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Territory-wide Readiness for IT Integration into Curriculum Delivery for Learner-centered Learning: The Current State in Hong Kong

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Abstract: The goal of this study was to forward information technology (IT) in education among secondary schools for promoting the paradigm shift to learner-centered learning. This study investigated the readiness of secondary schools in Hong Kong for IT integration into curriculum delivery. All 463 secondary schools in Hong Kong were invited for a territory-wide survey. With the response rate of 72.79%, the feedback from 337 schools indicated that most of the secondary school teachers confidently and habitually used IT for curriculum delivery. The teachers were adapted to integrate the use of digital resources, especially the free-of-charge ones, into students' in-class learning process and after-school learning tasks. The teachers were also willing to try the pedagogical use of Web 2.0 technologies for supporting subject learning and teaching. This study revealed that secondary schools in Hong Kong are ready to forward IT integration into curriculum delivery for learner-centered learning. It also revealed the need of sustainable and scalable teacher development to help teachers enhance pedagogical competency in promoting learner-centered learning along with the trend of digital classrooms.

Keywords: Curriculum delivery, IT integration, learner-centered learning, secondary schools, territory-wide survey

1. Introduction

In Hong Kong, the popularity of digital culture makes teachers and students in the secondary school sector ready for teaching and learning with the use of information technology (IT). To meet the trend of digital classrooms in school education in the twenty-first century, secondary school teachers in Hong Kong should be able to demonstrate competency and habits for the pedagogical use of IT. This study used a territory-wide survey to investigate the current state of IT integration into curriculum delivery in secondary schools in Hong Kong. The goal was to forward the use of IT in local secondary schools to promote learner-centered learning in twenty-first century classrooms.

2. Background of Study

The popularity of digital technology drives the use of digital resources and communication tools in school education. Learners are expected to access resources, other than textbooks, in the digital world on their own and negotiate meanings with peers for deep learning. This requires a learner-centered approach in which students actively develop deep understanding of subject knowledge. According to Chi's (2009) comprehensive review, the learner-centered approach, which integrates the elements of active, constructive and interactive learning into subject learning, is a possible way to engage students in deep learning efficiently and effectively (Fischer, Kollar, Stegmann, & Wecker, 2013). In fact, there is a global advocacy for the paradigm shift to learner-centered learning, of which students are exposed to a learning environment where they are the center of knowledge generation (Beyers, 2009; Wong & Looi, 2011). Students are provided with opportunities to actively participate in the process of

accessing resources and communicating with peers in learning tasks to construct knowledge in different learning contexts (Chi, 2009; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). In a technology-supported learning environment for learner-centered learning, teachers are expected to acts as a learning guide to encourage students' engagement in learning process (Ertmer et al., 2012; Hsu, 2008). They are also expected to be ready to apply various strategies that honor students' self-management and mutual support in the process of knowledge construction. Examples of the favorable strategies include providing students with access to online multimedia resources for idea formulation in authentic learning scenarios, and encouraging students to use Web 2.0 technologies for idea exchange in group discussions within collaborative learning tasks (Crick, McCombs, Haddon, Broadfoot, & Tew, 2007; Hsu, 2008; McCombs & Vakili, 2005).

Twenty-first century classrooms are digital ones, in which students typically use portable computing devices and social learning networks for resource retrieval and interpersonal communication related to subject learning (Chan, 2010; John & Wheeler, 2008; Wong, 2012; Wong & Looi, 2011). The use of social learning networks in digital classrooms can make students' learning processes transparent to teachers and peers, as these systems are able to track the process of peer interaction during classroom learning and after class. The learning process in typical digital classrooms often requires students to connect to digital resources for the retrieval, selection and sharing of authentic information from multiple sources with different perspectives to generate knowledge on their own or with peers. The creation of digital classrooms is an important way to promote active, constructive, and interactive learning under the learner-centered learning paradigm (Gut, 2011; Kang, Heo, Jo, Shin, & Seo, 2010).

The governments of many countries in the Asia-Pacific region have continuously invested in the promotion of IT in education in secondary schools. In Hong Kong, the government has made a significant investment in IT in education since late 1990s. In its current educational IT strategy, the Hong Kong government sets to further promote the effective use of IT in enhancing learning and teaching. It includes various measures of helping school teachers to continuously practice and enhance IT-related pedagogical practices, such as supporting school teachers to access curriculum-based teaching modules with suitable digital resources through a one-stop governmental teaching resource depository (Education Bureau, 2008). In order to identify ways to forward IT in education across secondary schools in Hong Kong for the promotion of learner-centered learning along with the trend of digital classrooms, this study examined the readiness of local secondary schools for integrating IT into curriculum delivery across different subject areas.

