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immersing, including and initiating digital transformation for smart societies*  
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## **Conduct, Connect, Continue: Foster students' digital literacy at a school library for a smart city**

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### **Abstract:**

*The school library of Lam Tin Methodist Primary School has a drastic change of its library programs for students, teachers and parents on digital literacy after joining the gamification research of the University of Hong Kong and the seed project of the Education Bureau on eLearning in 2013 and 2017 respectively. The on-going changes of the school library programs and services not only fit for the educational needs of the digital generation but also echo the development of Hong Kong as a smart city. Starting from the proposal of transformation Kowloon East into a Smart City District in the 2015 Policy Address and consolidating with “The Smart City Blueprint for Hong Kong” in 2017, Hong Kong is ready to be a smart society.*

*This paper will report the capacity of the Teacher-Librarian on coordinating the valuable resources within and outside the school on subsequently facilitating “equal and free access to information and knowledge” (IFLA Global Vision 2018 highlights) of different school stakeholders in addition to improving students’ engagement in learning. It focuses specifically on the digital tool adoption and online resources which have profoundly transformed students’ Reading to Learn performance, teachers’ professional development and parent education in a short period of time. To name a few, students were introduced to the Google-connected world, eBook creation with online tools, Makerspace as well as STEM collections with OR code on each book to access related video. Teachers were especially alert to the critical issues of cyber safety and cyber ethics. Parents were guided to see the new world of the 4th Industrial Revolution and the Reading to Learn needs of their children through school library newsletters, circulars, and parent education seminar series. Other than surveys, interviews, and observations were used to find out what the small digital natives’ value and how they could engage in their Reading to Learn.*

*The desirable results reinforce the collaborative efforts of the Teacher-Librarian, teachers, and parents. The synergy among different school stakeholders is crucial for fostering students’ digital literacy. Other than the Information and Communication Technology facilities and devices provided in the school, continued efforts on parent education upon the changing needs of their children on digital literacy, such as using new devices and gadgets to access various resources at home, are necessary for*

success. The positive impact of the school library's digital transformation was widely disseminated to the public, educators and practitioners of the field through the Teaching and Learning Expo, Knowledge Exchange Seminar, Master of Science in Library and Information Management courses of the University of Hong Kong, Seed Project Sharing of the Education Bureau as well as posted on the Curriculum Development website of the Education Bureau in Hong Kong. It is believed that there is a growing role of libraries, including school libraries, in digital transformation. Teacher-Librarians are undoubtedly the (pro)motors of change at the digital age.

**Keywords:** Hong Kong, smart city, digital literacy, school libraries

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## 1. Hong Kong as a Smart City

The plan of developing Hong Kong to be a smart city started from a pilot study in the 2015 Policy Address. The initial plan for the Hong Kong as a smart city was based on the two common features of a smart city. The first is Information and Communication Technology (ICT): ICT is the key enabler to address one or more of the specific characteristics – Smart Governance, Smart People, Smart Living, Smart Mobility, Smart Economy and Smart Environment. The second is smart initiatives: They are adopted by Smart Metropolitan Government to improve citizens' quality of life and economic growth (Cheung, 2015; Manville, 2014). Kowloon East was selected as a pilot area to explore the feasibility of “using technology to enhance pedestrian and vehicular accessibility, manage district facilities, and disseminate information to the public in digital format (Cheung, 2015)”. The formerly manufacturing and industrial district was then turned to be the first smart city of Hong Kong. It was not until 2017 that the outline of different innovation and technology (I&T) measures were set out in the *Smart City Blueprint for Hong Kong*. The blueprint was an important document which mapped out the development plans of Hong Kong as a smart city for the next five years and beyond. It was expected to advance the urban development, economy and global competitiveness of Hong Kong with the wise use of I&T. Common Spatial Data Infrastructure (CSDI) has been developed for sharing of geo-spatial data since 2017 and expect for full operation in 2023. For example, the mobile app, My Kowloon East (MyKE) was launched as a smart city initiative in Kowloon East. The application of Artificial Intelligent in daily livings were introduced with interesting videos of machine learning. It is an interactive platform to share the real-time data for government and initially among citizens (Press Releases, 2019). Other smart city infrastructure includes Fifth generation (5G) mobile networks for better Internet of Things (IoT), eID common login, public cloud services, digital government services, and the Government's cyber security capability.



