Sacred Heart Canossian School (嘉諾撒聖心學校)

- ● Sacred Heart Canossian School has focused their application on language learning. They have built a web platform for learning Chinese (學『適』中國語文」) (ML1,2){SE} and did a research on how does e-learning affect primary students in learning to write Chinese characters in proper manner.

  - ○ In general, students' ability on dictation and writing of Chinese characters with proper strokes sequences would not be degraded. However, less able students' ability of dictation seems affected.

  - ○ Therefore, if some of the traditional homework assignments in written form are going to be replaced with an electronic version, teachers need to cover the loss by increasing the chance of writing in other activities, or

  - ○ simply should not reduce the amount of traditional homework assignment. But we need to take care about the added workload to students in this way.

Case 5 : Buddhist Mau Fung Memorial College (佛教茂峰法師紀念中學)

- Buddhist Mau Fung Memorial College have tried the following in their pilot schemes of m-learning:

    - Webquest (ML2,4){ST}

    - Blog based teaching (ML4,5){ST}

    - Learning Apps (ML2)

    - QR-Code with Mobile Devices (ML3)

    - GPS with Mobile Devices on field trip (ML6)

  They are quite similar to what have been done by the other schools.

Case 6 : Salesian School (慈幼學校)

- Salesian School have tried m-learning in nearly all of the subjects they offered. Here is a listing of their trials:

    - Chinese: interactive story writing with Lino(ML4){ST}; Interactive lesson with Mouse Mischief(ML1){SE}; Electronic writing board with ScreenChomp(ML4{SE}); web based self-learning platform (ML5){ST}

    - English: interactive story writing with Lino(ML4){ST}; Interactive lesson with Mouse Mischief(ML1){SE}; Storytelling with Story Creator (ML4){ST}; web based self-learning platform (ML5){ST}

    - Mathematics : Flipped classroom (ML2){ST}; Learning 3D geometry with Apps (ML2){SE} ; web based self-learning platform (ML5){ST}

    - General Studies : Interactive web based learning with Edmodo (ML4,5){ST}; Simulated experiments (ML3){ST}; e-newspaper cut (ML6){SE} ; web based self-learning platform (ML5){ST}

    - Music : composition software (ML6){SE}

    - Visual Art : drawing software (ML6){SE}

    - Computer : Programming (ML2){SE}

Conclusion:

In short, the possible benefits to students (PB1-4) with the appropriate integration (LM1-6) of mobile learning technologies are practically achievable at least in many pilot schemes of local schools. Most of the pedagogical trials are resting on the Enhancement Level ({SE}, S3-4) of SAMR model only and hence focusing on knowledge acquisition with lower order thinking (B1-3) in the Bloom's Taxonomy. But, there are still significant amount of trials on Transformation Level ({SE}, S3-4) which are trying to achieve higher orders of thinking (B4-6) in the knowledge construction process which most educators are ultimately hoping for.

(4.3.1) Tools Design : Parent's Readiness

Overall Framework of Analysis:

According to the report "Living and Learning with Mobile Devices - What Parents Think About Mobile Devices for Early Childhood and K–12 Learning" by Grunwald Associates LLC, Learning First Alliance [14], the vast majority of children at all grade levels from preschool (pre-K) through 12th grade, have access to an array of technology at home, including mobile devices. Most children use many types of mobile devices and they use them often. Parents' attitudes about mobile learning differ, depending on children's grade level and gender. Majorities of parents believe that mobile devices and applications offer fun, engaging ways of learning, connecting and communicating. Still, despite their interest in mobiles for learning, parents of K–12 students are finding that most of the mobile apps and content their children use regularly are "purely entertainment."

The report also states that by high school, half of all students (51%) carry a smartphone to school with them every day. 16% of all K–12 parents, and almost one in four parents of high school students (24%), report that their child's school allows students to use family-owned mobile devices in the classroom, often called a "bring your own device" (BYOD) approach. Some schools require students to use portable or mobile devices which could be school or family owned in the classroom. More than half of parents believe that schools should make more use of mobile devices in education. Parents aren't waiting for schools to make the move to mobile learning. Already, 45% of parents report that they plan to buy, or already have bought, a mobile device to support their child's learning.

Overall, this study suggests that there is an unmet desire for more learning and educational value in the mobile world, both at home and in school. Here are the recommendations it states for the educators:

- Model the *safe, productive use* of mobile devices as ***learning tools*** in practice.

- ***Partner with parents*** to make the case for mobile learning, develop mobile device policies and showcase best practices—particularly for parents who are not yet persuaded.

- Enlist the ***support of parents*** who tend to be the most positive about mobile learning, including parents of younger children, parents of "super users" and tech-savvy parents.

- ***Leverage the devices*** *that students already have* access to or are bringing to school (the ***BYOD*** approach). Rather than trying to be the sole provider

- of devices for all students, schools should consider taking a need-based approach and provide devices only for students who do not have them—and ensure that students' ***access is as equal as possible***.

- Offer authoritative information and ***advice to parents*** and students on how to make better use of mobile devices and apps for learning, rather than for entertainment only, and how to use them safely—and differentiate this *guidance for different grade levels*.

- Do a better job communicating ***mobile device policies*** with parents—the "back to school" packet of information might not be enough.

- Share and learn from schools that already are offering mobile learning opportunities for their students. Connect with other educators via online communities of practice and other forums to exchange insights on best practices.

- ***Partner with industry*** to contribute to the development of mobile devices, apps and content that deliver robust educational benefits.

Therefore, with the suggestions or guideline from the report, we need to know the degree of **support** and eagerness of **partnership** of our parents towards the era of applying mobile devices in daily teaching , and hence we could establish our own **strategy of development** and hence appropriate **mobile device policy** and give **advice to parents** to further support the child with us to make the right use on those devices.

Objectives of Investigation	Details
Parental Support (PA1)	- welcome the use of e-books. - willing to provide BYOD devices.
Partnership with Parents (PA2)	able to distinguish learning activities from entertainment on mobile devices

	● able to guide their children to use their mobile devices as learning tools.
Strategy on device deployment (PA3)	● devices to be provide by school or students bringing their own devices (BYOD)
Policy on device usage (PA4)	● acceptable extent of use of mobile devices ● ensure the equal right of access to narrow down the consequences of digital divide
Guideline to Parents (PA5)	● Parental concern on known negative impact of extensive use of mobile devices, especially health related issue

Therefore, the Parental Issue Questionnaire should be designed to answer 6 Key questions, namely :

● What is the overall attitude of our students' parents towards the use of e-book or mobile learning? (PA1)

● What is parental observation on the popularity of mobile devices among our students ? (PA2)

● Can our students' parents support and guide their students to use their device in proper manner in order to support their daily learning? (PA2)

● How much did the parents of our students are willing to pay for an BYOD ? (PA3)

● What will be the acceptable extent of use of mobile devices daily? (PA4)

● How much did our students' parents concern about the known negative impacts aroused by the use of mobile devices? (PA5)

Parental Control (PA2) :

The BBC news "Parents unaware of dangers faced by children on smartphones" mentioned a picture of "Many parents are out of touch with the dangers faced by their children on tablets and smartphones; over 20% of parents do not monitor what their children are doing online; with such a high percentage of parents not having a clear view of their children's online activity, this way of thinking needs to change." Over 50% of parents who took part in the BBC poll said they had set up parental

controls and filters on their tablets but only 40% said they had done the same on their children's smartphones.

Obviously, it is very easy for parents to notice whether their kids are reading a comic or a textbook, but it is very difficult for them to notice whether their kids are using a tablet to study or not (e.g. chatting, viewing videos, reading comics, playing games,...etc.) This article clearly shows a scenario of parents not knowing much about what their children are doing with their mobile devices and network or they don't even have the idea that they need to monitor and control their usage. As our parents are mainly coming from lower socioeconomic classes, with their lower education level, they will be more likely lacking the sense of needs and skills of parental control. Therefore, we have to communicate with our parents to know with their awareness on this issue, before we think we are qualified to apply the BYOD mode of device deployment.

Partnership with Parents (PA2) :

The mobile devices usage agreement sample [19] provided by edb HK, given by Jordan Valley St. Joseph Primary School (original title: "使用平板電腦進行學習協議 - 佐敦谷聖若瑟天主教小學"), shows some insight in the implementation of device management in a school. The parental support section of the agreement mentioned the following responsibilities supposedly given by parents :

- Provide the device (BYOD , borrowing agreement from school)

- Keep the device in good running condition (protection shield, device charging)

- Be secure on the playstore account management (Application Installation)

- Suitable Parental Control to monitor the usage of device

- Remind their kids to use the mobile device in healthy manner

The above mentioned are practical aspects that our parents should support and partner with a school to provide suitable mobile devices operation environment for learning purpose.

Digital Divide Issue (PA3) :

In the newspaper article [18] "學生兩人一機 推電子教學 小學開家長班 冀減數碼鴻溝 (*English translation as : Promoting e-learning by providing 1 tablet for every 2 students, Primary School narrowing down digital divide by holding introductory classes for their parents*)" by singtao news, Shamshuipo Kaifong Welfare

Association Primary School has deployed mobile learning by providing 1 tablet per every 2 students. With this sufficiently high machine to student ratio, they should be able to carry out their proposed e-learning plan smoothly in terms of device sufficiency. They intended to narrow down the digital divide among their students coming from various socioeconomic classes with the device lending scheme. However, their parents have hesitation on either borrowing or buying tablets for their children as BYOD. Therefore, the school held introductory class for parents to change their thought. As mentioned by their head teacher : " some of them are living in old buildings, may not have optical fibre based broadband Internet connection, the cost of leasing a broadband internet connection may not be affordable, and hence, there may be useless for them to borrow a tablet from school for their kids to learn.", The extension of the usage of the mobile device after school as a learning machine may act as a supportive service, but if executed as an essential part in the whole learning package, we have to ensure the equal right of access to the learning material to narrow down this consequences of digital divide. As a result, we have to communicate well with our parents to know their ability on acquisition of mobile devices as BYOD.

Health Issue (PA4,PA5) :

As stated in the report "e-Report : Report of Advisory Group on Health Effects of Use of Internet and Electronic Screen Products" by Department of Health The Government of the Hong Kong Special Administrative Region , health concerns related to the use of mobile devices and screen products can classified into physically related and psychosocially related, here are the lists of them:

- Physical Health:
    - Physical fitness and obesity (*)
    - Vision (*)
    - Musculoskeletal problems
    - Hearing
    - Injury and accident
    - Infection (*)

- Psychosocial Health:
    - Addiction
    - Cyber-bullying
    - Cognitive development and learning (*)
    - Social development (*)
    - Sleep deprivation
    - Online sexual risky behaviour
    - Aggressive behaviour

Here, some of them are purely, directly related to students' entertainment habit with prolonged, uncontrolled use of devices with screens and connected with network, like Addiction, Sleep deprivation, Hearing and Physical fitness degrade or even Musculoskeletal problems. Moreover, Aggressive behaviours, Cyberbullying and Online sexual risky behaviour are also likely to be developed indirectly with their "social usage" of mobile devices. These issues should of course be tackled by teachers on their daily teaching agenda. But, when we focus on the instructional use of these devices, that is the potential problems aroused by future extensive use of devices in classroom environment, the following should the be highly concerned:

- Vision degrade due to excessive use of screens
- Infection risk due to sharing of mobile devices
- Weakened human communication skills hence affecting the social development of students

Infection risk of shared devices could be reduced by proper hygiene control that can be fully exerted with our judgement. The other two issues related to the the extent of usage of devices that we have to communicate well with our parents before we could made the decision.

Conclusion:

Finally we have designed a questionnaire consist of 2 sections focusing on :

(1) Parental Interaction with children's net-surfing habit,

(2) Parents' ideas on mobile devices as learning tool,

to answer our questions (PA1-PA5) and let us know the limitation of implementation of mobile learning induced by our parents.

The parent's readiness survey questionnaire can be referenced at appendix IV.

(4.3.2) Tools Design : Student Readiness

Readiness of Using Technology :

According to the article "Are You Ready for Mobile Learning?" [20] Various mobile devices have great potentials in instructional uses. Naismith et al.[21] hypothesized that mobile technologies will have a huge impact on learning; they made the following predictions based on emerging trends:

- Learning will **center on** the **individual** learner's environment rather than the classroom. (ST1)
- Learning will involve learners making **meaningful connections** to resources and other people.(ST2)
- The ability to **instantly publish** their observations and reflections as **digital media** will empower learners to become investigators of their own environments.(ST3)
- The ability to easily **capture and record** life events will assist learners in recall and collaborative reflection.(ST4)
- **Distributed collaboration** and mobile team opportunities will be greatly enhanced.(ST5)

In order to determine if the distance education students at the University of Texas at Brownsville were ready for mobile learning, they conducted an informal survey and then examined the **mobile devices** that students were using, as well as the **activities** they engaged in while using them. In their cases, students already participated in a variety of activities for recreation but not doing well in integrating mobile technologies into their learning activities. However, with their high ownership (90% for cellphone , 92% for laptop) and high competence on using ICT (over 50% for instant messaging, 98% for email, 82% for file transfer and 64% for viewing video) , most of them (94%) thought they are ready for Mobile Learning. Here, a clear picture shown is that **Technology competence is essential but not sufficient for e-learning or even mobile learning to work**.

Readiness of Using Technology to Learn

The article "Assessing Readiness for E-Learning" [22] by Ryan Watkins, Doug Leigh and Don Triner suggested that the success of e-learning as an alternative or supplement to classroom instruction requires many changes to our currently accepted mindsets regarding education or training (see Kaufman, Watkins, & Guerra, 2002). The Online Learner Self-Assessment (OLS) was initially developed to provide potential e-learners with comprehensive analysis of their readiness for success in an online learning environment (Watkins, 2003). The revised, valid self-assessment tool [22] for prediction of e-learning performance (OLSR)consists of 27 items in 6 subscales.

