
Augmenting Tandem Language Learning with the TandemTable

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Abstract

In this paper, we present our computer-assisted language learning system called TandemTable. It is designed for a multi-touch tabletop and is meant to aid co-located tandem language learners during their learning sessions. By suggesting topics of discussion, and presenting learners with a variety of conversation-focused collaborative activities with shared digital artifacts, the system helps to inspire conversations and help them flow.

Author Keywords

tandem language learning; collaboration; education; multi-touch; interactive; digital tabletop

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation (e.g. HCI)]: User Interfaces — User-centered design; K.3.1 [Computers and Education]: Computer Uses in Education — Collaborative learning.

Introduction

Tandem language learning (TLL) is a language learning method, in which two or more learners interact and communicate to improve their language skills. Based on the mutual exchange of language between partners, each person practices and learns their partner(s) native tongue. Its non-authoritarian and collaborative nature provides a

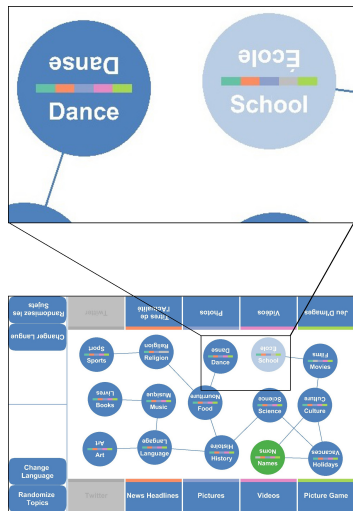


Figure 1: The main screen of TandemTable provides a selection of available conversation topics (central circles) and associated activities (rectangles along edges), and includes colour-coding to show a history of topics already discussed (light blue) and the current topic (green).

comfortable and motivational method of learning. Since TLL is based on communication, it also allows partners to learn about each other's culture and personal life, which in turn facilitates intercultural learning [4]. TLL can be performed using different communication media, such as through video conferencing, email or in-person. Akin to other learning domains, we see surface computing technology as being a tool that can be used to aid tandem language learners during their in-person TLL sessions. In this work, we present our design and implementation of a computer-assisted TLL system called TandemTable.

Related Work

Tables create a central location for congregation, and afford peripheral awareness of others, their actions, and the workspace [9]. These advantages are beneficial for in-person TLL due to non-verbal communication having an important role in information sharing [7]. Other co-located collaborative activities are also well supported by tables, since their form factor promotes face-to-face communication and provides comfortable proxemic arrangements. In view of these reasons, researchers have used digital tabletops for computer-supported cooperative work systems (e.g. [10]).

Supporting collaborative learning using multi-touch tabletops has also been a focus for members of the research community. Jamil et al. found that multi-touch tabletops are advantageous for collaborative learning as they promote on-topic and reflective forms of conversation [3]. Similar to this work, Morris et al. created collaborative language learning software designed for interactive tabletops [5]. Our research relates to the aforementioned work as we are investigating the influence of a multi-touch tabletop system on the conversations of tandem language learners.

Design and Implementation

Over the period of twelve months, we designed and implemented TandemTable with the use of the Simple Multi-Touch (SMT) toolkit [6]. TandemTable is a computer-assisted TLL system for a multi-touch tabletop that is designed for two co-located learners. To help inspire and inform the design, one researcher observed a real-world TLL session and interviewed its facilitator and four participants. Since TLL relies on interpersonal communication, the system is designed to act as a conversation facilitator by suggesting topics of discussion, and presenting learners with a variety of conversation-focused collaborative activities with shared digital artifacts. These help to ground the conversations by establishing a theme with related content. When using our system, tandem language learners face each other with the digital tabletop in between them. The interface is split in half horizontally with the digital content mirrored and oriented towards the closest learner. To use the system, each learner must first select the language that they would like to learn (target language). Our system currently supports English and French.

Introductions

When starting a TLL session, learners are first presented with an introduction phase where the system prompts partners to discuss their interests, and ask each other a series of non-invasive personal questions. This is meant to encourage learners to become familiar with one another, and create a more comfortable learning session. Learners are also prompted to discuss their learning goals and expectations, and how their partner can support them.

Topic and Activity Selection

After the introduction phase, learners are presented with an undirected graph where each node represents a

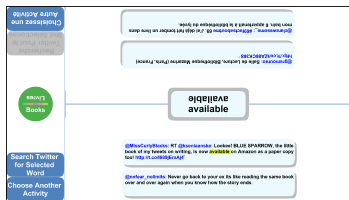


Figure 2: Twitter Activity: To further support serendipity, users are given the ability to search for tweets related to the selected word, and tweets from a specific Twitter user or hashtag.