Figure 1: My Kowloon East (MyKE) Mobile Apps for Kowloon East.  
(Source: [https://play.google.com/store/apps/details?id=hk.gov.ekeo.app&hl=en\\_US](https://play.google.com/store/apps/details?id=hk.gov.ekeo.app&hl=en_US))

The Ex-President of IFLA, Donna Scheeder, once stressed that “there is no sustainable development without access to information. And there is no meaningful, inclusive access to information without libraries (IFLA, 2017).” The sustainable advancement of the library programs in Lam Tin Methodist Primary School, especially after joining the gamification research of the University of Hong Kong and the seed project of the Education Bureau on eLearning, fulfills the changing educational needs of the Generation Z and information needs of their parents, as well as satisfy various development needs of Hong Kong as a smart city, with enhancing accessibility of information for all.

## 2. The profound impact of Reading Battle

Lam Tin Methodist Primary School Library joined the research project of the University of Hong Kong, “Strengthening students’ reading comprehension ability (both Chinese and English) through developing children’s literature e-quiz bank on cloud” since the school year 2013-2014. The equiz platform of the research entitled “Reading Battle”. This is a 3-million Hong Kong Dollar Quality Education Fund Project aims to elevate students’ reading comprehension abilities, enhance their reading interests and foster their reading habit (Wu et al., 2014). Taking advantage of the availability of cloud services, Information and Communication Technology as well as comprehensive computer facilities of schools, Reading Battle - “an interactive e-quiz cloud service with an award scheme as added incentive (Wu et al., 2014),” is successfully run in different schools. Over 5,000 students from over 50 schools/libraries from Hong Kong, Taiwan, Mainland China and United States, including those approximately 480 from Lam Tin Methodist Primary School, have used this award-bearing gamification equiz platform since 2013 (The University of Hong Kong, 2016).



Figure 2: Home Page of the gamification project “Reading Battle”.

(Source: <https://slideplayer.com/slide/12416565/>)

### 2.1 Creating a 21<sup>st</sup> Digital Learning Environment for Fostering Digital Literacy

To join Reading Battle, we have to perfect the digital environment in the school and students’ living environment. In the *Report on the Fourth Strategy on Information Technology in Education: Realising IT Potential Unleashing Learning Power*, the Hong Kong Government was committed to lead Hong Kong “toward a knowledge-based economy and to become a smarter city” with “the full benefits of the global technological proliferation and advancement,

as well as the position and role of Hong Kong in the national “One Belt One Road” Initiative (Education Bureau, 2015)”. To improve the school infrastructure under the government’s commitment, each school was provided with 40 iPads. Even though, the students and teachers of Lam Tin Methodist Primary were not accessible to Google Chrome in the school before joining Reading Battle in 2013. Without setting Google Chrome as one of the browsers of all school computers, many teachers were unfamiliar with Google, needless to say further its impact on students’ learning. After introducing Reading Battle, Chrome browsers were installed across all school devices as suggested by the Chief Investigator, Dr. Sam Chu, and his Research Team. Parent Guidelines in both printed and online formats of installing Google Chrome were provided by the teacher-librarian to enable students’ accessibility of Reading Battle via the Chrome browser at home. Starting at this point, both teachers and students got used to the Web 2.0 tools in students’ school learning and daily lives. Teachers could engage students in different learning activities with a repertoire of digital tools such as Google Classroom, Chromebook apps, and Google Earth. Students were able to use different Google and online tools to share their ideas and collaborate with their peers. To name a few, they were facilitated to share their messages through Gmail and YouTube, communicating through WhatsApp, Google Hangouts and Skype, brainstorming with Padlet, in addition to collaborating with their buddies through Google Docs and Google Form. The digital literacy program for students was further enriched with the Education Bureau’s resources on proper online behaviour, cyber ethics, cyber safety and cyber security. Furthermore, being one of the schools in Kowloon East, the students were encouraged to download the mobile apps, tried out the feasibility of the smart initiatives and give feedback to the District Councillor Members.