Online Learner Self-Assessment Tool (OLSR)

Aspects of Investigation	Objectives of investigation
Competence on using technology (ST1)	• Technology Access • Online Skills and Relationships • Online Audio/Video
Self-management (ST2)	• Motivation • Importance to your success
Ability on written language (ST3)	• Internet Discussions

As you can see, we could categorize the 6 subscales into 3 categories. Obviously, the study suggested that besides technology competence, abilities on self-management and written language are both essential for successful learning in an online environment.

Readiness of Using Technology to Complete a Course

There are many online readiness checklists or surveys hanging around the internet by different universities for their distance learning students to assess their own suitability to complete a course entirely through on online mode of learning before they enroll it. Most of these surveys are based on a well-known tool set called the TEST OF ONLINE LEARNING SUCCESS (TOOLS) [24] developed by the Center for Excellence in Teaching and Learning at Texas Wesleyan University (CETL).

Though the tool set is designed for distance learning learners, its aspects of investigation still have significant value for us to reference on as the core factors for successful online learning might remain the same. Moreover, we have the best confident to reference our own tool on this as it is the most widely accepted and referenced tool yet in various publications.

TOOLS consists of 45 items, which comprise five subscales:

- Computer Skills
- Independent learning
- Dependent Learning
- Need for Online Delivery
- Academic Skill

TOOLS and OLSR

Aspects	OLSR Subscales	TOOLS Subscales
Technology Skills (ST1)	- Technology Access - Online Skills and Relationships - Online Audio/Video	Computer Skills
Initiation management (ST2)	- Motivation - Importance to your success	- Independent Learning - Dependent Learning - Need for Online Delivery
Study Skills (ST3)	Internet Discussions	Academic Skills

As you can see the core factors of investigation of both tool sets are compatible to each other. That is our own student readiness assessment for mobile learning success (MLS) could be derived from integrating them and drop out those irrelevant items for high school environment such as "Need for Online Delivery".

Conclusion:

Our final set of tool consists of 3 focus : Technology Skills (ST1) (Mobile Technology Access, Online Skills, Multimedia Access); Initiation Management (ST2) (Independent Learning, Dependent Learning, Motivation and success); Study Skills (ST3) (Online discussion, Academic Skills). It could be referenced at appendix (III).

(4.3.3) Tools Design : Teachers' Readiness

Readiness for Teaching Online Surveys

According to the article "Are you Ready to Teach Online? Readiness Surveys Aim to Help Faculty Prepare" [26] in the Online Learning in stights Blogpost, the assessments available on the web specific to instructor-readiness are few, here are 2 examples:

1. *Faculty Self Assessment: Preparing for Online Teaching* [28] from Penn State University consists of thirty questions ranked within three categories: **technical**, **administrative** and **pedagogical** competencies. The survey assumes the instructor has teaching experience—it includes questions about familiarity with LMS features and teaching online for instance, but it does highlight for instructors new to online teaching, the skills and expectations required.

2. *Faculty Online Teaching Readiness Survey* [29] from the University of Toledo, consists of twenty-questions in a self-scoring survey. This survey is not nearly as comprehensive as Penn State's, but it does provide a **snapshot of skills** required and provides in the feedback for each response, a detailed description of the skill with links to resources for further learning and/or information.

Both categorize the required skills into three areas; 1) **technology**, 2) **pedagogy** and 3) **administrative** skills.

(A) Skill set of teachers to be investigated:

To measure teachers' readiness for online learning in K12 environment, above mentioned 3 Categories of skills are further break down to be included in the investigation as:

- (AT) **Technology & Social Media Skill** (TK)
    - (AT1) Basic Computer Skill (TK)
    - (AT2) Proficiency with software application (TK)
    - (AT3) Installing / Updating Software (TK)
    - (AT4) Internet search literacy (TK)

- ○ (AT5) Proficiency with LMS (e.g. eclass) (TPK)

- ○ (AT6) Communication with LMS (TPK)

- ○ (AT7) Communication outside LMS (TPK)

- ○ Focus : Hardcore skills to operate various computer devices & software

- ● (AO) **Administrative & Organization Skill** (PK)

  - ○ (AO1) Time Management (PK)

  - ○ (AO2) Constructive Feedback (PK)

  - ○ (AO3) Proficiency with gradebook and mark submission with LMS (TPK)

  - ○ Focus : Attitude and soft skills to be a good facilitator of learner

- ● (AP) **Pedagogical skill & teaching**

  - ○ (AP1) Delivering Content (TCK)

  - ○ (AP2) Delivering Instruction (TCK)

  - ○ (AP3) Supporting and guiding (PK)

  - ○ (AP4) Constructive Feedback (PK)

  - ○ (AP5) Student focused learning model (TPK)

  - ○ (AP6) Sustain online presence (TPK)

  - ○ Focus : Pedagogical skills to provide continues student centered learning activities.

- ● Remarks

  - ○ Aspects AT1~AT4 should be considered as necessary conditions for teachers to take part in the technology integration exercise of education.

  - ○ Aspects AO1~AO2 should be considered as sufficient conditions for teachers to have paradigm shift towards student centered pedagogies.

  - ○ Aspects AP1~AP4(Online), AP6 are highly involved in college environment providing online courses, which might not be fully compatible with the K-12 Schooling environment. So they have to be modified before we include them in our investigation.

(B) Pedagogical focuses to be investigated in an M-Learning environment:

Here are the major areas that M-Learning is advantages to traditional way of instruction:

- (AM1) Multimedia teaching materials (TCK) (S1)(AP1-2)

- (AM2) Providing Situated Learning activities / engaging students to learning activities (TPCK)(S2)(AP1-5)

- (AM3) Provide continuous learning experience / social media interactions (TPCK) (S3)(AP3-6)

- (AM4) Provide rewarding learning experience / successful demonstration by students (TPCK)(S4)(AP3-5)

- (AM5) Provide learning opportunities outside classroom (TPCK)(S1-4)(AP1-5)

- Remarks

  - Different major advantages of M-Learning (AM1-AM5) here are provided with the Modes of Teaching for Technology Integration (ML1-ML6) given in previous paragraphs. These advantages (AM1-AM5) enable teachers to shift their lessons from enhancement level {SE} to transformation level {ST} of SAMR model and hence facilitate higher order of thinking with their students.

  - On the other hand, activities involving these advantages (AM1-AM5) require more advanced technology integrated skills set (AP1-AP6 / TPCK) if they are going to be produced by teachers.

  - From this perspective, by measuring teachers' competence on (AP1-AP6 / TPCK), we could assess the possible degree of order of thinking possibly produced in their M-Learning enabled activities.

(C) Practical M-Learning Approach:

To measure the practical ability of teachers to implement the above mentioned pedagogical approach (AP1~AP6), we referenced to a well known practical guideline "Welcome to the 21 Things 4 Teachers" [30] by REMC Association of Michigan. Here are the practical skills suggested to be possessed by a teacher:

1. Basics (TK) (BIT)
2. Face of Your Classroom (TCK) (AP2-3) - BLOGS, wiki , website, LMS
3. Visual Learning (TCK) (AP2-3) - Infographics
4. Cloud Initiation (TCK) (AP2-3) - google drive , dropbox , onedrive
5. Collaboration (TPCK) (AP2-3) - google drive ,
6. Communication (TPK) (AP2-3) - whatsapp, email
7. Productivity (TPK) (AP3,6) - Calendars, Project Management
8. Digital Citizenship (TK) (I2) (BIT) - Ethics, respect and protect
9. Be Legal & Fair (TK) (I2) (BIT) - Copyright, Plagiarism
10. Search Strategies (TK) (I2) (BIT) - Web Evaluation , Citation
11. Content Area (TCK) (AP1) - resources iTunes U, Youtube , Teachers Tube
12. Interactives (TPCK) (AP2) - Quizzes, Flashcards, and Fun Interactives
13. Digital Images (TCK) (AP1,6) - Avatar , digital images
14. Powerful Presentations (TCK) (AP1) -
15. PLN (TK) (BIT) - ISTE
16. DI and UDL (TPK) (AP2-5) -
17. Evaluation & Assessment (S1-3) (TPK) - Polling , Online Quiz
18. Dig the Data (S3)
19. Digital Storytelling (S1-4)\
20. Blended or Flipped Classrooms (S3-4)
21. Emerging Technologies

According to "Readiness assessment tool for an e-learning environment implementation" by Mercado [27], he includes **attitudes** and **perceptions** of online learning as one component of a readiness which highlights the different mindset required for teaching online. The designated questionnaire encourage teachers to reflect on

- their teaching style and strategies,
- circumstances,
- abilities,
- motivation and
- time management.

Conclusion:

We finally prepared a tool set with 2 teacher survey questionnaires.

The first one is based on "Readiness assessment tool for an e-learning environment implementation" [27], with modification on some items to cater for the changes in mobile learning century, measuring the readiness of teachers towards technologies integration subjectively through self evaluation of their skill sets in criteria of Technology(AT), Organizational(AO) and Pedagogical(AP) readiness. It could be referenced at appendix (I).

The second one is based on "Welcome to the 21 Things 4 Teachers" [30], supplemented with local examples of implementations of m-learning analysed in section (4.2), measuring the readiness of teachers towards technologies integration in practical sense objectively. It could be referenced at appendix (II).

(4.3.4) Tools Design : Facility Requirement

Hardware Components of Mobile Learning System:

Basically the hardware of a mobile learning requirement includes mobile devices connected to the Internet for information exchange. In order to support the information exchange, proper scheme of storage have to be provided. To support the instructions of teachers, their must be a proper projection system to facilitate the demonstration of operation and presentation of systems. Therefore, the hardware facilities required to provide a proper M-Learning environment should include 4 major components : (1) Wireless Network, (2) Mobile Devices, (3) Storage Solution, (4) Projection Systems.

For the requirement of the **wireless network**, 2 aspects have to be considered, namely the range and the capacity of it. Of course it would be great if we could have the fastest available connection (currently 802.11 ac connection with 2Gbps) provided all over the campus with maximum no. of concurrent connections (over 100) at any hotspot. But capability won't come with no cost, we have to compromise between the capability of a wireless network and its cost. Therefore instead of asking for the favorable requirement of the wireless network, we should ask for requirements of expandable wireless network of different scales that could support different degree of implementation of mobile learning.

For the requirement of **mobile devices**, the following factors have been suggested to be considered in "Choosing a mobile device" by Dixons Carphone, tecknowledge.org.uk. They are : (1) Operating Platform, (2) Battery Life, (3) Internal Memory, (4) Durability, (5) Preventing access to unsuitable websites, (6) Best Screen size & Resolution, (7) Compatibility with Virtual Learning Environment. Therefore the choice can be made by comparing devices of different brands among these factors.

For the requirement of **storage solution**, we have to answer 2 questions, (1) how much information is going to be stored and (2) where to put it. There are virtually unlimited storage spaces for photos, documents or even video provided by Cloud services like Google and Youtube. However, the speed and security of access, and the ease of backup are issues to be concerned. By storing it to in house private cloud servers, we could own our own data with little additional cost and management issues. Here, a requirement for both inhouse and public cloud services with appropriate management scheme have to be drawn.

Finally, **projection system** choices ranging from existing kind projectors to dedicated WIFI based Apple TV for i-devices only, they have different advantages in terms of quality of projection, ease of use, flexibility and cost of installation. Here

the requirement for a right projection system is highly related to the choice of devices.

Conclusion:

Our final set of tool would like to collect technicians opinion on choices of 4 aspects : (1) Wireless network infrastructure, (2) mobile devices, (3) Storage Solution, (4) Projection System. It could be referenced at appendix (V).

(4.4) Schedule of Work:

Item	Duration	Task	Product
1.	2 months	Literature reviews and interviews with local teachers with piloting experience.	Summary report on potential benefits on M-Learning
2.	2 months	Questionnaires design & preparation	Well-designed tool set of Questionnaires for different stakeholders
3.	2 months	Conduct survey & raw data input	Raw data collected in digital form
4.	3 months	Data analysis	Summary report on current situation of our school
5.	2 months	Discussion on suggested actions to narrow the gap	Conclusion report with suggestions to our school
6.	1 month	Publish the result on the web	Website of our research project with tool-set download link for other schools to reference

Chapter 5 : Result and Findings

(5.1) Parents Readiness Survey for online learning with mobile devices - Summary of Findings

For the parents' readiness survey, there have been 555 valid questionnaires collected in June 2015. During that period there are 691 S1-S5 students returning to school. Therefore the sample size of 555 is much more than enough to draw a valid result.

The Parental Issue Questionnaire have been designed to answer 5 Key questions, namely :

A. What is parental observation on the popularity of mobile devices among our students ?

B. What is the overall attitude of our students' parents towards the use of e-book ?

C. Can our students' parents support and guide their students to use their device in proper manner in order to support their daily learning?

D. How much did our students' parents Concern about the known negative impacts aroused by the use of mobile devices?

E. What will be the acceptable extent of use of mobile devices daily?

Here is the summary of the finding:

(A) What is parental observation on the popularity of mobile devices among our students ?

1.1 看到孩子使用手機或平板電腦玩遊戲。(3.9)

1.2 看到孩子使用手機或平板電腦進行通訊。(3.8)

1.3 看到孩子使用手機或平板電腦進行學習(例如查字典，搜尋資料做家課等)。(3.3)

1.4 看到孩子使用手機或平板電腦進行閱讀。(3.2)

1.5 看到孩子使用手機或平板電腦看視頻短片(例如Youtube)。(3.8)

1.6 會利用手機或平板電腦應用程式與孩子通訊。(3.4)

* (Mean) out of 5 in Likert Scale

As observed by parents, mobile devices are mainly used for entertainment and communication purpose with friends, but not for learning. Cut in point for successful e-learning may be on social networking usage and enhanced presentation of learning material with video.

(B) What is the overall attitude of our students' parents towards the use of e-book ?

2.1 我對電子教科書很有認識。(2.7)

2.2 我認為電子教科書能有效協助孩子學習。(3.2)

2.3 我認為平板電腦上的電子教科書能取代傳統教科書。(3.1)

* (Mean) out of 5 in Likert Scale

Parents agreed that e-book (probably e-learning) should be good, but they don't know much about it. By the way, they don't think implementation of it is an urgent issue as the result suggest that they have positive attitude towards the issue, but the drive is not strong at all. Hence, they probably will rely on the professional judgment of teachers in the implementation of this.

