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Analysis of the Learner Content Creation Process in a 1:1 Seamless Idiom Learning Environment

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Abstract: This paper reports a pilot study on mobile-assisted language learning that focused on both creative learner output and seamless learning. In learning Chinese idioms, students proactively used smartphones on a 1:1 basis to take photos in their daily lives, subsequently in-class or online sharing and discussions took place, enhancing the students' understanding in the proper usage of the idioms. Our analysis of the student artefacts in both product- and process-oriented aspects reveals the students' cognitive process and learning strategies during the course of content creation. The students' ongoing, open-ended, personal-to-social meaning making process and learner-created authentic content have indeed shown some indicators of seamless language learning and induction-based peer learning that has the potential of transforming language learning into an authentic learning experience.

Keywords: Mobile assisted language learning, Seamless learning, Meaning making, Learner created content

1. Introduction

In language learning, "closed" exercises that restrict information to only standard answers are unlikely to remain in permanent memory [1] whereas meaningful and communicative activities build on classroom learning experience, and link them with the learners' wider knowledge [2]. Bringing in student-generated materials is also a time-tested method that may actively demonstrate informed participation to explore large problem spaces, learn from their peers and create new understandings [3].

This paper reports on a study of Mobile Assisted Language Learning (MALL) in Nan Chiau Primary School, Singapore. In the study, we facilitated a Primary 5 (11-year-old) class to study and apply 29 common Chinese idioms. Apart from in-class idiom lessons, the students were assigned with a smartphone each which they were allowed to access 24x7 throughout the study. They used their smartphones to take photos in their daily lives, make sentences with the learnt idioms, and post them onto a wiki space for peer review.

In this paper, we focus on analysing the student artefacts in both product- and process-oriented aspects, to unveil the students' cognitive process when participating in the learning activity. Such a learning design could be attributed to the process of multimodal, learner-created-content-focused, ongoing, open-ended meaning making in the context of vocabulary learning. Due to the space constraint, only a brief description of the peer learning process is given in section 4.4. Interested readers may refer to [4] for more details.

2. Literature Review

2.1 Constructivist Approach in Vocabulary (Idiom) Learning

In recent decades, there is a paradigm shift in language learning theories from behaviorism to a communicative approach [5]. Under the emerging paradigm, learning is seen not as a

passive activity that requires learners to accept pre-packaged information, but as an active process by which learners create their own understanding. In addition, researchers have raised the importance of the negotiation of meaning, also known as social meaning making, in second language development [6]. Such pedagogical strategies are particularly applicable to the learning of context-dependent vocabularies. Context-dependent vocabularies are certain types of compound vocabulary such as idioms whose complex nature may result in highly context-dependent appropriateness of their usage [7]. In other words, there are many possible real-life contexts where such vocabulary could suitably (or unsuitably but often mistakenly) be used. Just as scholars argue that language teachers should create the right conditions for students to “uncover” grammar [8] through students' active meaning making, we envisage a similar principle for vocabulary learning.

Over the years, vocabulary learning theorists have advocated productive learning [9], inductive meaning making [10], and contextual learning [11], among others. This points to the trend of emphasizing students' self-construction of understanding in vocabulary usage, and this is done likely through learning in the authentic context.

2.2 Mobile/Seamless Learning and Language Learning

As authentic learning comes into the picture of language learning, MALL becomes a viable solution to the blending of the language learners' learning environment into their real-life contexts. Prior research has shown that the mobility and connectivity of the devices enable students to become an active participant, not a passive receiver, in mobile learning activities [12]. The recent development of MALL demonstrates a similar tendency.

The notion of seamless learning may be the answer. The handhelds which could function as a personal *learning hub* [13] creates the potential for an evolution of ICT-enhanced learning, which is characterised by *seamless learning spaces* and marked by continuity of the learning experience across different environments, and emerging from the availability of one device per student (1:1) for 24x7 access [14]. The integration of individual and social learning could be enhanced by blending mobile and Web 2.0 technologies to bring to the students the situated mobile learning experiences that take into account both the students' everyday tasks and socio-constructivism [15]. Such an integration can be expected to balance and bring out the best of both individual and social learning.