These are only some examples of how the Teacher-Librarian take advantage of the free resources in an interconnected digital world to enrich her library programs for the students. Most important of all, students accustom the authentication system with login name and password, related security issues, usability of online tools, along with responsible online behavior that is legal and ethical, all of which are necessary skills, knowledge, and attitude of smart students to have the smart living of a smart city.

## **2.2. Reading and Creating eBooks**

Students of Lam Tin Methodist Primary school can access eBooks since 2010. There are over 250 eBooks offered to the students from the eRead Scheme of the Hong Kong Education City. In addition, Reading Battle provides the direct accessibility of 30 eBooks from the International Children’s Digital Library with equiz as well. Well-known eBook apps and other eResources, including those from robust eDatabases of the Hong Kong Public Libraries, are accessible through the school website after the introduction in library lessons and on TV Campus. The students have quality exposure to eBooks with various layout, multimedia, and interactivity. They are familiarized of different platforms, formats and distribution channels of different eBook ecosystems. Other than familiarizing students with gamification as a means to motivate their engagement in a smart city, the usability of eBooks of the smart students enable them to “Reading to Learning” and “Learn how to Learn” in the resilience city.

In Reading Battle, those children who finish reading over 200 books and score over 80 of each book in the equiz system, can grant the right to attend the eBook Creating Workshop and Question Setting Workshop. The eBook Masterpieces of students will upload to the equiz platform for participants’ reading challenge. This creative reading incentive idea of creating eBooks by reading champions stimulates many students’ positive attitudes towards reading and encourage them to read more. Some small authors’ eBooks are popular than the others.

Individual small author of Lam Tin Methodist Primary School got the chance to promote their eBooks on Campus TV. One of them got over 1000 LIKES within two months on the Reading Battle Platform. All these exciting practices on the gamified reading program facilitate students to succeed in the increasingly digital world through:

- (1) Analyze and synthesize the online data in order to plan and excel themselves anytime from the results-driven equiz platform;
- (2) Apply online tools to create and share their eCreations with consideration of marketing strategies;
- (3) Familiarize with the necessary basic skill sets of the digital era
- (3) Acknowledge different social media of the Smart World



Figure 3: A Lam Tin Methodist Primary School Student's eBook got 1440 LIKES on the Reading Battle Equiz Platform in four months, 22-4-2019

(Source: <http://equiz.cite.hku.hk/index.php/tw/booklist?booktype=ebook&page=1>)

Donna Scheeder once stated that “No Truly Sustainable Development Without Access to Information, And No Meaningful, inclusive Access Without Libraries” (IFLA, 2017). The fruitful achievement of the school from Reading Battle to students, parents, and teachers in addition to the implementation tactics were widely disseminated by the Teacher-Librarian of the Lam Tin Methodist Primary School Library under the initiation of the Reading Battel Principal Investigator in more than 14 open educational presentations, including the public lecture “Winning at the starting line!”, “The Stories of Seven 300s”, and “Knowledge Exchange Project 2017” at the University of Hong Kong, the Asia leading educational event – Learning and Teaching Expo 2016, the InnoTalk of the InnoCarnival of Hong Kong Science Park 2016, the Education Bureau advocated event - IT in Education e-Learning Series: 2015 International Conference on ICT/Social Media in Teaching and Learning, the Centre for Information Technology in Education (CITE) Research Symposium of the University of Hong Kong 2014, 2015 and 2016, as well as the Reading Battle Award Ceremony 2014, 2015, 2016, 2017 and 2018 at the University of Hong Kong. Other than online information, some of the events were reported by local newsletters. For example, the sharing at the Reading Battle Award Ceremony 2015 was reported by *Ta Kung Pao* (Ta Kung Net (Ed.), 2015, para. 6), *China News* (China News Service, 2015, para 7) and *Sino News* (Sino News Service, 2015, para 7); Presentation with the title: “The Impact of Incorporating Gamification in Reading to Students with Autism Spectrum Disorder: A Local Exemplar” was uploaded to the Inclusion Pavilion of the Hong Kong Education City, the largest one-stop professional educational portal in Hong Kong. In addition, the important achievement of the school in the implementation of Reading Battle can be accessed on the Reading Battle website under “Resources”. The



necessary knowledge, technology and skills involved in gamification of reading was therefore widely disseminated to educators/teachers, parents and students of different educational stages in Hong Kong.