(C) Can our students' parents support and guide their students to use their device in proper manner in order to support their daily learning?

1.7 知道孩子最常瀏覽哪些網站。(3.1)

1.8 有限制孩子在網上的活動。(2.8)

1.9 有設定手機和平板電腦等設備的「家長控制」功能（parental controls, 如利用密碼來控 制某些特定App或網站的使用）。(2.2)

2.4 我有能力分辨孩子正利用平板電腦學習或從事非學習活動。(3.3 / 3.0)

2.5 我有能力定時檢查孩子的平板電腦，並了解孩子的學習情況。(3.1 / 3.0)

2.6 我願意督促孩子每晚為平板電腦充電，以便有足夠電力於課堂上使用。(3.4/3.0)

2.7 我願意陪伴孩子在光線充足的環境下並以正確坐姿使用平板電腦。(3.4/3.0)

2.8 我願意保管Play Store / App Store 戶口密碼，勿讓孩子自行下載「非學習」程式。(3.2)

2.9 我願意讓學校管理學習用的平板電腦，甚至改動其系統設置。(3.2)

I am willing to but not specially interested to support and control my children in the use of mobile device to access the Internet , even on simple physical aspects such as maintaining power and lighting condition. Practically, I don't have the habit or skill to exert parental controls on the amount and contents of access.

* (Mean / median) out of 5 in Likert Scale

(D) How much did our students' parents Concern about the known negative impacts aroused by the use of mobile devices?

2.10 我擔心孩子會以閱讀電子教材為名，取用平板電腦作學習以外用途。 (3.2)

2.11 我擔心長時間閱讀屏幕會影響子女視力。(3.6)

2.12 我擔心長時間利用平版電腦學習會影響子女的溝通能力。(3.3)

Significant amount of parents are quite concern about the potential damage of vision of their children caused by the extended use of electronic screens. They seems don't worry too much on the negative impacts of the devices on their social life and academic study.

* (Mean) out of 5 in Likert Scale

(E) What will be the acceptable extent of use of mobile devices daily?

2.13 若果要購買平板電腦作為電子教科書，我願意承擔的價錢約為:

借用 | 少於$1000 | $1001至$2000 | $2001至$3000 |

$3001至$4000 | $4001至$5000 | $5001至$6000 |

多於$6000 (3.4)

2.14 我認為每天閱讀屏幕的時間應為:

越少越好 | 少於30分鐘 | 31分鐘至少於1小時 |

1小時至少於1.5小時 | 1.5小時至少於2小時 |

2小時至少於2.5小時 | 2.5小時至少於3小時 | 沒有限制 (4.0)

Median of acceptable price of device : ~$2000

Median of acceptable daily usage : ~ 1.25 Hour

Overall Conclusion:

- BYOD is not an option as the degree of support from parents is not enough though economically they are willing to do so.

- Overall readiness of parents are low as they don't have ideas on their responsibilities to support their children to use their devices properly in the domain of learning.

(5.2) Student Readiness Survey for online learning with mobile devices - Summary of Findings

For the student' readiness survey, there have been 654 valid questionnaires collected in June 2015. During that period there are 691 S1-S5 students returning to school. Therefore the sample size of 654 is much more than enough to draw a valid result.

The Student Issue Questionnaire have been designed to find the level of competence of our students in 9 areas, namely :

(A) Hardware Readiness:

(B) Computer Skill Level

(C) Internet Skill Level

(D) Video Comprehension Skill

(E) Online Communication Skill

(F) Online Working SKill

(G) Independent Learning Skill

(H) Dependent Learning Skill

(I) Academic Skill

(A) ~ (D) are measuring their technologies competence. (E)~(F) are measuring their online learning capabilities. (G) ~ (I) are general study skills related to learning with aid of technologies. Here is the summary of the finding:

(A) Hardware Readiness:

1.1.1 我家中有可連接互聯網的裝置(例如:桌上電腦，手機或平板)。(4.3 / 5 / 5)

1.1.2 我的上網裝置可應付日常要求。(4.1 / 4 / 5)

1.1.3 我的上網裝置有適當的軟件協助學習。（例如， MS Word，Powerpoint，PDF reader等）(3.6 / 4 / 3)

* (Mean / median / mode) out of 5 in Likert Scale

Most of our students have Internet capable devices for online learning purposes but significant amount of them are lacking of application for studying purpose. As expected, higher form / Group-CD students shows better result.

(B) Computer Skill Level:

1.2.1 我具備操作一台電腦的基本技能（例如，儲存檔案，建立新資料夾等）。(4.0 / 4 / 5)

1.2.2 有需要時，我懂得在我的上網裝置下載新的軟體。(3.9 / 4 / 5)

1.2.3 有需要時，我懂得在我的上網裝置安裝新的軟體。(3.9 / 4 / 5)

1.2.4 我能夠使用文書處理軟體(例如:MS WORD) (3.8 / 4 / 3)

1.2.5 我懂得以複製和貼上文本等方式來操作電腦。(4.1 / 4 / 5)

1.2.6 我善於學習新科技。(3.9 / 4)

* (Mean / median / mode) out of 5 in Likert Scale

Most of our students have confident that they have mastered major skills for operating and maintaining a PC, they don't even afraid of learning new technologies. Significant amount of students seems have difficulty on word processing (or writing).
As expected, higher form / Group-CD students shows better result.

(C) Internet Skill Level:

1.3.1 我懂得上網的基本技能（例如，使用瀏覽器，搜尋引擎，輸入密碼登入等）。 (4.3 / 5 / 5)

1.3.2 我能夠與他人進行有效的線上即時通訊（例如whatsapp、wechat ,line 等）。 (4.3 / 5 / 5)

1.3.3 我可以利用互聯網即時發送檔案或多媒體訊息（例如，照片，短片等）。(4.2 / 4 / 5)

1.3.4 我能發送和接收電子郵件。(4.2 / 4 / 5)

1.3.5 我能夠附加附件檔案到電子郵件。(4.1 / 4 / 5)

1.3.6 我懂得怎樣使用線上討論區。(例如，香港高登)。(3.9 / 4 / 5)

1.3.7 我懂得怎樣使用社交網絡。(例如，Facebook ,IG)。(4.3 / 5 / 5)

* (Mean / median / mode) out of 5 in Likert Scale

Most of our students have confident that they possess excellent skills for surfing and communicating through the internet. Their interest on communication with known friends is higher than discussion with unknown crowds. As expected, higher form / Group-CD students shows better result.

(D) Video Comprehension Skill:

1.4.1 我可以把短視訊（3分鐘內）涉及的內容與相關的文字資訊聯繫起來。(3.8 / 4 / 5)

1.4.2 我能夠在電腦上觀看視頻短片及同時做筆記。(3.8 / 4 / 4)

1.4.3 我能夠理解視頻短片表達的教學內容。(3.9 / 4 / 4)

* (Mean / median / mode) out of 5 in Likert Scale

Most of our students have confident that they can extract information from videos. Though the textual representation of information is a little bit more difficult than the understanding.   As expected, higher form / Group-CD students shows better result.

(E) Online Communication:

1.5.1 我能夠利用互聯網（例如，聊天室，討論區，即時通訊工具等）延續在課堂未完成的討論。(3.9 / 4 / 4)

1.5.2 我可輕鬆參看同時進行的多個線上討論，即使我未有回應所有的討論。(3.9 / 4 / 5)

1.5.3 我能夠在書寫一個文本訊息的同時，展開另一個討論 （例如，聊天室，即時通訊）。(3.9 / 4 / 5)

1.5.4 我喜歡有更多的時間思考才作出回應。(3.9 / 4 / 5)

* (Mean / median / mode) out of 5 in Likert Scale

Most of our students have confident that they are familiar with online mode of communication. As expected, higher form / Group-CD students shows better result.

(F) Online Working:

1.6.1 我可輕鬆面對一周多次使用電腦來做家課。(3.7 / 4 /3)

1.6.2 我能夠使用線上工具與同學分配工作以完成家課。(3.7 / 4 /3)

1.6.3 我能在學習時以文字清楚提問及提意見。(3.7 / 4 /3)

1.6.4 即使老師不在線上監察，我也能夠保持網上學習的動力。(3.6 / 4 /3)

1.6.5 即使在線上工作時預上干擾（例如，網上朋友找我聊天），我依然能夠完成網上家課。(3.7 / 4 /3)

1.6.6 即使家中有其它干擾(例如，電視)，我也能夠完成網上家課。(3.7 / 4 /3)

* (Mean / median / mode) out of 5 in Likert Scale

In general, our students can not be said as very capable of completing online assignments, but the situation can be improved with the monitory of teachers. As expected, higher form / Group-CD students shows better result.

(G) Independent Learning Skills:

2.1 我懂得分配不同任務的優先次序。(3.8 / 4 / 4)

2.2 我能很好地管理時間。(3.7 / 4 / 3)

2.3　我時常拖拉地完成任務。 (R 2.5 / 3 / 3)

2.4　我能找出時間來完成任務。(3.8 / 4 / 4)

2.5　我通常能在同時進行的許多任務中取得平衡。(3.7 / 4 / 3)

2.6　我有明確的學習目標及計劃。(3.6 / 4 / 3)

2.7　我在學業上十分自律。(3.6 / 4 / 3)

2.8　我懂得自我激勵以完成任務。(3.7 / 4 / 3)

2.9　我對我的學習負責。(3.7 / 4 / 3)

2.10　我有批判思維的能力。(3.8 / 4 / 4)

* (Mean / median / mode) out of 5 in Likert Scale

R Reverse Scaling

In general, our students can not be said as very independent when they are having their study, especially they are weak in self-discipline and lack of motivation. They have confident that they can think independently. As expected, higher form / Group-CD students shows better result.

(H)　Dependent Learning Skills:

3.1　我不介意未能完成學習相關任務。(R 2.7 / 3 / 3)

3.2　我需要協助才能理解文字性的指示。(R 2.7 / 3 / 3)

3.3　我通常等到最後一刻才去完成作業。(R 2.6 / 3 / 3)

3.4　我理解文字時感到困難。(R 2.9 / 3 / 3)

3.5　我需要老師提醒我繳交家課的限期。(R 2.9 / 3 / 3)

3.6　我需要獎勵方能完成任務。(R 3 / 3 / 3)

* (Mean / median / mode) out of 5 in Likert Scale

R Reverse Scaling

In general, our students can be said as quite dependent to their teachers when they are having their study. They have low responsibility and motivation to finish their work . Unlike other indicators, higher form students shows poorer results, though Group-CD students still shows better result.

(I) Academic Skills:

4.1   我可以獨自完成作業。(3.9 / 4 / 3)

4.2   有需要時，我能修訂我的學習目標。(3.7 / 4 / 3)

4.3   我能獨自解決問題。(3.8 / 4 / 4)

4.4   我需要面對面才能互動學習。(R2.6 / 3 / 3)

4.5   我需要老師作出回饋才有動機去完成作業。(R 2.7 / 3 / 3)

4.6   我是一個良好的閱讀者。(3.6 / 4 / 3)

4.7   我需要課堂互動討論才能學習。(3.4 / 3 / 3)

4.8   當我遇到學習問題時，懂得尋求協助。(3.7 / 4 / 3)

4.9   我不害怕學習新技能。(3.9 / 4 / 4)

4.10   我能夠仔細地閱讀。(3.8 / 4 / 3)

4.11   我的文字表達技巧清晰。(3.7 / 4 / 3)

4.12   我能夠按照書面指示完成任務。(3.8 / 4 / 3)

4.13   我能以文字方式傳達我的想法。(3.8 / 4 / 3)

* (Mean / median / mode) out of 5 in Likert Scale

R Reverse Scaling

In general, our students can not be said as possessing good study skills; they are willing to receive informations and follow instructions but not specially interested about discussions and interactions with their teachers. As expected, Group-CD students shows better result but higher form student is only marginally better than lower form students.

Overall Conclusion:

- Our students are familiar with computers and networks in general. They will welcome mobile devices in their learning environment.

- Our students are passive in learning. However, successful learning with aids of technologies needs active participation.

- Our students are dependent on their teachers in learning, which is not a good attitude for successful self-directed learning.

(5.3) Teacher's Readiness Survey for online learning with mobile devices - Summary of Findings

For the teachers' readiness survey, there are 2 sets of questionnaire measuring 1. subjective (self-evaluation) and 2. objective (practical skills) sense of readiness to technologies integration in teaching. There have been 58 valid set 1 and 48 valid set 2 questionnaires being collected in Sept. 2016. During that period there are 65 teaching staffs teaching in Lions College. Therefore the sample size of is much more than enough to draw a valid result.

(A) Teaching Style & Strategy (PK):

1. 我以討論作為一種教學策略。(3.7 / 4 / 4)

2. 我鼓勵學生學習時要具有自主性和創造性。(4 / 4 / 4)

3. 我會監督和協助學生在課堂中適當地互動。(4 / 4 / 4)

4. 作為一名教師，我支持學生為本的學習。(4.1 / 4 / 4)

5. 我會靈活處理學生要求 (例如:愈期家課、缺勤及小測驗補考等) 以滿足他們的需要。(4 / 4 / 4)

6. 批判性思維和解難能力是學生應具備的重要技能。(4.3 / 4 / 4)

7. 我會運用不同策略以鼓勵學生在學習過程中互動，參與和協作。(4.1 / 4 / 4)

8. 我會運用有效的策略及技巧以維持學生在學習中積極性。(例如:在課堂中建立解難團隊、提供寫作、分析及綜合和評價任務於課堂中，使學生不是被動的聽講）(4.1 / 4 / 4)

9. 我鼓勵從小組互動中學習。(3.9 / 4 / 4)

10. 我提供及時及具有建設性的反饋協助學生完成作業。(4 / 4 / 4)

11. 我會使用合適的教學設計和策略以配合不同學生的技能和天賦。(4 / 4 / 4)

12. 我會提供建基於主動學習概念且以真實世界應用為題的學生為本課堂活動。(3.8 / 4 / 4)

13. 我會設定不同的教學目標和運用不同的方法來滿足學生們不同的學習方式。(3.9 / 4 / 4)

14. 作為一名教師，我視自己為學習活動主持人。(3.9 / 4 / 4)

15. 我會於課堂中與學生磋商並糾正問題，協助他們完成學習任務。(4 / 4 / 4)

*(Mean / median / mode) out of 5 in Likert Scale

Most of our colleagues agreed that successful teaching should be student centered, that is the following elements such as discussion among students, quality feedbacks from teachers, collaboration among group works, student directed learning,... in short nowaday teachers act like an facilitator rather than just an instructor to their students.