3. Method

This study conducted a territory-wide survey to review the current state of IT integration into curriculum delivery in secondary schools in Hong Kong. All 463 secondary schools in Hong Kong were invited to join the study. A total of 337 secondary schools participated in the questionnaire survey. This gave a response rate of 72.79%. A web-based questionnaire was established on an online platform for data collection. The questionnaire had eight questions: the first one was a "Likert scale" question for collecting data on what extent teachers' use of IT for curriculum delivery (see Table 1), and the other seven were "single selection" questions for collecting data on how teachers used IT for curriculum delivery favorable for learner-centered learning (see Tables 2 and 3). The principal or his/her representative in each surveyed school was invited to complete the anonymous questionnaire in a self-administered approach. The first question was responded by all the 337 school representatives. For the other seven questions, school representatives were requested to collate data from all subject panel members in their schools; with a final number of respondents at 25,711. A reliability test was conducted for the question that collected information about targeted respondents' self-perceptions; and the Cronbach's alpha reliability coefficient of that question was 0.71.

4. Results and Discussion

Secondary schools in Hong Kong were found to have integrated IT into subject learning and teaching. Local secondary school teachers were found to use IT frequently in day-to-day subject teaching. As Table 1 shows, teachers across different subject areas in the surveyed schools indicated that they often used IT, with mean ratings around 4 ("a lot"). The teachers who taught computer/IT nearly "always" (a mean rating close to 5) used IT in subject teaching; while teachers in physical education used IT less frequently in their teaching.

Table 1: Extent of teachers' use of IT in various subjects (N = 337).

Subjects	Mean [a]	SD
Computer/IT	4.89	0.37
Liberal studies (for senior secondary levels)	4.34	0.79
Arts	4.05	0.90
Science	4.00	0.83
Others [b]	3.95	0.96
Personal, social and humanities education	3.91	0.82
English language	3.88	0.80
Technology education	3.84	0.88
Chinese language	3.69	0.82
Mathematics	3.24	0.87
Physical education	2.56	0.90

[a] Five-point Likert scale from 1 = "never" to 5 = "always."
[b] Examples are library period, religious studies, and so forth.

In general, secondary school teachers in Hong Kong had confidence in the use of IT for learning and teaching. As Table 2 shows, nearly 80% of the teachers in the surveyed schools felt confident or very confident of using IT for learning and teaching. Across different subject areas, computer/IT had the largest proportion of confident teachers (around 95% of the teachers in the subject panel). There were also a large proportion of confident teachers in science and arts (both around 85%).

Table 2: Teachers' confidence and experience using IT for learning and teaching by individual subjects.

Subject	N	Count (%) of surveyed teachers who reported			
		being confident or very confident using IT for learning /teaching	using IT for learning/ teaching in the month before the survey	assigning students to use IT to perform learning tasks after school	using emerging technology [a] for learning/ teaching
Chinese language	4005	2791 (69.69)	3324 (83.00)	1768 (44.14)	2071 (51.71)
English language	4206	2907 (69.12)	3522 (83.74)	2443 (58.08)	2164 (51.45)
Mathematics	3319	2518 (75.87)	2319 (69.87)	741 (22.33)	1465 (44.14)
Science	2652	2258 (85.14)	2257 (85.11)	1021 (38.50)	1440 (54.30)
Technology education	1020	811 (79.51)	846 (82.94)	489 (47.94)	468 (45.88)
Computer/IT	1552	1489 (95.94)	1482 (95.49)	1321 (85.12)	1167 (75.19)
Personal, social and humanities education	3024	2283 (75.50)	2506 (82.87)	1195 (39.52)	1576 (52.12)
Arts	942	801 (85.03)	835 (88.64)	590 (62.63)	572 (60.72)
Physical education	889	621 (69.85)	423 (47.58)	164 (18.45)	310 (34.87)
Liberal studies	3015	2427 (80.50)	2639 (87.53)	1826 (60.56)	1821 (60.40)
Others [b]	1087	895 (82.34)	849 (78.10)	334 (30.73)	472 (43.42)
Overall	25711	19801 (77.01)	21002 (81.68)	11892 (46.25)	13526 (52.61)

[a] Examples of emerging technology are Web 2.0 technologies such as blogs, wikis, and podcasts.
[b] Examples are library period, religious studies, and so forth.

Teachers' regular use of IT in learning and teaching would be an attribute to their confidence in the pedagogical use of IT. As shown in Table 2, over 80% of the teachers in the surveyed schools

used IT for learning and teaching in the month before the survey. Across the different subject areas, teachers of computer/IT, arts, liberal studies, and science made IT an integral part of day-to-day curriculum delivery, with over 85% of the teachers in these subjects using IT for learning and teaching.

Secondary school teachers in Hong Kong also integrated IT elements into students' after-school learning tasks. As Table 2 shows, nearly half of the teachers across different subject areas assigned students to use IT to perform learning tasks after school. Around 85% of the computer/IT teachers used this practice. Over 60% of the teachers in arts and liberal studies also designed after-school learning tasks that required students to use IT.

In addition, secondary school teachers in Hong Kong made pedagogical use of Web 2.0 technologies such as blogs, wikis, and podcasts. Table 2 shows that more than half of the teachers used emerging technology for learning and teaching in the month before the survey. Across different subject areas, around 75% of the computer/IT teachers made such attempts. Over 60% of the arts and liberal studies teachers tried to use emerging technology for teaching purposes.