3. Study Description

Our pilot study of “Move, Idioms!” took place during July-September 2009. We adopted the *design research* methodology [16] that involved identifying a problem and through rigorous research to provide solutions, which are then improved upon over a number of iterations of testing and implementations. We designed a customisable learning process to engage students in ongoing Chinese idiom learning and writing (sentence making) activities. A class of 40 11-year-old Primary 5 students, with mixed abilities in Chinese, participated in the pilot study. Each of them was assigned a HTC TyTN II smartphone running MS Windows Mobile 6, with built-in camera, Wi-Fi access, internet browser and English/Chinese text input. Furthermore, we adopted PBWorks (<http://www.pbworks.com/>) to create the wiki space for photo/sentence sharing and peer reviews. Apart from standard wiki features such as multi-user content editor and page history, an online forum-style comment tool is also incorporated on each wiki page. In addition, mobile-optimised comic animations that depict the meanings of idioms can be assessed by the students anytime, anywhere. The animations are sponsored by our research partner, a Taiwan-based digital content developer. Twenty-nine idioms were selected from the students' Chinese textbooks for Primary 3-5 as the target idioms to learn. The students had encountered most of these

idioms before but did not necessarily retain them or understand thoroughly their proper contextual usage, as revealed in their performances in the class-wide pre-test and the pre-interviews with selected students (see below).

Figure 1 depicts the process of our learning design. The four-activity process is iterative and encompasses formal and informal learning spaces, individual and social learning spaces, receptive and productive activities, and the use of both mobile and Web 2.0 technologies (i.e., learning takes place in both the physical world and the cyberspace).

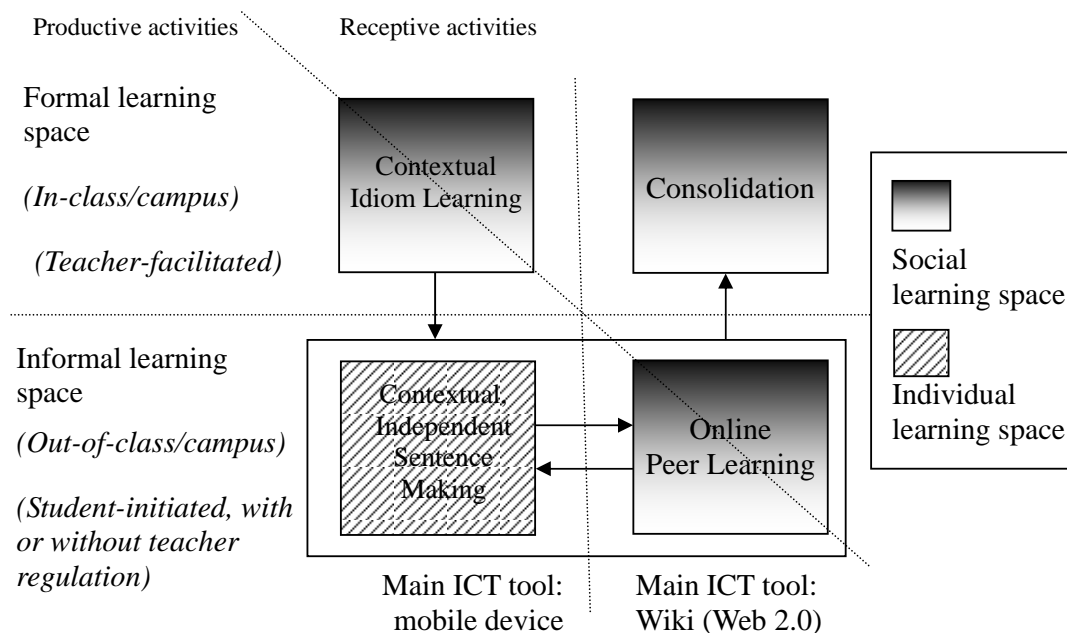


Figure 1. The mobile-assisted idiom learning process

The processes of the four activities are described below:

Activity 1 – In-class contextual idiom learning: The classroom/in-campus activities are conducted to motivate and prepare students to engage in subsequent out-of-school activities. During each lesson, a new set of *idiomatic animations* is shown to the class. The teacher then conduct contextualised learning activities such as flashing context-rich images taken in daily life and inviting students to discuss about relevant idioms, or facilitating them to search for or improvise relevant contexts in the campus that illustrate the idioms, take photos and compose sentences, and upload them to the Web.

Activity 2 – Out-of-class, contextual, independent sentence making: Students carry the mobile phones 24x7. Apart from watching the animations repeatedly, they proactively identify or create contexts in their daily lives which could be associated with any idiom. They then take photos, make sentences by using the idioms to describe the photos, and post them onto a class wiki space. In the wiki space, we create one page for each idiom covered in the class for students to post their photos/sentences. This offers convenience for comparing student-identified contexts and their sentences pertaining to the same idioms.