(B) Online Teaching Ability (TPK):

16. 我會利用互聯網尋找教學資源。(4.3 / 4 / 4)

17. 我跟不同文化背景的學生合作。(4 / 4 / 4)

18. 我與學生溝通良好。(4.3 / 4 / 4)

19. 我有很好的閱讀理解能力。(4.2 / 4 / 4)

20. 我能夠凝聚多角度的論述成為一個連貫的討論。(4.1 / 4 / 4)

21. 我在非傳統課堂(即師生不會於同時同地出現)的安排下，仍可獨立地完成教學工作 (例如:回答網上提問)。(3.7 / 4 / 4)

22. 我可以獨自完成艱鉅的任務，即使別人不提供支持和鼓勵。(4 / 4 / 4)

23. 我能夠 / 覺得我可以舒適地在網上工作。(3.9 / 4 / 4)

24. 我能夠熟練地以書寫方式完成溝通。(4.2 / 4 / 4)

25. 我能夠建立有效的師生 / 同學間互動環境。(4.1 / 4 / 4)

26. 我能夠自律地工作。(4.2 / 4 / 4)

27. 我能夠在沒有清晰界定工作範疇的環境中工作。(4.1 / 4 / 4)

28. 我有責任承擔學習任務的準備和介紹。(4.3 / 4 / 4)

29. 我有能力嘗試新的教學方法。(4.2 / 4 / 4)

*(Mean / median / mode) out of 5 in Likert Scale

Most of our colleagues have the confidence that they can work comfortably in an online environment, especially completing their works independently through a written form of interaction with others. When comparing with a

traditional lesson having verbal communication and face to face interaction with their students, the comfortability decreased, but still not feeling difficult about that.

(C) Online Teaching Motivation & Time Management (TPK):

30. 線上教學讓我彈性決定我的工作時間。(3.6 / 4 / 4)

31. 線上教學讓我有更多閒暇時間從事其他專業活動（例如:參加會議及諮詢等）。 (3.4 / 3 / 4)

32. 線上教學讓我以更方便的方式來教學。(3.5 / 4 / 4)

33. 我將致力於線上教學工作。(3.1 / 3 / 4)

34. 我幹勁十足和充滿熱情從事教學工作。(4.2 / 4 / 4)

35. 我開始任務之前會先設定一個目標，(3.9 / 4 / 4)

36. 我每週可以奉獻4～6小時（白天或夜間任何時間）進行線上教學。(3 / 3 / 3)

37. 我願意與學生在線互動並進行線上討論。(3.6 / 4 / 4)

38. 相比於課室授課，我願意投入更多的時間在線上課堂。(3 / 3 / 3)

39. 我能夠為自己創建教學計劃並堅持進度。(3.6 / 4 / 4)

*(Mean / median / mode) out of 5 in Likert Scale

Having considered about its flexibility and possibilities, most of our colleagues are not specially motivated towards online teaching, though they are are highly motivated in their teaching profession, and strive with their very best to catch up with their setted targets in teaching plans.

(D) Computer & Internet Skills (TK):

40. 我對電腦部件(例如:CPU及顯示器)及周邊設備(例如:打印機及鼠標等)有基本認識。 (0.9)

41. 我懂得如何從硬盤或其他可移動存儲裝置打開及保存文件。(1)

42. 我對安裝軟件和更改電腦上的設定並不感到害怕。(0.7)

43. 我懂得如何正確開關電腦。(1)

44. 我懂得如何解決常見的軟硬件問題， 即使遇上問題也會找技術員支援。 (0.9)

45. 我懂得打開 / 發送電子郵件及其附件。(1)

46. 我熟悉網上禮儀。(0.9)

47. 我懂得如何上網和瀏覽網頁。(1)

48. 我懂得如何使用瀏覽器（例如:IE瀏覽器，谷歌瀏覽器等）下載檔案。(1)

49. 我對於使用搜尋器(例如:Google， Yahoo!等)、設置書籤及下載檔案等並不感到困難。(1)

50. 我懂得如何解決上網時遇到的常見錯誤(例如:"找不到網頁"及"連接超時"等)。(0.8)

51. 我知道如何訪問在線圖書館和其他資源數據庫(例如:WiseNews)。(0.9)

52. 我曾經參加線上課程(Online Course)。(0.7)

53. 我懂得如何使用非同步網上通訊工具。(例如:討論區及聊天室等) (0.9)

54. 我懂得如何使用社交網絡。(例如:Facebook、Twitter及Instagram 等) (1)

55. 我知道甚麼是PDF文件並懂得下載和閱讀它。(1)

56. 我可熟練地使用文字處理器(例如:word等)。(1)

57. 我能同一時間打開多個應用程序並在它們之間工作(例如:複製及貼上等)。(1)

58. 我懂得如何使用電子試算表(例如:Excel)。(0.9)

59. 我懂得如何使用演示軟件(例如:PowerPoint)。(1)

60. 我懂得使用在線學習管理系統(LMS) (例如: eclass， blackboard 等)。(0.8)

61. 我有能力於在線學習管理系統(LMS)修改和添加內容、習作及考核。(0.7)

62. 我有參加在線學習管理系統(LMS)相關的研討會/工作坊等。(0.5)

*(Mean) out of 1- Yes , 0-No

As expected, majority of our colleagues (>70% usually) possess basic computer and network operation skills . In general, they are familiar with a network rich working environment, except setting up online interactive activities for their students.

(E) Practical Implementation : "21 Things 4 Teachers" by REMC Association of Michigan

1. 我會使用網上教室 (例如: 教學網頁、BLOG、Wiki或eclass等LMS教學平台)。(3.3 / 3 / 3)

2. 我會製作信息圖表Info-graphics (例如: 概念圖，總結表，等)。(3.1 / 3 / 4)

3. 我會使用雲端儲存 (例如: Google drive, Dropbox, Onedrive等)。(3.5 / 4 / 4)

4. 我會使用網絡來協作 (例如: 共同編製平時分報表等共享文件)。(3.6 / 4 / 3)

5. 我會使用網絡來通訊 (例如: 以電郵、WhatsApp等即時通訊軟件聯絡同事)。(4.4 / 5 / 5)

6. 我會使用網絡來管理專案 (例如: 行事曆等專案管理工具)。(3.6 / 4 / 4)

7. 我關注學生在網絡上的禮儀，權利和對自身行為應付的責任。(3.8 / 4 / 4)

8. 我關注合法及公平使用網絡資源 (例如: 版權(Copyright), 剽竊(Plagiarism)等)。(4.1 / 4 / 4)

9. 我會先評估網上搜尋得來資訊的真偽，轉載時並會適當引用出處。(3.9 / 4 / 4)

10. 我會從網上搜尋教學內容和材料 (例如: iTunes U, Youtube , Teachers Tube 等)。　　　(4.2 / 4 / 4)

11. 我會製作互動教學活動 (例如: Quizzes, Flashcards, and Fun Interactives 等)。(2.8 / 3 / 3)

12. 我會拍攝，編輯及製作數碼圖像。(3.1 / 3 / 4)

13. 我會製作有效的教學示範 (例如: 短片 , PowerPoint , Google slide 等)。(3.9 / 4 / 4)

14. 我能從教師專業培訓中(例如: eservices中的seminar)分享或學習到新的教學科技。(3.5 / 4 / 3)

15. 我會利用網絡及多媒體提供不同形式及策略的示範和教學以滿足學生不同需要。(3.6 / 4 / 4)

16. 我會利用互聯網進行學習評估(例如: 投票(Polling) , 線上測驗(Online Quiz)等)。(3 / 3 / 3)

17. 我會利用試算表(例如: Excel) 進行數據分析及圖表製作。(3.8 / 4 / 4)

18. 我會利用數碼故事製作(例如: 網上續寫練習或故事短片製作等)加強學生的參與。(2.5 / 2 / 2)

19. 我會使用混合課堂(Blended Classroom)策略。
    (例如:利用教學錄像協助學生按各自需要重溫重點)。(2.7 / 3 / 3)

20. 我會利用翻轉課室(Flipped Classroom)這策略。
    (例如:學生展示錄像示範預習成效)。(2.4 / 2 / 2)

*(Mean / median / mode) out of 5 in Likert Scale

When we are talking about technology skills nowadays educator should possess to transfer learning into professional practice through the effective integration of technology, our colleagues show varied competence in skills of different categories. In general, they are not quite familiar with technology skills for creation of online interactive activities, but they have high competence in technology skills related to communications, information retrieval and presentation.

(F) Practical Implementation: Feasibility of Local Cases

*以下問題中"智能裝置"指智能手機或平板電腦等可攜式上網裝置

21. 利用QR code製作探究式學習活動。(例如: 自然教育徑導賞,"數碼遊踪"等) (2.7 / 3 / 2)

22. 利用智能裝置作模擬實驗。(例如: 或然率,處境抉擇投票 等) (2.6 / 2 / 2)

23. 利用智能裝置作測量儀器。(例如: 角度、方位、pH值、含氧量及水流速度等) (2.6 / 2.5 / 2)

24. 利用GPS於實地考察活動記綠行縱並配合照片和Google Map報告行程及發現。(2.8 / 3 / 3)

25. 利用QR code製作具超連結功能的筆記或工作紙。(2.7 / 3 / 3)

26. 與學生共同製作電子書。(例如: 遊記、活動報告、數碼故事書及畫集 等) (2.6 / 2 / 2)

27. 老師利用智能裝置拍攝學生習作,作即時示範及討論。(3.3 / 3.5 / 4)

28. 學生利用智能裝置拍攝手寫習作並上載至家課伺服器繳交家課。(2.8 / 3 / 3)

29. 學生錄製並繳交短片式家課。(例如:朗誦錄音(SoundCloud)或視頻錄影(YouTube),等) (2.7 / 3 / 3)

30. 利用雲端共享檔案,以協作形式進行專題研習。(例如: IES 及 SBA 報告) (3 / 3 / 3)

31. 利用智能裝置上各式互動教學Apps,補充教科書的不足。 (3.1 / 3 / 3)

32. 利用智能裝置上各式電子參考工具Apps,支援學習。(例如:發聲字典, 圖表計算機等) (3.2 / 3 / 3)

*(Mean / median / mode) out of 5 in Likert Scale

When we are talking about experimental practical examples of lessons with mobile devices, our colleagues thought that using the devices as an supportive tools to enrich their current teaching, is more feasible than those require their students to participate actively.

Overall Conclusion

● Our colleagues possess suitable computer and network operation skills and have the potential to improve their teaching with the aid of the technologies.

● Our colleagues possess good attitude towards their teaching profession. They all agreed that successful teaching activities should be student centered.

● With the transition going to be made with the technologies, they thought its communication and information presentation and retrieval capabilities can be readily adapted. But may be due to the passive attitude of our students towards learning, they seems disagree of carrying out activities having their active participation.

Chapter 6 : Discussion & Suggestions

6.1 Hardware

6.1.1 Wireless Network Infrastructure:

Current Situation:

Currently there is a wired LAN connected with Cat.5 cables (maximum transfer rate 100 Mbps), providing standard RJ-45 nodes at all the classrooms and special rooms. For wireless network connection, currently 6 commercial grade high performance WIFI access points (WiFi AP) (2.4/5Ghz 802.11 n/ac) each could allow 40+ concurrent connections are set at both staff rooms, meeting room, and room 501. In addition, 2 portable low performance home grade WIFI access points (2.4Ghz 802.11 n) are set at computer room 201, which could allow 10+ concurrent connections. Currently they are being used in junior form portable apps development lessons. All of them are sharing the same 100 Mbps outgoing broadband connection to the internet with all other computers on the LAN.

Discussion:

There are several ways to make the transition from wired to wireless connection to the internet.

Way 1 is the most economical choice. We could simply provide each classroom with an WiFi AP, however, the added loading to the existing network may be huge (40 devices for each Wi Fi AP) and the stability of the whole network may also drop.

Way 2 is more expensive as we need to have new wiring work around the campus. As the additional wires may pass through the existing trunks, the cost of installation might be not as high as expected. Since there will be 2 separate networks, loading induced by new mobile devices might not affect the operation in the existing network. The new broadband connection might be used as a backup connection for the existing network (or vice versa) too in case of emergency. Moreover if the new network is being provided by different vendor from the existing one (currently PCCW), they will have clear responsibility on each other's own network. So in the management point of view, we have better independence in choosing different vendor from the existing one to run the new network.

Way 3 share the same cost and capacity with 2, but with reduced stability as those 2 networks might interfere with each other. However, there will be increased flexibility on accessing the content on existing servers in the old network.

Suggestions:

Way 2 is suggested as the stability of the establishment is the most important in our consideration. Here are the proposed specification:

Proposal 1 : 1 Classroom 1 AP

If the noise caused by background radio-wave is strong, 2.4GHz 802.11n standard cannot provide stable connection since the available frequency channels might be occupied by nearby household emissions. In this case, 5GHz 802.11 ac standard of connection has to be used. Since the penetration power of the high frequency 5GHz signal are weaker, we cannot share the connection between adjacent classrooms by the same WiFi AP. Therefore our proposed installation plan will look like plan 1 in appendix IV. We will install 24 802.11 ac/n routers (running in ac mode) in each of the mostly used classrooms running at ac mode. In this way, the capacity of connection of each classroom is 40+ devices. But the drawback is that we have no coverage for nearly the whole block of special rooms. The future expansion plan might be costly.