It was common for secondary school teachers in Hong Kong to use digital resources for learning and teaching. Table 3 shows that free-of-charge resources were the most popular type of digital resources for learning and teaching, with over 60% of the teachers using this type of digital resource in the month before the survey. The free-of-charge resources used were mainly provided by educational publishers and/or educational authorities, and developed by school teachers. The governmental teaching resource depository was the second most popular resource, used by nearly 25% of the teachers. Offline or online fee-charging resources were less popular, with around one-fifth of the teachers using them for learning and teaching.

Across different subject areas, over 65% of the computer/IT, liberal studies, science, and arts teachers used free-of-charge resources. Over 25% of the liberal studies, computer/IT, personal, social and humanities education, and science teachers used the governmental teaching resource depository, and around one-third of the liberal studies, English language, and computer/IT teachers used offline or online fee-charging resources in their curriculum delivery.

Table 3: Teachers' use of digital resources for learning and teaching in individual subjects.

Subject	N	Count (%) of surveyed teachers who reported		
		using the governmental teaching resource depository for learning/teaching in the month before the survey	using free-of-charge resources for learning/teaching in the month before the survey	using offline or online fee-charging resources for learning/teaching in the month before the survey
Chinese language	4005	755 (18.85)	2467 (61.60)	727 (18.15)
English language	4206	856 (20.35)	2422 (57.58)	1387 (32.98)
Mathematics	3319	588 (17.72)	1828 (55.08)	362 (10.91)
Science	2652	698 (26.32)	1799 (67.84)	482 (18.17)
Technology education	1020	235 (23.04)	591 (57.94)	160 (15.69)
Computer/IT	1552	476 (30.67)	1166 (75.13)	480 (30.93)
Personal, social and humanities education	3024	810 (26.79)	1928 (63.76)	513 (16.96)
Arts	942	218 (23.14)	626 (66.45)	162 (17.20)
Physical education	889	154 (17.32)	312 (35.10)	75 (8.44)
Liberal studies	3015	1144 (37.94)	2199 (72.94)	1194 (39.61)
Others [a]	1087	171 (15.73)	610 (56.12)	135 (12.42)
Overall	25711	6105 (23.74)	15948 (62.03)	5677 (22.08)

[a] Examples are library period, religious studies, and so forth.

In summary, secondary schools in Hong Kong have made IT an integral part of learning and teaching. They provide many resources related to educational IT that encourage teachers to use IT in curriculum delivery. Local secondary school teachers across different subjects are generally confident of and adapted to the use of IT for learning and teaching. The results reveal the emerging trend in

local secondary schools of IT integration into curriculum delivery for learner-centered learning; as a fairly high proportion of local secondary school teachers took initiatives in tailoring the use of IT (especially the free-of-charge digital resources and Web 2.0 technologies) for subject learning and teaching, which is in line with the strategies suggested by researchers for promoting learner-centered learning. There is a solid foundation in the local secondary school sector for encouraging teachers to strengthen students' roles in using IT to build and share subject knowledge in digital classrooms.

5. Conclusion

This study had a goal of forwarding IT integration into curriculum delivery across secondary schools in Hong Kong for promoting learner-centered learning along with the trend of digital classrooms. It used a territory-wide survey to investigate how and to what extent teachers' use of IT for curriculum delivery in local secondary schools. It found that around 80% of secondary school teachers in Hong Kong built confidence and habits of using IT for teaching. As over 60% of the teachers are ready to use diverse types of digital resources (especially the free-of-charge ones available on the Internet) and over half of the teachers start to integrate emerging technology (such as Web 2.0 technologies) into day-to-day subject teaching, the secondary school sector in Hong Kong has a solid foundation for promoting learner-centered learning in digital classrooms. In the paradigm of learner-centered learning, teachers are expected to act as facilitators who observe students' learning processes and provide timely support, so that students can control their own learning in the classroom. It is different from the teacher-centered approach well-established in the local secondary school sector, that teachers commonly are the learning authority and control students' learning in the classroom. To forward IT in education, teachers have to enhance their competency in the strategies for promoting learner-centered learning, such as engaging students in the use of various digital resources and Web 2.0 technologies for the sufficient access to learning information and convenient exchange of learning products.

As the paradigm shift to learner-centered learning in digital classrooms is relatively new, there should be policy support and professional development for teachers in order to better prepare them for coping with the challenges in the motivational and practice changes correspondingly. On the one hand, the educational authorities should provide schools with policy incentives to share innovative practices related to the use of IT for promoting learner-centered learning. On the other hand, the research community should work with schools on further research into the design of professional development for preparing teachers for the long-term and impactful changes in teaching motivations and teaching practices, with a focus on creating opportunities for students to actively engage in constructive learning and peer interaction using portable computing devices and wireless Internet networks. One of the future directions is integrating the concepts of collaborative apprenticeship model premised on community of practice (CoP) (Glazer & Hannafin, 2006; Lawless & Pellegrino, 2007) into the design of sustainable and scalable professional development, which emphasizes reciprocal interactions and experience sharing among teachers for mutual scaffolding under an iterative process of developing, implementing, reflecting and refining pedagogical practices. Further case studies will be considered in order to showcase the strategies that teachers, after completing related professional development, implement for promoting learner-centered learning.

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