Activity 3 – Out-of-class, online peer learning: Students perform peer reviews on the wiki by commenting on, correcting or improving their peers' sentences (by making direct modifications on the sentences posted on the wiki pages). Due to technical constraint, they only carry out these activities with PC's or laptops at home, not the handhelds.

Activity 4 – In-class consolidation: Possible activities include class-wide or small group discussions on selected sentences made by the students, or polls for “the most popular photo/sentence” on each “idiom page”.

During the pilot study, the teacher conducted five “idiom classes” (Activity 1) in the first five weeks with one-week intervals. In the first three classes, the students enacted some of the idioms for peers to take photos within the classroom. In the last two classes, they captured images to illustrate idioms within the campus. In between, the students carried out Activity 2 and 3. The teacher then facilitated Activity 4 in the seventh week. Students worked in groups of five, with each group being assigned an “idiom page” to identify erroneous uses of idioms with respect to the contexts in the photos or the sentences made, and to offer recommendation in correcting or improving the sentences. The students returned the smartphones to the school upon the completion of the study.

The data collected and analysed consist of: (1) Pre- and post-tests to assess the students’ learning gains in the target idioms (i.e., proper idiom-context associations); (2) Pre- and post-questionnaires (to investigate the students’ perceptions and behaviours in learning Chinese, learning Chinese idioms and the use of mobile devices in learning.); (3) Pre- and post-interviews with two high-, two medium- and two low-ability students (in terms of their academic performances in Chinese class) selected by the teacher; (4) Video recordings during the in-class activities; (5) Student artefacts and online interactions; (6) Another post-questionnaire for the students to self-report their various thinking processes in creating individual artefacts in order to unveil how *personal meaning making* may take place during such content creation activities. Considering the focus of this paper (students’ content creation process), we will not go into (1) and (2) in great details.

4. Findings

4.1 Pre- and Post-test and Questionnaires

We analysed the students’ pre- and post-test results (full score: 30 respectively) and yielded: mean of pre-test scores = 19.36 (SD = 5.68), mean of post-test scores = 20.77 (SD = 4.50), $t = -2.32$, $p = 0.026$ (< 0.05). The analysis shows that the students achieved a statistically significant improvement in their abilities in associating idioms with the right contexts after the nine-week intervention.

We also applied paired-samples t test on the questionnaire data to examine if there were significant changes in students’ perceptions toward Chinese learning, Chinese idioms and writing, and technology for learning before and after the intervention. The results show positive, though insignificant shifts in all the aspects. We believe it was because the intervention was relatively short and therefore did not result in prominent changes.

Nevertheless, the students expressed favourable attitudes in their participation in the intervention through the post survey. The descriptive statistics of the relevant items show that more than 80% of the participants “agreed” or “strongly agreed” that they “enjoyed the learning activities”, “wished to participate in more rounds of such learning activities”, and “could learn idioms better with such activities than the previous ways of learning idioms”.

4.2 Product-oriented Analysis of the Student Artefacts

Within the nine-week period, the 40 students contributed a total of 453 photo/sentence sets, revised (corrected or modified) sentences for 124 times, and posted 134 comments. From their artefacts, the students demonstrated their creativity by making up contexts that associate with specific idioms. Table 1 features examples of different types of photo/sentence set with the idioms underlined in the original Chinese sentences. We analysed all the 453 photo/sentence sets and classified them into 12 categories with respect to two dimensions, namely, “types of physical setting” and “types of meaning making”. “Types of physical setting” refers to the sources of the physical setting captured by each

photo, i.e., “natural setting”, “physical object manipulation”, “human enacted scenario”, or “previously published materials” (exemplified by (A), (B), (C) and (D) in Table 1 respectively). “Types of meaning making” refers to how the associated sentence reflects the student's personal meaning making on the photo (i.e., the relationship between the photo content and the sentence content). , which could be “literal meaning making”, “extended meaning making” and “creative meaning making”.

Here is how we distinguish the personal meaning making types: (1) *Literal meaning making*: The sentence demonstrates a direct interpretation of the photo context – all the elements stated in the sentence are visible in the photos (e.g., (B) in Table 1). (2) *Extended meaning making*: The sentence demonstrates a logically deductive interpretation on the photo context – there are elements in the sentence which are invisible in the photos but they are logical deductions from the photo context. For example, in (A), the additional element is “a full day of house cleaning”. (3) *Creative meaning making*: The sentence demonstrates a twisted, perhaps creative re-interpretation on the photo context (i.e., others may not interpret the photo in the same way). For (D), for instance, the author associated a close-up photo of a bird and green plants with “the tiny island” and “tourists to spend holidays”.

