

Collaborative early EFL reading among distributed learners: A simulation pilot study

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It is widely accepted that reading provides important opportunities for second language (L2) development, however, in Taiwan sources of L2 input are often limited for learners in English as a Foreign Language (EFL) settings. This problem is compounded by environmental constraints such as students' diversity in reading abilities, the socio-economic gap between urban and rural students, class sizes, time constraints and available resources, and dealing with these constraints effectively requires new pedagogies and tools. We designed a wireless peer-assisted leaning system for early EFL reading to enhance online collaborative EFL reading and provide EFL learners with an opportunity to teach and learn with each other. In this study we examine the use of this wireless reading system in a conventional EFL class to simulate a distributed learning situation. The results suggested that wireless EFL reading may emerge as a flexible and portable solution to the pedagogical challenges that exist in conventional EFL reading and teaching environments.

Students' reading abilities play an important role in their academic achievement, and a student with higher reading abilities will usually perform better than peers whose reading abilities are not as well developed. In addition, because of a growing recognition that reading provides important opportunities for second language (L2) development in second language learners (Day & Bamford, 1998), especially for learners in English as a foreign language (EFL) settings where sources of L2 input are limited (Gehard, 1996), teaching of English reading has been drawing increased attention from teachers of EFL.

Numerous researchers argue that providing children with an intense intervention program can effectively prevent children from encountering reading difficulties (Clay, 1993; Foorman & Torgesen, 2001; Hiebert, Colt, Catto, & Gury, 1992; Slavin, Madden, Karweit, Dolan, & Wasik, 1992; Taylor, Frye, Short, & Shearer, 1992). Both collaborative learning and scaffolding are widely used strategies to increase intensity and benefit English reading instruction and reading achievement of EFL learners.

Collaborative learning (CL) is a learning approach in which students teach and learn with each other (Ravenscroft, Buckless, & Hassall, 1999) and all work together to accomplish a common goal (Johnson & Johnson, 1994). CL can be implemented in three basic forms: **tutoring** (peer or crossage), in which one student teaches another; *pairs*, in which students work and learn with each other; and *small groups*, where small numbers of students teach and learn together. According to Slavin (1989), CL methods are considerably more effective than traditional methods in increasing basic achievement outcomes, including performance on standardized tests of reading and language arts, mathematics, social studies, and science. Ushioda (1996) suggests that CL can promote students' learning motivation and satisfaction. Ghaith (2003) argues that students' EFL reading achievement and academic self-esteem improve and that feelings of school alienation decrease in CL learning situations.

Regarding scaffolding used in reading intervention, a number of studies have commented positively on the efficiency of peer-assisted learning strategies (Fuchs, Fuchs, Mathes, & Simmons, 1997; Jacobs & Gallo, 2002; Mathes, Torgesen, & Allor, 2001). Peer-assisted learning occurs in four main varieties: peer tutoring, cooperative learning, peer collaboration, and peer modeling. Based on a study by Hartup (1992), children teaching each other is generally effective as a cognitive activity. Similarly, Greenwood and his colleagues has also reported that the ClassWide Peer Tutoring model they used increased the degree of improvement in learning outcomes in reading (see Greenwood, 1996).

However, just heterogeneously placing students in a group and assigning them a common goal does not guarantee that students will become involved in effective CL activities. Furthermore, even though students with higher reading abilities are able to provide their peers with learning support, there are some weaknesses that need to be overcome, such as postponed support, invisible helper, and a failure to provide feedback (Lan, 2006). Actually, because of pedagogical challenges such as students' diversity in reading abilities, the socio-economic gap between urban and rural students, class sizes, time constraints and available resources, CL and scaffolding are not as easily implemented in Asia's EFL settings as in that of the Western countries (Lan, Chang, & Sung, 2006). For example, at elementary level in Taiwan, there are about 30 students with diverse reading abilities in an EFL class. Some of them are able to read individually, yet some of them are unable to recognize the common sight words or to decode and encode a new word. There is only one EFL teacher to take charge all of the teaching and classroom management tasks. The teaching time is only 2 forty-minute classes a week. Furthermore, the resources available to the EFL teachers or learners differ significantly between urban and rural areas. Some ideas have been proposed to address the reality of teaching in Taiwan stated above, such as cross-age placing or homogeneous ability-placing, but these are seldom successfully implemented in real EFL settings because of the logistical restrictions including school organization, lack of available qualified EFL teachers, and financial limitations.