Proposal 2 : 2 Classrooms 1 AP

If the noise caused by background radio-wave is weak, 2.4GHz 802.11n standard can provide stable connection through 1 of its 10 channels. In this case, 2.4GHz 802.11 n standard of connection can be employed. Since the penetration power of the low frequency 2.4GHz signal are stronger, we can share the connection between adjacent classrooms by one WiFi AP. Therefore our proposed installation plan will like plan 2 in appendix IV. We will install 24 802.11 ac/n routers (running in n mode) , with the relocated 6 existing routers, we can provide a broad WIFI coverage for nearly the whole campus. In this way the capacity of each classroom is 40+ or 20+ depending on whether the adjacent classrooms are using up the connections concurrently. Also, the speed of data transmission at n-mode is slower than that at ac-mode.

Modified Proposal 2 : 2 Classrooms 1 AP 2 nodes

Having the advices from our IT technicians, as the wiring work is the most expensive, if we could install 2 nodes at each WiFi AP share points between the classrooms, it will be possible for them to expand the network to 1 Classroom 1 AP configuration in future. This can increase the capacity of connection to meet the future demand when we have the resources. But the backend management console of the wireless network have to be designed to cater for the presence of WiFi APs in all rooms all over the campus. We have to discuss the possibilities with the vendor.

SSID Management and Authentication Scheme:

Hidden temporary guest SSID with PSK2 passcode protection will be provided for guests for temporary connection. All teacher devices are secured by access control list with supplied MAC addresses with a shared teacher SSID. For all school provided devices (for students and teachers to

use in classroom) are connected with a roaming student SSID all over the campus with passcode known by IT team only. There is a location based SSID being protected with access control list by MAC addresses endorsement, for devices to sync. with the location dependent apple TV projection system.

Procedures:

Here is the suggested procedure of implementation.

1. Invite interested vendors for site visit and feasibility study of our proposals.

2. Finalize our final Network Specification.

3. Invite Tender for a suitable vendor.

4. Implementation.

5. Testing.

6.1.2 Mobile Device selection:

Current Situation:

There are 11 google nexus 7 16GB tablets and 1 nexus 7 II 32GB tablets purchased for teaching mobile app development and had been used in the school based pilot scheme for testing purpose.There are another 4 ipad minis 16GB tablets purchased for that scheme too. Recently, there are another 15 ipad air 1 16GB tablets purchased with the Project We Can for teaching video production. Therefore, we have experiences on deploying both idevices and android tabs in small scale and we have to make a choice for the future.

Discussion:

Operating System:

There are 3 choices of operating system to be chosen for the mobile devices, namely iOS, android and windows 10. Since the windows system are not quite user friendly and also many apps for education are absent from that platform, it is not a good choice at the moment. For iOS from Apple Computer and android from Google, both of them have wide choices of apps in education era. If we look at their user interfaces, iOS has the best performance in terms of responses to user interactions.

Battery:

The battery life of the i-devices is significantly longer than the android devices. Our ipads and ipad-minis out performed our nexus tablets both in terms of battery life (1 hour per charge) and charging time.

Internal Memory:

According to our experience, 16GB is more than enough for educational use if cloud storage are used appropriately.

Screen size and resolution:

7" size is big enough for browsing web pages and small enough to be held easily and delivery to classroom is easier too for smaller size. Bigger screen like 9.7" is great for using as ebook replacing paper text but far more expensive in our point of view (nearly 1/3 more expensive for a larger device).

Suggestions:

Selection of device:

We suggest to purchase ipad minis 16GB as it strive very good balance between size and price and its performance on battery life, ease of use and choices of apps also outperform the android pads.

MDM and Volume Purchase Program:

As large amount of devices have to be managed, technicians need to take training course on **MDM** for management of softwares to be installed in the devices. By joining the **volume purchase program**, we could centralize the purchase of apps to be run in all devices with a single apple store account and we need another mac book for cloning and backing up the systems of the idevices.

School resources:

As stated in the survey finding, BYOD approach is currently not suitable for our students and parents. Therefore we have to provide enough amount of the devices for students to use in the classroom. We suggest to accumulate these devices with the recurrent grant gradually. The first target is 25 ipad mini. Together with the existing devices, we could have 40+ idevices, enough amount for a whole class of students to use at the same time.

External resources:

We suggest to seek for external resources whenever there is, such as applying for the "project can" and we have 15 more ipads purchased. In this way, we might be able to accumulate our tablets reserve in a even faster pace.

Charging Facilities:

Convenient charging facilities (e.g. 24x USB charger) and trolleys have to be prepared for daily operation of large amount of tablets.

MAC address management:

A proper procedure for registration and discard of MAC address of devices or teaching staffs or devices owned by school, have to be established. Termed registration of MAC addresses of staffs' devices might be necessary otherwise the limited available spaces in the access control list might finally used up.

6.1.3 Choice of Projection System:

Current Situation:

Currently 45 projectors are located in various locations around the campus, from classrooms to school hall. 17 of them are old models with no HDMI port. Others are equipped with that port and are ready to be connected with a wireless projection device.

Discussion:

We have did tests on wireless projection devices like apple TV and miracast dongle. The projected screen of miracast dongle have significant time lag and also there exist compatibility issues with different model of android devices. Apple TV works as expected with ipad or ipad mini tabs, projecting smooth, synchronous images on the screens.

Suggestions:

We suggest to equip our classrooms with Apple TV wireless projection devices. To avoid collision of projection, each classroom's Apple TV will have its own SSID when connected with WiFi. Teacher's device need to be connected to the WIFI with a right SSID to project its screen out. This involves proper SSID management in the wireless network configuration.

There is currently no extra power socket around the projectors to provide power for the device. Modifications on AC sockets is needed and security measure have to be put on this tiny device.

6.1.4 Storage Scheme:

Current Situation:

Teachers and students are mainly using storages within the LAN (T drive and S drive). E-class is a way to provide storage accessible through the internet, but its design is not user friendly enough with the touch screen operated mobile devices. We have established an domain LCHK.org , to

provide free google colud storgae to all S3 students in mobile apps development classes, but not all of our students currently.

Discussion:

Cloud storage are convenient and accessible anywhere connected to the Internet. Some public cloud storage scheme like google drive are free of charge and with plenty of spaces. Private cloud storage can be established through configuration of servers and network attached storages (NAS). Public Clouds are excellent for exchange of information (collaboration) while Private Clouds are good for restricted access of all rights reserved materials. (e.g. teachers produced videos). Both of them play important roles in the implementation of mobile learning.

Suggestions:

Private Cloud

Build a 6TB volume with NAS to provide spaces for teachers to put in house teaching materials. (Like existing T drive share folder)

Build another volume provide spaces for teachers and students to exchange their information inhouse. (Like a web clipboard)

Public Cloud

Expand the existing google drive with lchk.org for all students to put their work on. (Like existing S drive)

Apply Google for education, such that the drive of lchk.org can be linked with series of google apps for education. This linkage will made the student training on google documents far more easier.

6.2 Software & Culture

6.2.1 Establishing the culture with teachers:

Current Situation:

Teachers have adequate computer and internet operation skills, but not specially motivated towards mobile learning. There is a need for an establishment of a **supportive culture** in the era of integrating technologies to their daily teaching. To demonstrate the advantages and convince them on the use of the mobile devices, we have to encourage our colleague to try applying them in their manageable step.

Discussion:

Manageable technology integration:

We divide the practical practices of teaching with mobile technologies integrated into 3 levels:

- Media Access and Instant Presentation (Level 1) {SE}
- Interactive elements in classroom (Level 2) {SE > ST}
- Social Networking for communication out of classroom (Level 3) {ST}

The practices in Level 1 are easily manageable, and the convenience provided with it is obvious. This kind of practices can also be integrated with traditional instruction easily such as multimedia enhanced presentation or easily assessed student work with their instant demonstration through the WiFi based wireless projection system. With the aid of the camera, all written assignments become digitally enabled instantly. This kind of moderate transition of classroom practices agreed with the research finding stated in chapter 4 that written work of less able student should not be taken away to maintain their dictation capability. So teaching practices at this level should be easily accepted and promoted to all teachers to establish the atmosphere of using technologies to enhance their lessons.

The practices in Level 2 are interesting but not quite easy to be managed if the teacher is not familiar with the technologies. The preparation work of this kind of activities are also demanding. So this kind of activities should be done by chosen KLA as an staff development exercise first. It takes time for teachers to develop and get familiar with the skill sets to transform their lessons with mobile technologies.

The practices in Level 3 are very involving. The idea of shifting the whole discussion from within a classroom to the cyber space with no boundary is amazing but not realistic at the moment with students have weak motivation towards learning. But there are still some area they have higher motivation on. For example, the discussion on their experience in a field trip or a study

tour. So practices in this level need a suitable context for the transformation to occur and success.

Suggestions:

(A) KLA selection for mobile learning implementation:

(1) Implementation at SAMR Enhancement Level {SE}:

English are chosen as the listening and oral activities are suitable to be enhanced with the aid of technologies.

(2) Implementation at SAMR Transformation Level {ST}:

Technology subjects are chosen as computer and technology teachers from this KLA are more familiar with the use of technologies, they have lower burden when handling new IT devices and hence will not be distracted and keep focusing on students response during their practices.

Some of the subjects in this KLA like Tourism and Hospitality, have suitable context in nature (e.g. study trip) to be enabled with mobile technologies to facilitate collaborative learning out of classrooms.

(3) Implementation at SAMR Transformation Level {ST} (Beyond Classroom):

Science and Liberal Study are both involving Project based Learning in their usual teaching practices. If the context of the project is interesting enough, or the nature of the study is out of the classroom, it will be easier to done with the aid of mobile technologies.

Therefore, here is a suggested Implementation Plan of the WIFI 900 Scheme :

WIFI 900 Action Plan Timeline

To be 年級	2015/16 科目	班別數目	2016/17 科目	班別數目	2017/18 科目	班別數目	將資訊科技融入學科的策略，如適用
中一			普通電腦	2	普通電腦	4	進行與資訊素養相關之網絡探究活動並進行協作式學習
			英語	2	英語	4	利用數碼媒體作聆聽訓練。
			科學	1	科學	2	進行與模擬實驗相關之探究式協作學習

中二			電腦	2	電腦	4	進行與資訊素養相關之網絡探究活動並進行協作式學習
			英語	2	英語	4	利用數碼媒體作互動語言訓練。
			科學	1	科學	2	進行與模擬實驗相關之探究式協作學習
中三			電腦	2	電腦	4	手機平板電腦應用開發工作坊
			英語	2	英語	4	利用數碼媒體作寫作訓練。
			科學	1	科學	2	進行與模擬實驗相關之探究式協作學習
中四			資訊及通訊科技	2	資訊及通訊科技	4	以社交網絡平台協助優化校本評核(SBA)的推行。
			通識	2	通識	4	以社交網絡平台協助進行專題研習(IES)中的討論與協作。
			旅遊與款待	2	旅遊與款待	4	以社交網絡平台及移動裝置協助考察活動的資料搜集及匯報。
中五			資訊及通訊科技	2	資訊及通訊科技	4	以社交網絡平台協助優化校本評核(SBA)的推行。
			通識	2	通識	4	以社交網絡平台協助進行專題研習(IES)中的討論與協作。
			旅遊與款待	2	旅遊與款待	4	以社交網絡平台及移動裝置協助考察活動的資料搜集及匯報。
中六			資訊及通訊科技	2	資訊及通訊科技	4	以社交網絡平台協助優化校本評核(SBA)的推行。
			通識	2	通識	4	以社交網絡平台協助進行專題研習(IES)中的討論與協作。
			旅遊與款待	2	旅遊與款待	4	以社交網絡平台及移動裝置協助考察活動的資料搜集及匯報。

(B) Suggested technology integration in Different KLA

Here is the suggested area of technologies integration in different KLA , with appropriate skill or context

- Chinese / English Language

  - Multimedia for lesson (Video Recording and Sharing)

- Science

  - Simulated Experiment (Appropriate Mobile Apps)

- Technology Studies

  Computer Literacy – Webquest (Internet ethics)

  ICT - Collaboration (SBA)

  Tourism & Hospitality – Collaboration and Presentation (Study Tours)

- Liberal Studies – Collaboration (IES)

(C) e-learning Development Schemes:

Here are some proposed e-learning development schemes to assist the development of technology integration:

- Video Production plan (LC TUBE) (2014/15 ~ 2017/18)

  The QE Fund funded project LC TUBE have been conducted in the 2015-16, and have teachers involved in producing instructional video with corresponding teaching plans. This resources will enhance the lesson with multimedia which would be facilitated with the introduction of connected Mobile devices. (Appendx VIII)

- IT enabled Lesson Plans (2016/17 ~ 2017/18)

  4 Lesson plans are currently written by our teachers every year for reflection and professional development purposes. Some of them are encouraged to be emphasised as IT enabled lesson plans with the usage of mobile devices in mind. (Appendix VII)

- Panel-based assessment on level of ICT application (2017/18)

  Assessing the extent and depth (level 1-3) of implementation of technology integrated teaching practices by related subject panels in the last year of the WiFi 900 scheme to assess the result of technologies integration. (Appendix VII)

6.2.2 Establishing the culture with students

Current Situation:

Students have low initiation and are highly dependent on teachers in learning. They use camera of voice recorder to assist themselves in information input, so their communication are multimedia based, Their language ability are limited, so acquire knowledge from web independently might have difficulty.

Discussion:

With mobile devices enabling the receival of multimedia information, our students have better chance of understanding than just reading texts. As they are highly dependent, teaching practices at SAMR transformation level {ST} will be difficult to be implemented.

Student Training Needs:

Here are some suggested training for our students to support their learning with mobile devices: (Appendix VII)

- Use of Google Documents for cloud based collaboration and more chances for writing.

- Use of Google Drive for sharing and archive of files, including images, screen shots and videos.

- More on Internet ethics can be done with Safety or Student Affairs Committee.

6.2.3 Parents' Issue:

Current situation:

Parents have no skills and little intention on controlling children's use of mobile devices. BYOD is not a suitable option right now.

