Pairing Craft-Making with Mandarin eBooks: An Investigation into the Potential Use of Craft for Language Learning by Preschoolers

Wil-Kie Tan[✉], Stephen Jia Wang, and Jeffrey Janet

Department of Design, Faculty of Art Design & Architecture, Monash University,
Melbourne VIC 3145, Australia
`wilkie.tan@gmail.com`

Abstract. Bilingual ethnic Chinese parents are concerned about their preschoolers' learning of their mother tongue. Many allow their children to learn Mandarin by accessing Mandarin language applications on mobile devices. However the effectiveness of solely using mobile devices as a learning tool for preschoolers is debatable. This paper presents a field investigation on how adult-facilitated craft-making promotes interaction between the adults and their children, generates greater interest the reading of Mandarin eBooks and retention of the stories. The data suggests pairing of activities may be useful to children of across language abilities. This also highlights a need for designers and educators to formulate a holistic design approach in the development of preschool mobile learning content.

Keywords: Craft · Design · eBooks · Education · Mandarin learning · Mobile devices · Preschool · Reading · Tangible interaction

1 Introduction

In Singapore, despite an academic emphasis in the learning of both English and Mother Tongue, many families struggle with the use of their Mother Tongue both at home and in school [1]. While Mother Tongue might be spoken prior to preschool, there would be an increase in the use of English once the child starts formal schooling. Bilingual families' cultural hybridity [2] sparks a negotiation of meaning and representation [3] on their perceived value of Mother Tongue. For a child from a bilingual family, home, where two or more cultures interact readily, is an ambiguous area to grow up in.

Many bilingual ethnic Chinese parents use "edutainment" (blend of educational and entertaining) Mandarin language applications to engage their children's interest, in hope of retaining of Mandarin as their Mother Tongue. But the effect of mobile devices usage within their home space or when coupled with another activity such as craft-making is much less understood, as much of present research on language learning and technology pertains to technological and curricular integration of devices for literacy learning [4] or with references drawn from studies of more than 40 years of educational television programs [5].

This paper presents an investigation of the researchers' hypothesis that a more structured adult involvement in shared reading of Mandarin eBooks and complementary craft-making, with its materiality, tangibility and interaction; and within the child's familiar context of home, can help foster the learning of Mandarin. It will include the theoretical considerations, methodology, data from 15 preschoolers and correlations of collated findings.

2   Theoretical Considerations

The researchers take the view that an adult-child interaction is central to preschoolers' learning. Familiarity and trust of the child towards his/her attached parent helps build confidence in learning from his/her immediate environment and reaching out to others [6]. Traditionally home is the primary space for transmission of knowledge, where the child also learns to make meanings from a setting that offers a cultural context to who he/she is, especially for one growing up in a bilingual family.

Unlike Piaget who placed language as only as a form of symbolic representation and its development as a result of the child's cognitive development, Vygotsky opined that the child learner is not a blank slate [7] but is seen to be constructing his/her own knowledge with the amalgamation of previous experiences and cultural influences to every new situation. Hence, Vygotsky placed learning within social situations and the role of language and cultural transmission is core to his notion of social constructivism perspective. His notion of "scaffolding" proposed that a child learns from a more experienced person and it occurs within a "zone of proximal development (ZPD)" [8]. He also saw ZPD as being formed through play in the early childhood as it is an internalization of social rules, formation of real-life plans and intentions on the part of the child [9]. However for ZPD to be effective, the child has to be an active rather than a passive learner and it is often the quality of interpersonal relationships between the child and the adult, that creates a more fruitful interaction and hence better learning outcomes [10].

EBooks' popularity means that stories continue to be an essential part of cultural and language transmission and storytelling is still important to language acquisition milestones. But there are some researchers who are unsure that shared book reading between adults and children would contribute to the development of children's literacy skills [11]. There are also concerns that adults now have a diminished role to share read once automated media-rich reading features are enabled in the eBooks, leading to comparisons made between adult–child interaction when they share a paper-based or eBook [12].