Obviously, both EFL teachers and learners need adequate support to overcome the above challenges and to promote effective EFL reading teaching and learning. In order to attempt to deal with this problem, we designed a mobile dynamic peer-assisted learning (MDPAL) system to implement CL and peer-assisted learning strategies in a wireless environment. The purpose of MDPAL was to provide EFL learners with an opportunity to teach and learn to perform early EFL reading tasks with online peers. Through connecting distributed learners, MDPAL was expected to decrease the socio-economic gap between town and country, and to provide learners with learning support to engage them in collaborative EFL reading activities anytime, anywhere. In this study, we conducted a pilot study to evaluate the effect of MDPAL in collaborative EFL reading activities. It was implemented in a conventional EFL class and to simulate the online collaborative EFL reading activities were carried out via the *Skype* audioconferencing software (experimental group). Identical EFL reading activities were also implemented in another class (control group) except without the support of mobile devices. Both the learning-related and learning-unrelated behaviors of EFL learners were observed to build a foundation to further implement MDPAL in a real, distributed EFL learning community.

The MDPAL system is described below, followed by the evaluation and results of the pilot study and finally, the conclusions regarding the system.

MDPAL

MDPAL consists of two modules: a phonological skills training module and a peer assessment module. The phonological skills training module focuses on the learning of phonic rules and common sight words. It provides students with real-time learning support and feedback. The peer assessment module asks students to read a written text. Whenever they have problems in reading the text, they are able to find online support by making an online phone call via the *Skype* software. The function of each module is explained briefly below.

Phonological skills training module

This module includes two sub modules: sight words and phonetic words. After students log in to MDPAL, the system first assesses students' reading skills in terms of sight word fluency and phonetic word fluency. If they pass this first test, then they can go straight on to the peer assessment module; if not, then they have to practice the sight words and phonetic words. During the learning processes (practice and test), MDPAL is capable of providing students with real-time feedback and learning support. Examples of the learning activities are shown in Figures 1a and 1b.

Peer assessment module

After students pass the phonological skills training module, they continue doing text reading. In this module, MDPAL keeps an online helper list which includes the names of qualified students who have passed the online peer assessment. The EFL teacher's name is always the first one in the list. An online helper can help online peers do the online peer assessment or text reading.

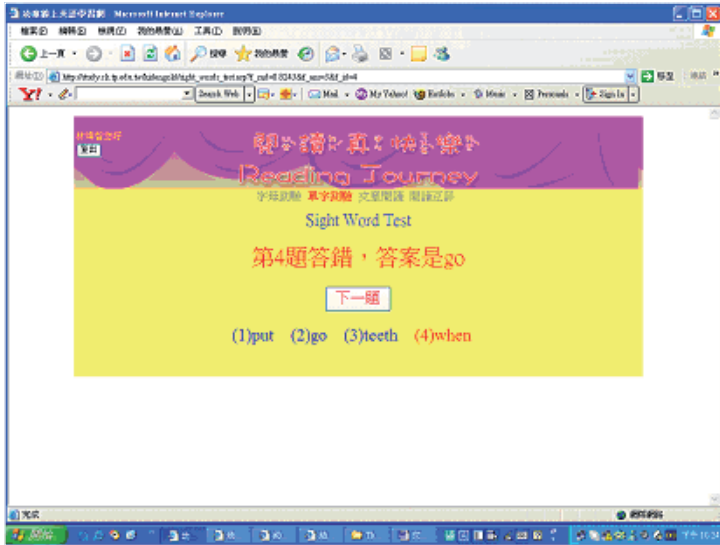


Figure 1a. An example of the phonological skills training: sight word learning activities