Suggestions:

Student affairs committee, safety Committee or PTA should jointly held appropriate seminars for parents (or with students) on Mobile Device Management and Internet Safety. (Appendix VIII)

6.3 Insight for the Future

6.3.1 Cross subjects implementation in the STEM subjects:

As suggested in the document " Promotion of STEM Education - Unleashing Potential in Innovation" [32], the following six strategies are proposed to promote STEM Education in Hong Kong:

(1) Renew the curricula of Science, Technology and Mathematics Education KLAs;

(2) Enrich learning activities for students;

(3) Provide learning and teaching resources;

(4) Enhance professional development of schools and teachers;

(5) Strengthen partnerships with community key stakeholders; and

(6) Conduct review and disseminate good practices.
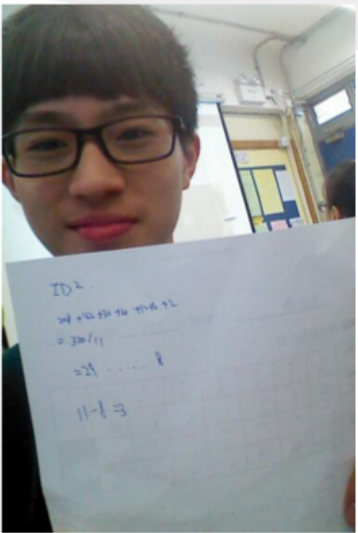
For (2), (3) and (5) here are some examples of cross subjects implementation of mobile learning in STEM subjects:

Project based learning

Mobile devices facilitate **collaboration** with the aid of social networking apps, and sharing of information with the convenience of cloud storages. Since the fact collection process can be done with **low cost handy mobile devices** with **cameras**, sound **recorders** or even **GPS** loggers, the projects can be done with an revolutionary approach.

Here is an example we have done with our students in our school based pilot testing program on mobile device integrated classroom:

The lesson was carried out with the Enhancement Level {SE} implementation firstly with students learning the calculation of check-digit of Hong Kong identity card on written worksheets, and their result being shared on a social network for their classmates to look at. Afterall, they were asked to design and share their own id card with a valid HKID no. that could cheat a computer for validation check (here is an Transformative Level {ST} trial already) . This sharing of work shows the ownership and creativity of their own design and then enhance their engagement level in the lesson.

Here, it shows a clear opportunity for applying the **collaborative learning** with **Project based** approach with mobile devices bringing social network to a live lesson inside the classroom. So how to make use of the social networking capability bought by the technologies to enable the project based learning on STEM subjects become an interesting area for further study.

> *How to make use of those mobile devices with social networking capability to enable the project based learning on STEM subjects?*

Scientific Investigation

With mobile devices taking pictures, measurements with various sensors attached with it, mobile apps can help doing scientific experiments or completing complicated simulations. In this way, scientific investigation can be done with ever low cost but ever high accuracy. Besides learning the formal way of investigation, sometimes possibility brought with technologies might inspire students to uncover the mystery around them.

Here is another example we have done with our students in our school's information day for primary students:

Being inspired by a youtube clip on the internet, we led a group of students decomposing some unused CD-ROM drives, took its micro lens for laser focusing out, and then attached it with some ipads mini to form low cost (or no cost) microscopes to investigate the micro pattern appears on various banknotes.

Here it shows the opportunities of converting mobile devices into low cost, creative instruments for doing experiments or discovering the world around you. So how to make use of various sensors and connectivity of a mobile device to enable the learning on STEM subjects no matter in the formal way (for students with high mathematical and language capabilities) or in an inspirational way (for all students with different academic abilities) forms another interesting area for further study.

> *How to make use of various sensors and connectivity of mobile devices to enable the learning on STEM subjects through an investigative approach ?*

Solving problems with Programming

Writing mobile apps, games or utility programs solving daily problems related to STEM subjects might be interesting and rewarding. By learning programming, everyone has a chance for better logical training with only a smartphone everyone has.

Here is a snapshot of our mobile apps development lesson :
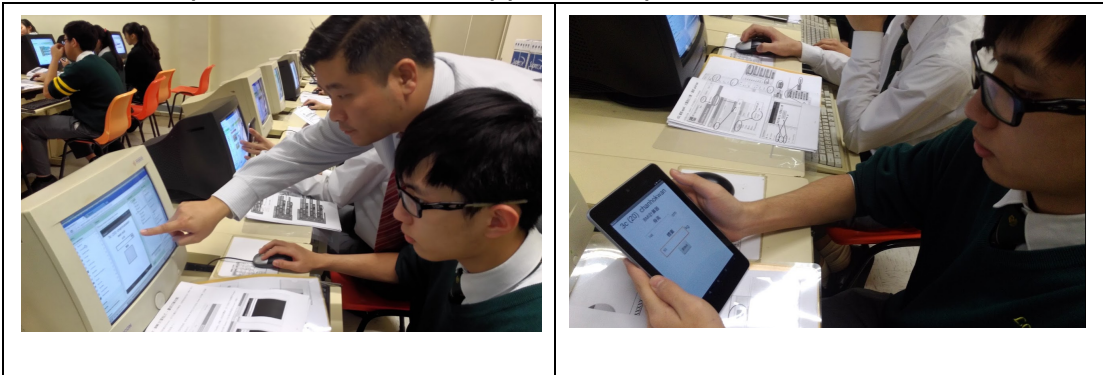
The students was writing and testing a mobile app for calculating the BMI index of a person. The program he did can be run on his own smartphone, so it is a self rewarding exercise. Netherderless, the student had asked us on how to save the data collected onto the cloud for further investigation, which is beyond the original objective of the lesson.

This example shows an opportunity of bridging the problem solving capabilities of programming with STEM subjects such as Biology or further application of that knowledges in other areas such as fitness test or health survey. So how to make use of the programming capabilities of these devices to assist the learning or apply the learned is an practical area for further study.

How to make use of the programming capabilities of mobile devices to assist the learning of problem solving in STEM subjects ?

Sharing with the community:

With the "Hong Kong Electric - Smart Power Campaign" , our students had designed an mobile Apps for promoting the concept of "low carbon living"and won an award.

As the mobile app can be downloaded through the android play store, they have shared their success with the community by giving tips on reducing our carbon footprint on this earth. This is an high order education exercise showing the understanding of value behind the application of technologies. This should form the core subject of teaching among all STEM subjects and mobile communication technologies enabled our students to complete their goal in a revolutionary way. So how to make use of the mobile communication technologies to promote those important core values behind the STEM subjects is yet another important question for us to ask for an answer.

> *How to make use of the mobile communication technologies to promote important core values behind the learning of STEM subjects ?*

The above scenarios shows only some of the possibilities and further research opportunities derived from them. Sure, this technologies integration opens a doorway to another fascinating world of STEM learning.

So the big question of how to integrate the mobile learning technologies with STEM education for students with both low and high academic capabilities will need further study to be answered.

> **How to integrate the mobile learning technologies with the learning of STEM subjects ?**

6.3.2 Possibility with technology advancement:

Mobile Learning technologies are still evolving. With the latest advancement. Two more interesting area will become increasingly popular in near future, they are:

- Virtual Reality
- Augmented Reality

With Virtual Reality, virtual learning tour or field trip become possible. A simulated world for students to learn and discover are unfolded. Some places that they ever have chances to visit , for example Mars or ISS Station, can be visited in first person view with the aid of this amazing technology.

With Augmented Reality, virtual elements can be added on top of the real world. Student can play flashcard, or spelling cards, or arranging cards in sequence show some steps of operations, then the virtual object will appear to indicate the result, implication, explanation, or simply some fun to enjoy.

We might not need to wait too long to see these scenarios appear in our classrooms, but we need to keep ourselves updated and prepared as new creative technologies are coming always .

Chapter 7 : Conclusion

According to "Mobile Learning Implementation Steps" from Mobl21 [5]. Here are some of the factors suggested to be considered before we begin implementing a mobile learning solution :

1. Defining the learning issue

2. Identifying content sources and subjects

3. Identifying technologies needed

4. Skill & training for teachers/facilitators

5. Cost of implementation

6. Facilitating Acceptance

7. Measuring Success

With this study, we have defined the learning issue, identified appropriate content sources and subjects with appropriate technologies. We then proposed a development path to establish our own culture. We have just tried to complete the first 3 steps of the above guidelines.

In coming years, we will have appropriate staff training and sharing sessions fulfilling step 4. Select appropriate tenders to complete the new wireless network, purchasing mobile devices and completing the supporting systems fulfilling step 5.

Finally we need to facilitate acceptance and hence measuring success in 2017-18 by panel based reflection on the overall levels (Level 1-3) and participations in the mobile technology integration with our classrooms.

For the future, there is a big opportunity of integrating mobile learning with the learning of STEM subjects.

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Appendix

(I) Teachers Survey Questionnaire (1)

獅 子 會 中 學
優質教育基金移動裝置與電子學習研究計劃
科任老師問卷調查(1)

主要任教科目	中文	英文	數學	通識	科學	科技	人文	體藝
所屬學習領域(KLA)	○	○	○	○	○	○	○	○

教學科技: 1 從未←--------------------→5 經常

	1	2	3	4	5
1. 我會使用網上教室 (例如: 教學網頁、BLOG、Wiki 或 eclass 等 LMS 教學平台)。	○	○	○	○	○
2. 我會製作信息圖表 Info-graphics (例如: 概念圖,總結表,等)。	○	○	○	○	○
3. 我會使用雲端儲存 (例如: Google drive, Dropbox, Onedrive 等)。	○	○	○	○	○
4. 我會使用網絡來協作 (例如: 共同編製平時分報表等共享文件)。	○	○	○	○	○
5. 我會使用網絡來通訊 (例如: 以電郵、WhatsApp 等即時通訊軟件聯絡同事)。	○	○	○	○	○
6. 我會使用網絡來管理專案 (例如: 行事曆等專案管理工具)。	○	○	○	○	○
7. 我關注學生在網絡上的禮儀,權利和對自身行為應付的責任。	○	○	○	○	○
8. 我關注合法及公平使用網絡資源 (例如: 版權(Copyright), 剽竊(Plagiarism) 等)。	○	○	○	○	○
9. 我會先評估網上搜尋得來資訊的真偽,轉載時並會適當引用出處。	○	○	○	○	○
10. 我會從網上搜尋教學內容和材料 (例如: iTunes U, You tube , Teachers Tube 等)。	○	○	○	○	○
11. 我會製作互動教學活動 (例如: Quizzes, Flashcards, and Fun Interactives 等)。	○	○	○	○	○
12. 我會拍攝,編輯及製作數碼圖像。	○	○	○	○	○
13. 我會製作有效的教學示範 (例如: 短片, PowerPoint , Google slide 等)。	○	○	○	○	○
14. 我能從教師專業培訓中(例如: eservices 中的 seminar)分享或學習到新的教學科技。	○	○	○	○	○
15. 我會利用網絡及多媒體提供不同形式及策略的示範和教學以滿足學生不同需要。	○	○	○	○	○
16. 我會利用互聯網進行學習評估(例如: 投票(Polling) , 線上測驗(Online Quiz)等)。	○	○	○	○	○
17. 我會利用試算表(例如: Excel) 進行數據分析及圖表製作。	○	○	○	○	○
18. 我會利用數碼故事製作(例如: 網上續寫練習或故事短片製作等)加強學生的參與。	○	○	○	○	○
19. 我會使用混合課堂(Blended Classroom)策略。(例如:利用教學錄像協助學生按各自需要重溫重點)。	○	○	○	○	○
20. 我會利用翻轉課室(Flipped Classroom)這策略。(例如:學生展示錄像示範預習成效)。	○	○	○	○	○

*以上項目取材自 REMC Association of Michigan 的"21 Things 4 Teachers" 網站中提及的"變革性教學科技"。

教學運用實例: *以下問題中"智能裝置"指智能手機或平板電腦等可攜式上網裝置。 1 極不可行←----------------→5 十分可行

	1	2	3	4	5
21. 利用 QR code 製作探究式學習活動。(例如: 自然教育徑導賞,"數碼遊踪" 等)	○	○	○	○	○
22. 利用智能裝置作模擬實驗。(例如: 或然率,處境抉擇投票 等)	○	○	○	○	○
23. 利用智能裝置作測量儀器。(例如: 角度、方位、pH 值、含氧量及水流速度等)	○	○	○	○	○
24. 利用 GPS 於實地考察活動記錄行縱並配合照片和 Google Map 報告行程及發現。	○	○	○	○	○
25. 利用 QR code 製作具超連結功能的筆記或工作紙。	○	○	○	○	○
26. 與學生共同製作電子書。(例如: 遊記、活動報告、數碼故事書及畫集 等)	○	○	○	○	○
27. 老師利用智能裝置拍攝學生習作,作即時示範及討論。	○	○	○	○	○
28. 學生利用智能裝置拍攝手寫習作並上載至家課伺服器繳交家課。	○	○	○	○	○
29. 學生錄製並繳交短片式家課。(例如:朗誦錄音(SoundCloud)或視頻錄影(YouTube),等)	○	○	○	○	○
30. 利用雲端共享檔案,以協作形式進行專題研習。(例如: IES 及 SBA 報告)	○	○	○	○	○
31. 利用智能裝置上各式互動教學 Apps,補充教科書的不足。	○	○	○	○	○
32. 利用智能裝置上各式電子參考工具 Apps,支援學習。(例如: 發聲字典, 圖表計算機 等)	○	○	○	○	○

*以上項目取材自香港教育局,關於 WIFI-100 計劃之 PDP 中摘錄的中小學移動裝置與電子學習應用實例。

- 問卷完畢 -

(II) Teachers Survey Questionnaire (2) - p.1

獅 子 會 中 學
優質教育基金移動裝置與電子學習研究計劃
科任老師問卷調查(2)

請同事於 2015 年 11 月 2 日 (五)或前交
本問卷予校務處 Clara。謝甚!