On the other hand, craft-making is recognized to be beneficial for the development of visual-processing skills, fine motor skills and building executive function, such as concentration, in young children [13]. This coupling of the craft-making with the eBooks also provides the contextualization necessary within the child in his/her learning process [14]. Adult-facilitated craft-making, while not spontaneous or self-directed by the child, when elaborated with age appropriate resources, may become sustained play episodes [15]. However, craft-making is regarded more as qualitative expression than in economic objectives [16] these days, and adults tend to dismiss it to be activities done in day care centres or that they do not have time for it at home.

3   Research Methodology

The methodology for this investigation included collaboration with an e-learning resource publisher, selection of suitable eBooks from them, and designing complementary craft activities with different levels of difficulties, before packaging them for the participants. These were then made accessible to them on a secure test site online. The adult volunteers facilitated the activities and assisted with the logging of observations and photo/video documentation of the prescribed activities with their children.

3.1   External Collaboration and Design of Craft Activities

Collaboration was sought with Commontown[1], an e-learning service provider from Singapore, in early 2015. They had developed *Dudu Town*[2], a subscriber-based portal, offering browser-based Mandarin eBooks to primary schools and preschools. When approached, they expressed an interest to know how subscribers can better understand their stories, and maintain or improve their motivation to read and learn.

A proposal was made to integrate craft making as a means to extend the currency of their eBooks. 4 preschool-level titles (Fig. 1), were shortlisted by the researchers from *Dudu Town*'s repository. The selection criteria included diversity in themes, illustration style and potential for integration of craft activities. Commontown offered technical assistance in hosting the test site with the 4 craft-eBook packages. Subsequent activities and data collation were conducted without their further involvement, but they were briefed on the data collated at the end of the investigation.

Fig. 1. Top 4 screenshots of eBooks show title pages with designated tabs (bottom right of each title page) for downloading craft activities. First and third screenshots from second row show mid-story prompts for craft activities.

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1 http://www.commontown.com.

2 *Dudu Town* was designed for self-paced reading and incorporates an Automated Reading Programme (ARP) that provides adaptive learning and matching of the reader's ability to appropriate leveled changes in the readers' content. http://dudu.town/.

The eBooks selected were:

1. Friends and the Bear, a story about being true to your friends in the face of danger.
2. Goldfish is Asleep, a story about why fishes do not close their eyes when sleeping.
3. The Rain Drop, a story about the water cycle.
4. Rabbit & Snail, a story about the importance of keeping promises.

4 story-specific craft activities were then designed for the investigation (Fig. 2). Their visual elements were inspired from the stories so that the children can relate to what they read. They were also designed with ascending levels of technical difficulties:

1. For Friends and the Bear, a memory flip-card game, to simulate Bear hunting Friends (Level 1).
2. For Goldfish is Asleep, a cardboard aquarium with mobile goldfish (Level 2).
3. For The Rain Drop, a PVC bottle mini simulation of 'water cycle tank' (Level 4).
4. For Rabbit & Snail, a date-matching card game, to simulate counting down the days to a week (Level 3).

Fig. 2. Sample pages of craft instructions in Mandarin.

These were then packaged as PDF files, accessible from the books' title pages.

The adults were to prepare the material prior to the shared reading and the children were to start on the craft activities midway, when they were prompted by audio-visual cues in the eBooks. Upon completion of the craft objects, the adults could scan designated QRcodes on the instructions sheets to return to the stories, if they had printed them out prior to the activities.

3.2   Field Activities

Adults were sought as facilitators and documenters. Being 'gatekeepers' to the 'field' [17] provided both familiarity to the children and also a degree of control and participation that an external researcher would take a while to cultivate. Before starting on the activities, they provided background information on their use of Mandarin at home. They

stated their children's exposure to craft-making and use of Mandarin at home and with immediate family members. They also logged down the time taken to complete each activity and documented their observations of the children during the sessions, from reading, craft making to post-reading activities.