Table 1: Four examples of student artefacts created in the pilot study

	<p>(A) 妈妈一整天把家里打扫得干干净净之后就精疲力尽地躺在沙发上。 After a full day of house cleaning, mom lays <u>exhausted</u> on the sofa.</p>		<p>(C) 现在三更半夜, 我不想吵醒爸爸妈妈。可是我想吹一吹哨子所以我以为我掩住耳朵, 听不到了。没想到, 爸爸听到了出来骂我。他说: “<u>掩耳盗铃</u>没用的。” It is midnight but I want to blow the whistle without waking up mom and dad. Therefore, I plug my ears. However, dad hears me and comes out to scold me, "It is no use to <u>bury your head in the sand</u>."</p>
	<p>(B) 有一辆车横冲直撞, 撞到了另一个车! A car <u>is romping about</u> and then crashes with another car.</p>		<p>(D) 整个小岛绿茵环抱, <u>鸟语花香</u>, 吸引了很多游人前来度假。 Surrounded by green plants and <u>joyous sceneries</u>, the tiny island has been attracting many tourists to spend holidays there. (photo source: http://www.pconline.com.cn/)</p>

Table 2 shows the cross tab analysis of the student artefacts fit into the respective cells. In generating the table, two researchers coded all the student artefacts independently and then discussed about the discrepancies to reach consensuses.

Table 2: Cross tab of photo contexts versus students' meaning making (n = 453).

	Natural setting	Physical object manipulation	Human-enacted scenario	Previously published materials	Total
Literal meaning making	154	13	19	52	238
Extended meaning making	89	11	39	32	171
Creative meaning making	18	7	4	15	44
Total	261	31	62	99	453

The variety of photos/sentences reflected the students' greater attention to their surroundings and their more conscious attempts to associate their daily experiences with the idioms – be it in campus, at home, during family outings, when they read books or watch TV shows. In addition, the post-questionnaire results indicate that the students may have extended their mental habit of Chinese-idiom-and-real-life-context association beyond our study, as 75.0% of the students “agree” or “strongly agree” that “after participating in the learning activities, I think of Chinese idioms more often in my daily life.”

4.3 Process-oriented Analysis of the Student Artefacts

The categorisation of the student artefacts in the previous section was a product-oriented analysis of the artefacts. As stated before, we have also administered another student post-questionnaire for self reporting of their cognitive processes in creating individual artefacts – note that the unit of analysis is individual artefacts, while a particular student might have created artefacts with mixed types. We compiled the descriptive statistics of the three types of cognitive processes and yielded (n = 453):

- (Type 1) With an idiom in mind → object finding/manipulation or scenario enactment → photo taking: 170 (photo/sentence sets) or 37.5%
- (Type 2) Object/human/scenario encountering → associating with an idiom → photo taking: 150 or 33.1%
- (Type 3) Object encountering/manipulation or scenario encountering/enactment → photo taking → associating with an idiom: 133 or 29.4%

The major distinction among these three types of cognitive process is in where the idioms come in. A Type 1 process (e.g., (B) and (C) in Table 1) begins with having an idiom in mind, which could most likely be attributed to the mentality of conscious, learning objective-driven school assignment doing. One of the target students' claims during the post-interview may illustrate such a strategy, *"I took photos at home ... usually started with an idiom, and then thought about how and what to photograph."*

Type 2 (e.g., (A) and (D) in Table 1), on the other hand, could take place anytime and anywhere in the students' daily life, with or without the photo taking / sentence making activities in place. In our study, however, it was such activities that motivated the students to try associating their encounters with some idioms. That becomes a form of incidental learning. One more example created by an interviewed student is presented in Table 3(a). During the post-interview, the student elaborated, *"My sister left the teddy bear on the sofa. I saw it and imagined that it was tired."*