主要任教科目 所屬學習領域(KLA)	中文	英文	數學	通識	科學	科技	人文	體藝
	○	○	○	○	○	○	○	○

教學風格和策略:　　　　　　　　　　　1 從未←-------------------→5 經常

1.	我以討論作為一種教學策略。	○	○	○	○	○
2.	我鼓勵學生學習時要具有自主性和創造性。	○	○	○	○	○
3.	我會監督和協助學生在課堂中適當地互動。	○	○	○	○	○
4.	作為一名教師,我支持學生為本的學習。	○	○	○	○	○
5.	我會靈活處理學生要求 (例如:愈期家課、缺勤及小測驗補考等) 以滿足他們的需要。	○	○	○	○	○
6.	批判性思維和解難能力是學生應具備的重要技能。	○	○	○	○	○
7.	我會運用不同策略以鼓勵學生在學習過程中互動,參與和協作。	○	○	○	○	○
8.	我會運用有效的策略及技巧以維持學生在學習中積極性。(例如:在課堂中建立解難團隊、提供寫作、分析及綜合和評價任務於課堂中,使學生不是被動的聽講)	○	○	○	○	○
9.	我鼓勵從小組互動中學習。	○	○	○	○	○
10.	我提供及時及具有建設性的反饋協助學生完成作業。	○	○	○	○	○
11.	我會使用合適的教學設計和策略以配合不同學生的技能和天賦。	○	○	○	○	○
12.	我會提供建基於主動學習概念且以真實世界應用為題的學生為本課堂活動。	○	○	○	○	○
13.	我會設定不同的教學目標和運用不同的方法來滿足學生們不同的學習方式。	○	○	○	○	○
14.	作為一名教師,我視自己為學習活動主持人。	○	○	○	○	○
15.	我會於課堂中與學生磋商並糾正問題,協助他們完成學習任務。	○	○	○	○	○

網上教學技能:　　　　　　　　　　　1 從未←-------------------→5 經常

16.	我會利用互聯網尋找教學資源。	○	○	○	○	○
17.	我跟不同文化背景的學生合作。	○	○	○	○	○
18.	我與學生溝通良好。	○	○	○	○	○
19.	我有很好的閱讀理解能力。	○	○	○	○	○
20.	我能夠凝聚多角度的論述成為一個連貫的討論。	○	○	○	○	○
21.	我在非傳統課堂(即師生不會於同時同地出現)的安排下,仍可獨立地完成教學工作(例如:回答網上提問)。	○	○	○	○	○
22.	我可以獨自完成跟鉅的任務,即使別人不提供支持和鼓勵。	○	○	○	○	○
23.	我能夠 / 覺得我可以舒適地在網上工作。	○	○	○	○	○
24.	我能夠熟練地以書寫方式完成溝通。	○	○	○	○	○
25.	我能夠建立有效的師生 / 同學間互動環境。	○	○	○	○	○
26.	我能夠自律地工作。	○	○	○	○	○
27.	我能夠在沒有清晰界定工作範疇的環境中工作。	○	○	○	○	○
28.	我有責任承擔學習任務的準備和介紹。	○	○	○	○	○
29.	我有能力嘗試新的教學方法。	○	○	○	○	○

- 轉下頁 -

Teachers Survey Questionnaire (2) - p.2

線上教學動機及時間管理:	1極不同意←--------------→5 十分同意				
30. 線上教學讓我彈性決定我的工作時間。	○	○	○	○	○
31. 線上教學讓我有更多閒暇時間從事其他專業活動（例如:參加會議及諮詢等）。	○	○	○	○	○
32. 線上教學讓我以更方便的方式來教學。	○	○	○	○	○
33. 我將致力於線上教學工作。	○	○	○	○	○
34. 我幹勁十足和充滿熱情從事教學工作。	○	○	○	○	○
35. 我開始任務之前會先設定一個目標，	○	○	○	○	○
36. 我每週可以奉獻4~6小時（白天或夜間任何時間）進行線上教學。	○	○	○	○	○
37. 我願意與學生在線互動並進行線上討論。	○	○	○	○	○
38. 相比於課室授課，我願意投入更多的時間在線上課堂。	○	○	○	○	○
39. 我能夠為自己創建教學計劃並堅持進度。	○	○	○	○	○

電腦互聯網及線上工具:	同意	不同意
40. 我對電腦部件(例如:CPU 及顯示器)及周邊設備(例如:打印機及鼠標等)有基本認識。	○	○
41. 我懂得如何從硬盤或其他可移動存儲裝置打開及保存文件。	○	○
42. 我對安裝軟件和更改電腦上的設定並不感到害怕。	○	○
43. 我懂得如何正確開關電腦。	○	○
44. 我懂得如何解決常見的軟硬件問題， 即使遇上問題也會找技術員支援。	○	○
45. 我懂得打開 / 發送電子郵件及其附件。	○	○
46. 我熟悉網上禮儀。	○	○
47. 我懂得如何上網和瀏覽網頁。	○	○
48. 我懂得如何使用瀏覽器（例如:IE 瀏覽器,谷歌瀏覽器等）下載檔案。	○	○
49. 我對於使用搜尋器(例如:Google， Yahoo!等)、設置書籤及下載檔案等並不感到困難。	○	○
50. 我懂得如何解決上網時遇到的常見錯誤(例如:"找不到網頁"及"連接超時"等)。	○	○
51. 我知道如何訪問在線圖書館和其他資源數據庫(例如:WiseNews)。	○	○
52. 我曾經參加線上課程(Online Course)。	○	○
53. 我懂得如何使用非同步網上通訊工具。(例如:討論區及聊天室等)	○	○
54. 我懂得如何使用社交網絡。(例如:Facebook、Twitter 及 Instagram 等)	○	○
55. 我知道甚麼是 PDF 文件並懂得下載和閱讀它。	○	○
56. 我可熟練地使用文字處理器(例如:word 等)。	○	○
57. 我能同一時間打開多個應用程序並在它們之間工作(例如:複製及貼上等)。	○	○
58. 我懂得如何使用電子試算表(例如:Excel)。	○	○
59. 我懂得如何使用演示軟件(例如:PowerPoint)。	○	○
60. 我懂得使用在線學習管理系統(LMS) (例如: eclass， blackboard 等)。	○	○
61. 我有能力於在線學習管理系統(LMS)修改和添加內容、習作及考核。	○	○
62. 我有參加在線學習管理系統(LMS)相關的研討會/工作坊等。	○	○

- 問卷完畢 -

(III)   Students Survey Questionnaire - p.1

<div align="center">

獅 子 會 中 學
優質教育基金移動裝置與電子學習研究計劃
學生問卷調查(1)

</div>

級別:				班別:			學號:								
1 ○	2 ○	3 ○		A ○	B ○		0 ○	1 ○	2 ○	3 ○		0 ○	1 ○	2 ○	3 ○	4 ○
4 ○	5 ○			C ○	D ○							5 ○	6 ○	7 ○	8 ○	9 ○

		1表示極不同意 ← →5表示非常同意				
		1	2	3	4	5
1.1.1	我家中有可連接互聯網的裝置(例如:桌上電腦,手機或平板)。	○	○	○	○	○
1.1.2	我的上網裝置可應付日常要求	○	○	○	○	○
1.1.3	我的上網裝置有適當的軟件協助學習。（例如,MS Word , Powerpoint , PDF reader等	○	○	○	○	○
1.2.1	我具備操作一台電腦的基本技能（例如,儲存檔案,建立新資料夾等	○	○	○	○	○
1.2.2	有需要時,我懂得在我的上網裝置下載新的軟體。	○	○	○	○	○
1.2.3	有需要時,我懂得在我的上網裝置安裝新的軟體。	○	○	○	○	○
1.2.4	我能夠使用文書處理軟體(例如:MS WORD)	○	○	○	○	○
1.2.5	我懂得以複製和貼上文本等方式來操作電腦。	○	○	○	○	○
1.2.6	我善於學習新科技。	○	○	○	○	○
1.3.1	我懂得上網的基本技能（例如,使用瀏覽器,搜尋引擎,輸入密碼登入等	○	○	○	○	○
1.3.2	我能夠與他人進行有效的線上即時通訊 例如 whatsapp、 wechat ,line等）。	○	○	○	○	○
1.3.3	我可以利用互聯網即時發送檔案或多媒體訊息（例如,照片,短片等	○	○	○	○	○
1.3.4	我能發送和接收電子郵件	○	○	○	○	○
1.3.5	我能夠附加附件檔案到電子郵件	○	○	○	○	○
1.3.6	我懂得怎樣使用線上討論區。(例如,香港高登)	○	○	○	○	○
1.3.7	我懂得怎樣使用社交網絡。(例如,Facebook ,IG)	○	○	○	○	○
1.4.1	我可以把短視訊（3分鐘內）涉及的內容與相關的文字資訊聯繫起來。	○	○	○	○	○
1.4.2	我能夠在電腦上觀看視頻短片及同時做筆記。	○	○	○	○	○
1.4.3	我能夠理解視頻短片表達的教學內容。	○	○	○	○	○
1.5.1	我能夠利用互聯網（例如,聊天室 討論區,即時通訊工具等）延續在課堂未完成的討論	○	○	○	○	○
1.5.2	我可輕鬆參看同時進行的多個線上討論,即使我未有回應所有的討論。	○	○	○	○	○
1.5.3	我能夠在書寫一個文本訊息的同時 展開另一個討論（例如,聊天室,即時通訊）。	○	○	○	○	○
1.5.4	我喜歡有更多的時間思考才作出回應。	○	○	○	○	○

		1表示極不同意 ← →5表示非常同意				
		1	2	3	4	5
1.6.1	我可輕鬆面對一周多次使用電腦來做家課。	○	○	○	○	○
1.6.2	我能夠使用線上工具與同學分配工作以完成家課	○	○	○	○	○
1.6.3	我能在學習時以文字清楚提問及提意見。	○	○	○	○	○
1.6.4	即使老師不在線上監察，我也能夠保持網上學習的動力。	○	○	○	○	○
1.6.5	即使在線上工作時預上干擾（例如，網上朋友找我聊天），我依然能夠完成網上家課。	○	○	○	○	○
1.6.6	即使家中有其它干擾(例如，電視)，我也能夠完成網上家課	○	○	○	○	○
2.1	我懂得分配不同任務的優先次序。	○	○	○	○	○
2.2	我能很好地管理時間。	○	○	○	○	○
2.3	我時常拖拉地完成任務。	○	○	○	○	○
2.4	我能找出時間來完成任務。	○	○	○	○	○
2.5	我通常能在同時進行的許多任務中取得平衡。	○	○	○	○	○
2.6	我有明確的學習目標及計劃	○	○	○	○	○
2.7	我在學業上十分自律。	○	○	○	○	○
2.8	我懂得自我激勵以完成任務。	○	○	○	○	○
2.9	我對我的學習負責。	○	○	○	○	○
2.10	我有批判思維的能力	○	○	○	○	○
3.1	我不介意未能完成學習相關任務。	○	○	○	○	○
3.2	我需要協助才能理解文字性的指示	○	○	○	○	○
3.3	我通常等到最後一刻才去完成作業	○	○	○	○	○
3.4	我理解文字時感到困難	○	○	○	○	○
3.5	我需要老師提醒我繳交家課的限期。	○	○	○	○	○
3.6	我需要獎勵方能完成任務。	○	○	○	○	○
4.1	我可以獨自完成作業	○	○	○	○	○
4.2	有需要時，我能修訂我的學習目標。	○	○	○	○	○
4.3	我能獨自解決問題。	○	○	○	○	○
4.4	我需要面對面才能互動學習。	○	○	○	○	○
4.5	我需要老師作出回饋才有動機去完成作業	○	○	○	○	○
4.6	我是一個良好的閱讀者。	○	○	○	○	○
4.7	我需要課堂互動討論才能學習	○	○	○	○	○
4.8	當我遇到學習問題時，懂得尋求協助。	○	○	○	○	○
4.9	我不害怕學習新技能	○	○	○	○	○
4.10	我能夠仔細地閱讀。	○	○	○	○	○
4.11	我的文字表達技巧清晰	○	○	○	○	○
4.12	我能夠按照書面指示完成任務	○	○	○	○	○
4.13	我能以文字方式傳達我的想法	○	○	○	○	○

以上問卷所收集數據僅作教育研究用途，研究完成後將予以銷毀。

(IV) Parents Survey Questionnaire - p.1

優質教育基金移動裝置與電子學習研究計劃
家長問卷調查(1)

級別:			班別:		學號:								
1 ○	2 ○	3 ○	A ○	B ○	0 ○	1 ○	2 ○	3 ○	0 ○	1 ○	2 ○	3 ○	4 ○
4 ○	5 ○		C ○	D ○					5 ○	6 ○	7 ○	8 ○	9 ○

(1) 子女上網習慣調查:

	1表示從不 ← → 5表示經常				
過去三個月內，我:	1	2	3	4	5
1.1 看到孩子使用手機或平板電腦玩遊戲。	○	○	○	○	○
1.2 看到孩子使用手機或平板電腦進行通訊。	○	○	○	○	○
1.3 看到孩子使用手機或平板電腦進行學習(例如查字典，搜尋資料做家課等)。	○	○	○	○	○
1.4 看到孩子使用手機或平板電腦進行閱讀。	○	○	○	○	○
1.5 看到孩子使用手機或平板電腦看視頻短片(例如Youtube)	○	○	○	○	○
1.6 會利用手機或平板電腦應用程式與孩子通訊	○	○	○	○	○
1.7 知道孩子最常瀏覽哪些網站。	○	○	○	○	○
1.8 有限制孩子在網上的活動	○	○	○	○	○
1.9 有設定手機和平板電腦等設備的「家長控制」功能（parental controls 如利用密碼來控制某些特定App或網站的使用	○	○	○	○	○

(2) 電子教科書與自攜裝置(BYOD):

	1表示極不同意 ← → 5表示非常同意				
	1	2	3	4	5
2.1 我對電子教科書很有認識	○	○	○	○	○
2.2 我認為電子教科書能有效協助孩子學習。	○	○	○	○	○
2.3 我認為平板電腦上的電子教科書能取代傳統教科書	○	○	○	○	○
2.4 我有能力分辨孩子正利用平板電腦學習或從事非學習活動。	○	○	○	○	○
	1表示極不同意 ← → 5表示非常同意				
	1	2	3	4	5
2.5 我有能力定時檢查孩子的平板電腦，並了解孩子的學習情況	○	○	○	○	○