The shared reading of eBooks on mobile devices and all 4 craft activities were compulsory. Then the children attempted the post-reading activities, by answering simple questions in the eBooks and retelling the stories, with the aid of their craft objects. The adults were advised that their children's comfort take precedence and some completed the activities over a few sessions. Most importantly, the children were allowed to respond comfortably by code switching - alternating of Mandarin and English. Even when a child could not fully remember the stories, they were encouraged to string together fragments of the stories, with the aid of the craft objects. A stylistically different retelling meant the child grasped what was read.

Upon completion, each child answered a simple questionnaire with a series of 5 Yes/No answers regarding his/her experiences in reading, crafting and retelling, and was given a "Certificate of Completion" to encourage further reading and crafting.

4   Data Collation and Analysis

A total of 15 children aged 3 to 5 from bilingual (English & Mandarin-speaking) Singaporean families based in Singapore and Melbourne participated in the activity.

When the respondents' answers from 2 key background questions: *The child responds in Mandarin when spoken to* and *The child needs me to encourage him/her to speak in Mandarin* were correlated, it showed that most adults still saw the need to encourage their children to speak in Mandarin despite that they were already responding in Mandarin when spoken to. This implies that the adults in this sample group must have felt the same anxiety towards the maintenance of Mandarin (Fig. 3).
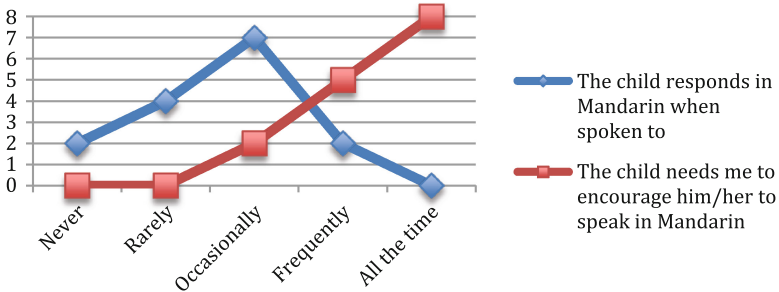

Fig. 3. Correlation between adults' encouragement and children's response in Mandarin

The children who were noted to "never"/"rarely" respond in Mandarin were compared to those who responded "occasionally" and "frequently" (no adults indicated "all the time"), in their interest to start reading the eBooks (Fig. 4). Almost all the children, regardless of their willingness to respond in Mandarin, were keen to start reading

the Mandarin eBooks, possibly due to the visual appeal of the characters in the stories and/or the opportunity to access or "play" with the mobile devices.
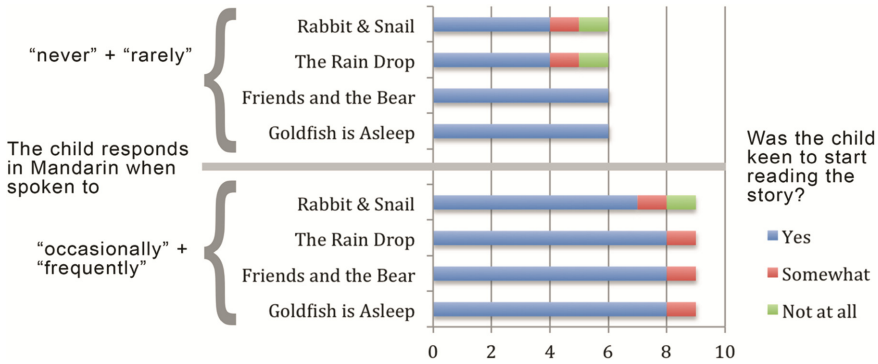

Fig. 4. Correlation between whether the children were keen to start reading the respective stories and their willingness to respond in Mandarin.