Figure 4: Reading Battle Website  
(Source: <http://battle.cite.hku.hk/>)

Other than Hong Kong, the experiences of Lam Tin Methodist Primary School in the implementation of Reading Battle and its achievement also spread out to other Asian countries through different events, such as the Seventh World Chinese School Librarians' Forum with school librarians from China, Malaysia, Hong Kong, Macau and Taiwan in 2017, the presentations and workshops at the Association for Information Science and Technology (ASIS&T) Asia-Pacific Regional Conference 2019 in Cambodia, and also the collaborative project of The University of Hong Kong and the National Taiwan Normal University - MOOC of Reading Studies for Primary School in 2014. It is through the repertoire of local and overseas activities that the positive impact on fostering students' reading interest and digital literacy in gamification of reading create expected attention to the reading and digital learning needs of digital natives of a smart city in different areas, and could facilitate the development of smart cities under collaborative effort.

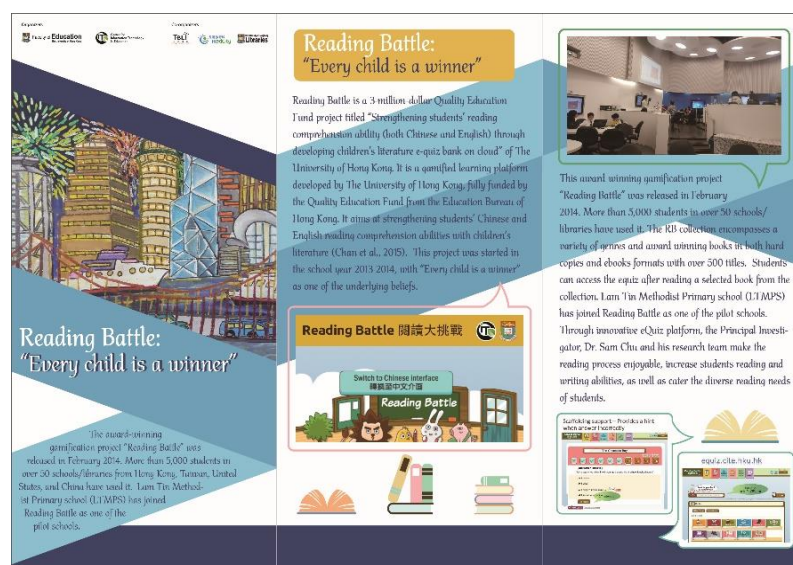


Figure 5: The leaflet for the promotion of Reading Battle.

### 3. A Brief Summary of the Education Bureau Pilot Scheme on E-Learning

To understand the learning needs of Generation Z and further unleash their competence in eLearning at the Smart age, Lam Tin Methodist Primary School Library joined the seed project of the Life-wide Education & Library Section of the Education Bureau, entitled “Pilot Scheme on Promoting E-Learning Through School Library Services” in 2017. The one-year project was run under the synergy of the Teacher-Librarian, Chinese subject Teachers with the support of the School Principal and Middle-Managers in a collaborative mode for the 145 Primary Five Students. The theme of the school-based project was Chinese idioms. The students can select a Chinese idiom story they learned in their Chinese lessons to create their eStories. The whole project was mainly divided into two parts. The first part focused on students’ usage of both printed books and eBooks of the school library. Students used software, such as Sketchboard.io, to outline their stories on the web whiteboard and give comments in peer evaluation. The second part emphasized more on the web-publishing matter. The creative online tools, such as Draw & Tell HD and StoryJumper, were employed by the small digital story authors to create their own professional looking eBooks with iPads or computers. The participated students enjoyed their learning and satisfied with their online publication.