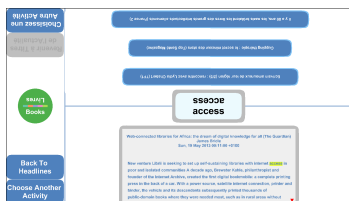


Figure 3: News Headline Activity: By performing a vertical drag gesture on the background of a learner’s screen space, users can search through the list of retrieved headlines.



Figure 4: Picture Activity: High level gestures can be used to scale, rotate and translate the pictures.

possible topic of conversation (see Figure 1). A topic of interest is selected when both learners select the same node simultaneously. When selected, the topic’s available activity buttons are enabled, and the learners can select an activity. When both users have selected the same activity, the system transitions to the selected activity screen.

Activities

To inspire conversations, the system includes five different media activities: Twitter, news articles, pictures, videos, word-to-picture matching game. To reduce the cost of content creation, we decided to create activities which draw content from web-based sources rather than requiring teacher-curated content. The learners can freely explore activities, and switch topics to change activity content. Within the Twitter and News Headline activities, words can be selected, which will cause them to be highlighted and displayed in the center of the screen for both learners to see and discuss. These words can be automatically translated as well.

Twitter Activity

The Twitter activity allows learners to view what other people are discussing in real-time, and exposes learners to slang and idioms (see Figure 2). When the users select this activity, tweets in the target languages that relate to the selected topic of discussion, are downloaded from Twitter, and a manageable number of them are displayed in each of the personal interaction areas [8]. We rely on learning partners to assist one another in discovering when there is informal language use or spelling mistakes.

News Headline Activity

In this activity, up-to-date news articles in the target languages that relate to the chosen topic, are retrieved using a news feeds distributor [1]. The news headlines from these articles are displayed for the learners in both of

their screen spaces (see Figure 3). When a learner selects a news headline, the author, date, associated picture(s), and the article are shown.

Picture Activity

When users select the picture activity, pictures related to the chosen topic are downloaded from Flickr, and four of them are displayed for the learners to discuss. New pictures are retrieved when learners drag an existing one into a garbage bin (see Figure 4).

Video Activity

In the video activity, videos in one language that relate to the chosen topic of discussion are retrieved from YouTube (see Figure 5). Learners can select a button to retrieve videos in the other target language. Each personal interaction area contains an interface current [2], where thumbnails of the videos travel along. If both learners select the same video for viewing, then the video is displayed in each of the learners’ personal screen space. To enable discussion, the video can be paused as well.

Picture Game Activity

The picture game activity is a collaborative word-to-picture matching game. Six pictures are displayed in the center of the screen, and each of the personal interaction areas contain a list of words in their respective target language (see Figure 6). The learners must work together to match the words to their associated picture.

Preliminary Evaluation

To evaluate our system, a preliminary exploratory study with 16 participants was conducted. The participants were university students comprising of 4 females and 12 males with ages ranging from 18 to 31 ($M = 22$, $SD = 4$). In groups of two, participants used TandemTable for a total of 35 minutes to learn a language, while a researcher

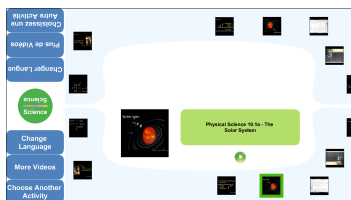


Figure 5: Video Activity: When a learner selects a thumbnail, a larger sized image and the title of the video are displayed with the ability to select the video for viewing.

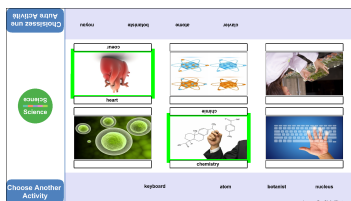


Figure 6: Picture Game Activity: Learners drag each word to their appropriate picture.

observed and made notes. Pre- and post-interviews and questionnaires were used to gather additional data.

Results

All of the participants stated that there were lulls in their conversations, and that aspects of TandemTable helped to bridge awkward moments through inspiring new topics and discussion content. These aspects include the many topics to choose from, the different activities and the shared digital artifacts. All, but one, participant thought that our system helped to increase the amount of discussion between partners, and found that it helped them find new things to talk about.

When asked what aspects of the software were helpful for language learning, participants stated that the visual content, translation ability and the features that induced more interaction between learning partners helped the most. These features included the ability to highlight words for discussion and having them appear in the center of the screen, how the system suggested topics for conversation, and the content of the activities, with special attention to the collaborative picture game. The picture game was found to be the most popular due to its collaborative and playful nature, and its visual content.

Future Work

Our next steps are to use the insights gained from conducting our exploratory evaluation to improve the design and implementation of TandemTable. Since our evaluation was only preliminary and resulted in mostly qualitative data, we plan to conduct a full comparative evaluation study to discover what kind of impact TandemTable has on TLL sessions when compared to traditional means.

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