Next, the focus is on adults who said they spent time on craft-making with their children. Children of adults who indicated "rarely" and "frequently" to spending time on craft-making, are investigated to see if they related the craft object with the eBooks, and if they used the craft object to aid in their retelling of stories. The correlated result of the children with the adults who quoted "rarely" was too small to be read effectively. However, children of the 7 adults who cited "frequently" gave interesting results (Fig. 5) about their choice of craft. *Goldfish is Asleep* topped their list for being the most relatable craft object to the eBooks, followed by *Friends and Bear*, *The Rain Drop* and *Rabbit & Snail*. This matches the difficulty level of the craft activities designed. *Goldfish is Asleep*, despite being slightly more difficult, could have topped due to its whimsical factor. This same group of children was also using the craft object when attempting to retell the stories. Most of them indicated "yes" and "somewhat" to using what they made, so perhaps prior experience with the adults had affected their actions in the post reading activities.
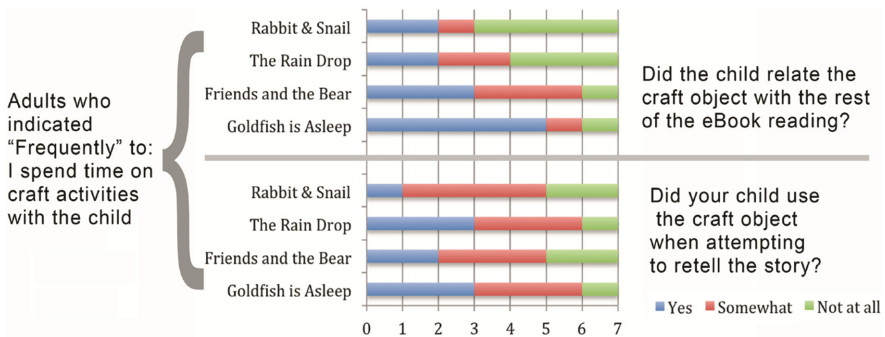

Fig. 5. Correlation between whether the children were keen to start reading the respective stories and their willingness to respond in Mandarin.

At the end, 4 out of 6 of the children who "never"/"rarely" respond in Mandarin at home were noted to be "somewhat" able to engage in the retelling of the story in Mandarin. All other children who "occasionally"/"frequently" respond in Mandarin at home, expectedly were able to ("yes" and "somewhat") engage in Mandarin retelling. While it was not conclusive that the children warmed up to the use Mandarin after going through the activities, it was helpful to know that the children were not adverse to the experience. These sentiments were also captured in the final children questionnaire, with 13–15 of them noted that they liked reading and retelling the stories (with the craft objects), playing the toys they made and liked making them with the adults (Fig. 6).

Fig. 6. Participants accessing the eBooks and playing with their craft objects.

5   Limitations and Strengths of the Investigation

The results are not definitive that a structured adult involvement in shared reading and craft-making, can help foster the children's interest in the learning and use of Mandarin. The differences or limitations of individual adults' approach when facilitating the activities might have affected how the children responded or went about their activities. Neither was there a consistent use of Mandarin in the communication between the adults and children from some of the video documentation submitted. However, this may be seen as adults using code-switching to engage rather than to negate the efforts of the children.

Future in-depth investigations, with a larger pool of participants, different family demographics, more varied stories and a control group exercising without craft-making activities, would provide a better picture on how the role of adults, adult-child interaction and craft-making's materiality and tangibility, can help retain interest and knowledge. The documentation from this investigation did however shed light on how the children were

injecting their own individuality into the craft objects, and that they were at ease when reading and crafting within their homes. From the perspective of design research, this indicates that the development of screen-based edutainment preschool resources requires more than just better narratives and audiovisual content. The understanding of child development, play, the recognition of their creativity, the engagement of adults and even site specificity should be key considerations for any designer, developer and manufacturer.

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