Figure 6: Students’ Draw and Tell Stories

The goals of the pilot scheme were as follows:

- (1) Enhance students' literacy
- (2) Enhance student digital literacy
- (3) Improve students' generic skills, including creativity and communication skills
- (4) Accelerate students' understanding of Chinese idioms

The students were engaged in their learning and put extraordinary effort in self-directed learning. The fruitful results of the pilot scheme were shared to the other school teachers in the Education Bureau seminar entitled, “Application of IT in School Libraries Activities: Collaborating with Subjects in Carrying Out Story Writing (Primary) (New)”. The pilot scheme report of Lam Tin Methodist Primary School Library can be assessed on the Education Bureau website (Education Bureau, HKSAR, 2017). The project largely increased the confidence and skills of students in handling digital technologies and their understanding of cyber ethics, cyber safety and cyber security. All these are fundamental competence for living, working, communicating and learning in a smart society.

#### 4. Teacher-Librarians as (Pro)motors of digital transformation in Societies

Science, Technology, Engineering and Mathematics (STEM) education is key for providing skilled workforce for a smart city. The sustainable advancement to the information and media literacy issues of the library program throughout these years in addition to the setup of Makerspace in the school library are far beyond the imagination and understanding of the school principal and subject teachers upon the role of school library in education. They also create a large gap between parents' understanding of school education and their parental support on students' schooling at home. To solve these problems, a timeslot for professional development about Smart technology and Reading to Learn before each school library meeting with the principal and teaching staff was assigned, and a series of parent seminar upon the changing paradigm of parent-child Reading was carried out by the teacher-librarian at the school. Big terms of the 4<sup>th</sup> Industrial Revolution such as Smart devices, Internet of Things, Big Data, Artificial Intelligent, Cyber Ethics, Cyber Safety, Cyber Security were introduced along with strategies of conceptualized reading in parent-child Reading 2.0 were addressed in parent education. The paradigm shift in Reading 2.0 was reported by an online newsletter reporter (Chin, 2019) and was published by the Hong Kong Public Libraries on the Library Newsletter in March 2019 (Chan, 2019). A talk over Shared Reading 2.0 incorporated with the introduction of the 4<sup>th</sup> Industrial Revolution were delivered with examples by the teacher-librarian to the public via a talk at the Hong Kong Public Library (Tsuen Wan) in 2018. It was through the public lecture of the parent education seminar series of the Hong Kong Public Library and the online publication of the teacher-librarian's article on the Library Newsletter of the Hong Kong Public Libraries (Chan, 2019), that the key issues related to reading and eLearning transformation of a smart city were introduced to the public. It fulfills the IFLA highlight, "equal and free access to information and knowledge" to all (IFLA Global Vision 2018 highlights, 2018) in addition to the role of libraries in the United Nation's Sustainable Development Goal 11 Sustainable Cities and Communities - "Effective libraries stand at the heart of their communities. They are centres for learning and empowerment, places for meeting and building networks, and drivers of innovation and creativity (IFLA, 2018b)."



Figure 7: The Article, Reading 2.0, on the Hong Kong Public Libraries' Newsletter Issue 105.

(Source: [http://www.hkpl.gov.hk/en/common/attachments/about-us/publication/newsletter/2019/HKPL\\_Newsletter\\_105.pdf](http://www.hkpl.gov.hk/en/common/attachments/about-us/publication/newsletter/2019/HKPL_Newsletter_105.pdf))



## 5. Conclusion

The constant updates on emerging technology transform every aspect of our living, work, communication and learning in the Smart city. The smart environment is created by multiple technical capabilities woven together. Redesigning school library space, leveraging the print and online resources, professional education and training for different school stakeholders are all necessary smart-oriented changes in school libraries. Devotion to related research projects as well as active sharing of the learning needs of Generation Z and the smart students' learning results in various events of government educational bodies, institutions, reading-related organisations of the civil society in addition to reports and messages from different types of social media and websites, will spread out the words rapidly in the Smart world. One of the keys to success in cultivating digital literacy among the smart generation relies on the proactive role of teacher-librarians to conduct, connect and continue the smart metamorphosis process. It is only through teacher-librarians as promoters of change in digital transformation can the synergic forces be maximized to the most on shaping smart cities with data and digital technology in the local and global contexts.

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