Parents Survey Questionnaire - p.2

2.6	我願意督促孩子每晚為平板電腦充電，以便有足夠電力於課堂上使用。	○	○	○	○	○
2.7	我願意陪伴孩子在光線充足的環境下並以正確坐姿使用平板電腦。	○	○	○	○	○
2.8	我願意保管Play Store / App Store戶口密碼，勿讓孩子自行下載「非學習」程式。	○	○	○	○	○
2.9	我願意讓學校管理學習用的平板電腦，甚至改動其系統設置	○	○	○	○	○
2.10	我擔心孩子會以閱讀電子教材為名，取用平板電腦作學習以外用途。	○	○	○	○	○
2.11	我擔心長時間閱讀屏幕會影響子女視力。	○	○	○	○	○
2.12	我擔心長時間利用平版電腦學習會影響子女的溝通能力。	○	○	○	○	○

2.13	若果要購買平板電腦作為電子教科書，我願意承擔的價錢約為。	○ 借用	○ 少於 $1000	○ $1001至 $2000	○ $2001至 $3000
		○ $3001至 $4000	○ $4001至 $5000	○ $5001至 $6000	○ 多於 $6000

2.14	我認為每天閱讀屏幕的時間應為:	○ 越少越好	○ 少於 30分鐘	○ 31分鐘至 少於1小時	○ 1小時至 少於1.5小時
		○ 1.5小時至 少於2小時	○ 2小時至 少於2.5小時	○ 2.5小時至 少於3小時	○ 沒有限制

以上問卷所收集數據僅作教育研究用途，研究完成後將予以銷毀。

(V) Technician Survey Questionnaire

Lions College IT Education Development Committee

Wireless Network and Mobile Devices Equipment Survey

(A) Wireless Network				
Number and Type of existing WIFI Router	No.	Location	Specification	
Bandwidth of existing broadband connection and current performance				
Bandwidth of suggested additional broadband connection for future wireless connection				
Proposed Floor Plans	5GHz 802.11ac 1 Classroom 1 AP Mode File :		2.4 GHz 802.11n 2 Classroom 1 AP Mode File :	
Location based SSID Scheme	Pros.		Cons.	
Owner based SSID Scheme	Pros.		Cons.	
MAC Address ACL	Pros.		Cons.	No. of MAC to be Sufficient

(B) Mobile Devices:				
	iOS Devices		Android Tablets	
Number and Type of existing devices	No.	Type	No.	Type
Comment on type of existing devices and Battery Life				
Comment on type of existing devices and sufficient Memory Size				
Comment on type of existing devices and Screen Size				
Comment on type of existing devices and Projection Support				
Comment on type of existing devices and MDM Solution				
Comment on type of existing devices and Price				
Comment on type of existing devices and response of UI				

(C) Storage System:

	Comments			
	A/C Management	Ease of Use	Speed of Data Transfer	Capacity
NAS Solution				
Google Drive				
i-Cloud				

	Folder Structure	Access Right	Account
Subject Panel Data Sharing Scheme			
Students Data Sharing Scheme			

(D) Projection System:

	Screen Quality	Refresh Rate		Price
Miracast Dongle				
Apple TV				
	Model	HDMI	No.	Location
Projectors				

(VI) Proposed Floor Plan for WiFi Hotspots
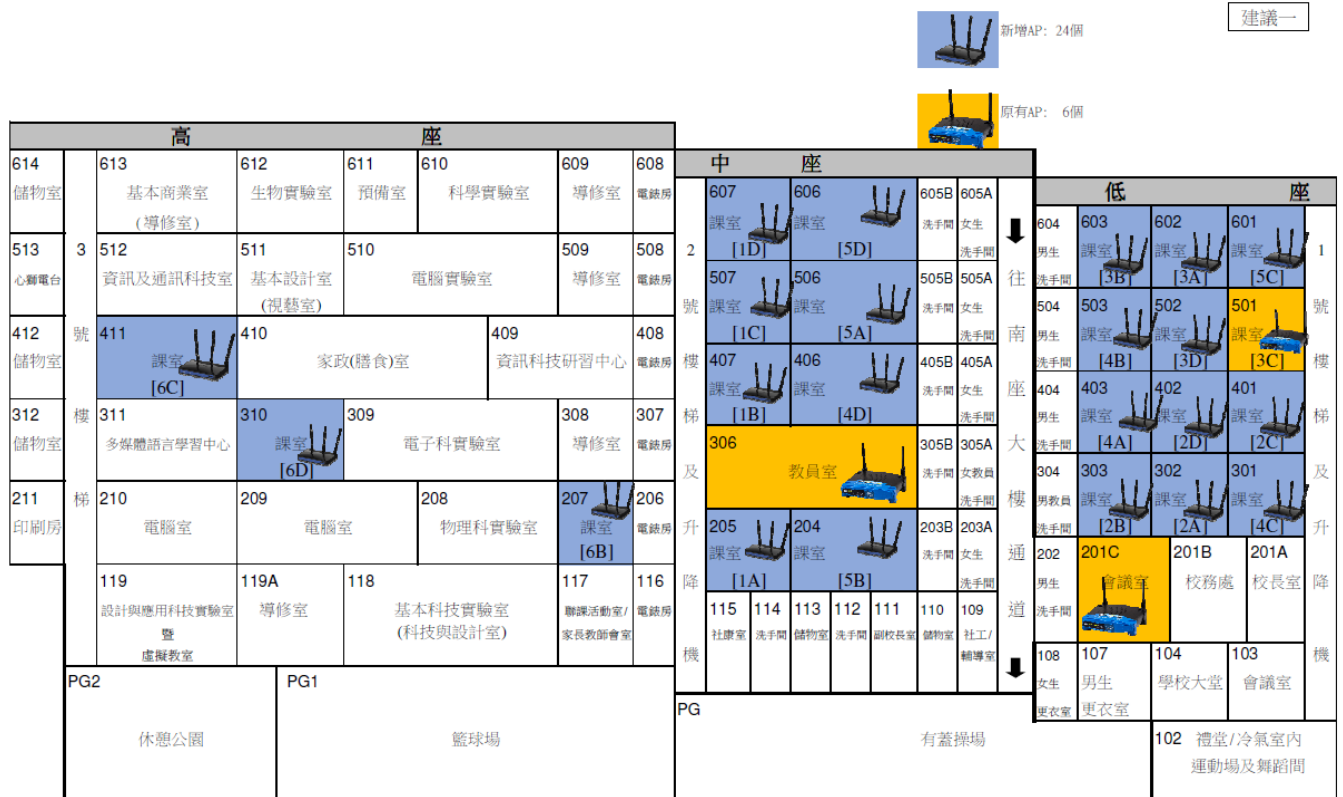
(VII) Year Plans of the Professional Development Committee of Lions College

獅子會中學
2015/2016 年度
學校及教師專業發展委員會
周年計劃書

關注事項：1. 深化教師參與 提升專業能力(同心‧參與‧提升)

目標	策略	成功準則	評估方法	時間表	負責組/人	所需資源
● 深化專業學習社群能提升教師專業水平 (T-分享)	● 發佈研究結果及建議： ➢ 發佈上年度校本專業學習社群的行動研究結果 ➢ 建議及跟進專業學習社群的工作情況	● 發佈研究報告及建議	● 研究報告 ● 問卷調查	2015年8月至2016年7月	● 學校及教師專業發展委員會 ● 學與教事務委員會 ● 總科主任 ● 科主任 ● 資訊科技教育發展組	● 電腦技術員 ● 行政助理
	● 透過教案編寫進行研究及社群分享： ➢ 優化教案編寫計劃，加入研究部份 ➢ 提供有關優化教案範本	● 教案具研究及實踐部份 ● 教案範本	● 教案			
	● 鼓勵教師向外間學術期刊投稿： ➢ 建議持續深化教案，並對外間投稿者作出支援	● 能為投稿提供建議	● 學術文章			
	● 設立及推展小型研究撥款： ➢ 設立小型研究撥款審批委員會 ➢ 每年總金額不少於港幣一萬元	● 成立審批委員會 ● 設立小型研究撥款	● 申請書			

目標	策略	成功準則	評估方法	時間表	負責組/人	所需資源
● 電子學習能提升教學效能 (T-培訓)	● 進行資訊科技教學策略校本現況檢視： ➢ 進行行動研究及製作校本檢視工具 ➢ 發佈研究果及提出建議	● 發佈研究報告及建議	● 研究報告 ● 問卷調查	2015年8月至2016年7月	● 資訊科技教育發展組	● 電腦技術員
	● 建立電子學習基建設施： ➢ 完成硬件採購及設置 ➢ 進行系統整合	● 完成無線網絡基建 ● 兩個網絡能建立聯網	● 無線網絡 ● 系統效能			
● 中層領導員能提升能力(T-專能)	● 支援初任中層領導員： ➢ 為兩年內任職中層領導員配編專業成長導師	● 初任中層領導對計劃持正面評價	● 問卷調查	2015年8月至2016年7月	● 學校及教師專業發展委員會	/
	● 發展資深教師潛能： ➢ 鼓勵教師進修人力資源及財務管理課程	● 更多資深教師報讀有關課程	● 進修紀錄			
● 持續推展積極的教學環境 (剛柔並兼人人有責)	● 教師知悉班別特徵及最新發展： ➢ 發放整體、按級、按班的每月學生發展關注事項	● 每月發放學生發展關注事項文件	● 關注事項文件	2015年8月至2016年7月	● 學校及教師專業發展委員會 ● 學生事務委員會 ● 學與教事務委員會 ● 總科主任 ● 科主任	● 行政助理
	● 共同執行每月重點政策： ➢ 教師按學校的每月學生發展關注事項而採取有關行動 ➢ 每月檢視成效	● 懲罰紀錄下降 ● 獎勵紀錄增加	● 獎懲統計 ● 持分者問卷			
	● 支援個別教師： ➢ 向個別教師提供建立與學生積極關係及有效與教效能的密集式跟進工作	● 師生關係良好 ● 教學更具成效	● 獎懲統計 ● 持分者問卷			

學校及教師專業發展委員會
2015-2018 年度發展計劃

關注事項	目標	時間表			策略大綱
		15/16	16/17	17/18	
1. 深化教師參與 提升專業能力 (同心·參與·提升)	● 深化專業學習社群能提升教師專業水平(T-分享)[1]	✓			● 發佈研究結果及建議
		✓	✓	✓	● 透過教案編寫進行研究及社群分享
		✓	✓	✓	● 鼓勵教師向外間學術期刊投稿
		✓	✓	✓	● 設立及推展小型研究撥款
	● 電子學習能提升教學效能 (T-培訓)[4]	✓			● 進行資訊科技教學策略校本現況檢視
		✓			● 建立電子學習基建設施
			✓		● 進行教師及學生培訓
					● 部份科目進行先導計劃
			✓		● 發佈研究結果及建議
				✓	● 全部科目參與計劃
	● 中層領導員能提升能力(T-專能)[4]	✓	✓	✓	● 支援初任中層領導員
		✓	✓	✓	● 發展資深教師潛能
	● 持續推展積極的教學環境 (剛柔並兼 人人有責)[3]	✓	✓	✓	● 教師知悉班別特徵及最新發展
		✓	✓	✓	● 共同執行每月重點政策
		✓	✓	✓	● 支援個別教師

1:外評報告　2:持分者問卷/情意指標調查　3:教師/學生/家長建議　4:政府政策

(VIII) Year Plans of the IT Education Development Committee of Lions College

<div align="center">

獅子會中學
2015/2016 年度
資訊科技教育發展組
周年計劃書

</div>

1. 關注事項：<u>推展第四個資訊科技教育策略</u>

目標	策略	成功準則	評估方法	時間表	負責組/人	所需資源
● 電子學習能提升教學效能 (T-培訓)	● 進行資訊科技教學策略校本現況檢視： ➢ 進行行動研究及製作校本檢視工具 ➢ 發佈研究果及提出建議 ➢ 訂定第四個資訊科技計劃推行架構	● 發佈研究報告及建議 ● 發佈推行架構	● 研究報告 ● 問卷調查 ● 推行架構	2015 年 8 月至 2016 年 7 月	● 資訊科技教育發展組	● 電腦技術員
	● 建立電子學習基建設施： ➢ 完成硬件採購及設置 ➢ 進行系統整合	● 完成無線網絡基建 ● 兩個網絡能建立聯網	● 無線網絡 ● 系統效能			

2. 關注事項：<u>積極面對資訊社會</u>

目標	策略	成功準則	評估方法	時間表	負責組/人	所需資源
● 積極面對資訊社會	● 進行本校資訊科技發展情況研究： ➢ 向學生、家長及教師進行有關資訊科技應用於學習的行動研究 ➢ 發佈研究果及提出建議	● 發佈研究報告及建議	● 研究報告 ● 問卷調查	2015 年 8 月至 2016 年 7 月	● 學生事務委員會 ● 資訊科技教育發展組 ● 電腦科	● 電腦技術員
	● 裝備教師以培育學生使用互聯網的道德操守： ➢ 進行有關教師專業發展活動 ➢ 預備有關教材	● 教師認同活動及教材有幫助	● 進修紀錄 ● 問卷調查			
	● 為學生進行互聯網德育教育： ➢ 初中以電腦科作為平台推行有關教育 ➢ 高中以專題式推行有關教育	● 學生認同活動及教材有幫助	● 問卷調查 ● 考試成績			

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獅子會中學
資訊科技教育發展組
2015-2018 年度發展計劃

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關注事項	目標	時間表			策略大綱
		15/16	16/17	17/18	
1. 推展第四個資訊科技教育策略	● 電子學習能提升教學效能 (T-培訓)[4]	✓			● 進行資訊科技教學策略校本現況檢視
		✓			● 建立電子學習基建設施
			✓		● 進行教師及學生培訓
			✓		● 部份科目進行先導計劃
			✓		● 發佈研究結果及建議
				✓	● 全部科目參與計劃
2. 積極面對資訊社會	● 成為精明的互聯網使用者	✓			● 進行本校資訊科技發展情況研究
		✓	✓		● 裝備教師以培育學生使用互聯網的道德操守
		✓	✓	✓	● 為學生進行互聯網德育教育