Finally, Type 3 delays the context-idiom-association to later time. Such processes are more likely to take place during family outings or student group photo taking activities in campus. As such activities were rare chances for them to access to specific locations or work with their classmates together, students often considered maximising photo takings as their priority, rather than spending extra time to switch between the kinesthetic tasks of photo taking and the cognitive tasks of context-idiom association *in situ*. Therefore, the photo taking activities became the occasions almost purely for data or resource collection while their linguistic learning only took place after they returned to their PC or laptops to make sentences. One such example is presented in Table 3(b). The author informed us during the post-interview, *"A classmate visited me at home. She played with my smartphone. She took many photos casually and I was photographed. After she left, I checked the stored photos. When I encountered this photo of mine, I thought I could associate it with 眉开眼笑 [grin from ear to ear]."*

Our further analysis of the three types of processes suggests that each type of these processes would correspond to a vocabulary learning strategy. We consider Type 1 the easiest process and could serve as an entry-level activity for newcomers to such photo taking / sentence making activities; Type 2 the highest level process as such immediate retrieval of the relevant idioms require the students' internalisation of their learnt idioms. Type 3, therefore, has the potential to serve as a bridging strategy between the first two.

Table 3: Two student artefacts that exemplify Type 2 and Type 3 cognitive processes

	<p>(a) 小熊筋疲力尽地躺在沙发睡觉。 <u>Exhausted</u>, the bear falls asleep on the sofa.</p>		<p>(b) 姐姐眉开眼笑地笑因为妈妈让她玩电脑游戏。 My sister <u>grins from ear to ear</u> because mom allows her to play computer game.</p>
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4.4 Peer Learning Activities

The student artefacts were being accumulated in the wiki space, thus triggering students' ongoing online discussion on their peers' work. Here was where the teacher had chipped in by applying some online forum facilitation strategies to tactfully comment on student artefacts at the right time and in the right way in order to give space for the students to engage in meaningful discussion. During the only Activity 4 session toward the end of the study, each student group compared the photo/sentence sets posted on the assigned "idiom page". Through their group discussions, they managed to identify and explain all the erroneous artefacts, and offered good proposals to improve the sentences (e.g., to replace an idiom with a more suitable one). We attribute such a learning activity to induction-based peer learning, based on learner-created authentic content.

5. Discussion

Looi et al. [13] describes how mobile computing can be an enabler for personalized learning: (a) allowing multiple learning pathways, (b) supporting multi-modality, (c) enabling student improvisation *in-situ*, and (d) supporting the sharing and creation of student artifacts on the move. Our learning design encompasses all four characteristics. While such language learning activities could be carried out without technological support, it is the mobile affordance of *in situ* data collection (phototaking) that offers them the ease of generating their artefacts and helps the teacher and other students to visualise their idiom-and-context associations. Furthermore, the deployment of the mobile technology has made our students paying greater attention to, and perhaps reflecting more upon, the physical world that they are experiencing in their daily life. As sharing and *rising above* the shared artefacts are the key to achieve students' deep learning of the idioms, the incorporation of the Web 2.0 (wiki) technology further enhances their social learning space by "affording" them rapid artefact revisions and interactions. The intertwining usage of both the mobile and Web 2.0 technologies would bring the students an all-round language learning experience that seamlessly integrate their learning experience in both the physical and cyberspace contexts.

This is indeed what makes our work unique from similar prior studies by Joseph, Binsted and Suthers [17], Hasegawa *et al.* [18], and Pemberton, Winter and Fallahkhair [19]. These earlier work treated learner-created content (photos or videos demonstrating vocabularies) created beyond the school fences and the school hours as the end – once verified by the instructors, the content would then become relatively static materials accessible by their peers online. In our seamless language learning design, the rich and diversified learner content is also the means for fostering further peer learning and social meaning making in an inductive manner. Indeed, this learning process extends the language subject beyond the four walls of the classroom to become an authentic learning experience.

Such a learning activity process may be applied to other school subjects, e.g., in science learning, students may take photos of objects with different material types encountered in their daily life, categorise and post them onto the wiki for peer discussions.

6. Conclusion

In this paper, we report a MALL pilot study that focuses both creative learner output and seamless learning. These two aspects, which promised great educational potential, have been seriously untapped in prior MALL studies. In our study, from artefact generation to peer learning activities, we observed a trajectory of personal-to-social meaning making among the students. We are keen to relate the students' three types of cognitive process emerged from their artefact creation activities to linguistic psychology. We believe that these prospective theoretical studies of our learning design and the data collected may inform us to refine the pedagogy (the in-class Activity 1 design and additional scaffolds for all four activities). With proper design and enactment of *seamless language learning*, we see the potential for MALL to reform language learning by using mobile devices to synergise the formal and informal, as well as the personal and social learning spaces.

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