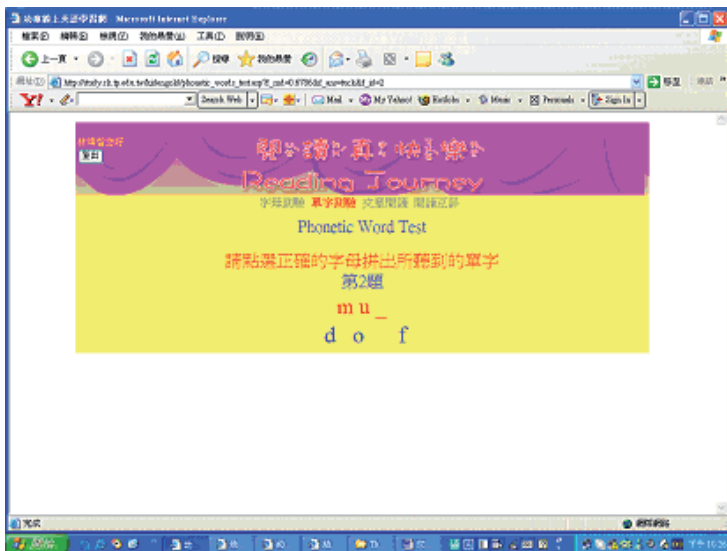


Figure 1b. An example of the phonological skills training: phonetic word learning activities

Generally, after students get into the module, they are asked to read the text individually, whenever they encounter problems in text reading or meaning comprehension, they can ask for help via the Skype software. After they have been able to read the text, they invite two online helpers and then read the text to them. If both of the two online helpers judge the readers as passing the assessment, they can then become a new online helper. If one or both of the two online helpers judge that the student has 'failed', then the student needs to keep practicing reading the text. Figures 2a and 2b shows the learning examples of this module.

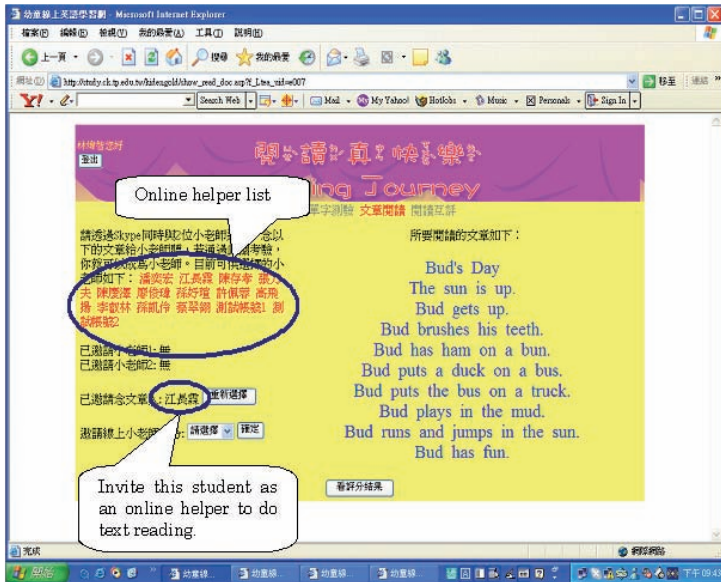


Figure 2a. An example of text reading activities with online support

System architecture

MDPAL system adopts a three-tier architecture, as shown in Figure 3. The first tier is responsible for users' online practice and testing through a browser. The modules on the web server of the second tier uses database accessing objects to access data from the database server in the third tier. The interactive results between the second and the third tiers will display on the browser in the first tier. All of the modules are adapted to Microsoft's ASP (Active Server Pages) to interact with the forms in the browser on the client and the objects of request and response. Through accessing the database on the server, MDPAL can provide users with the necessary scheme for synchronous practice and testing.

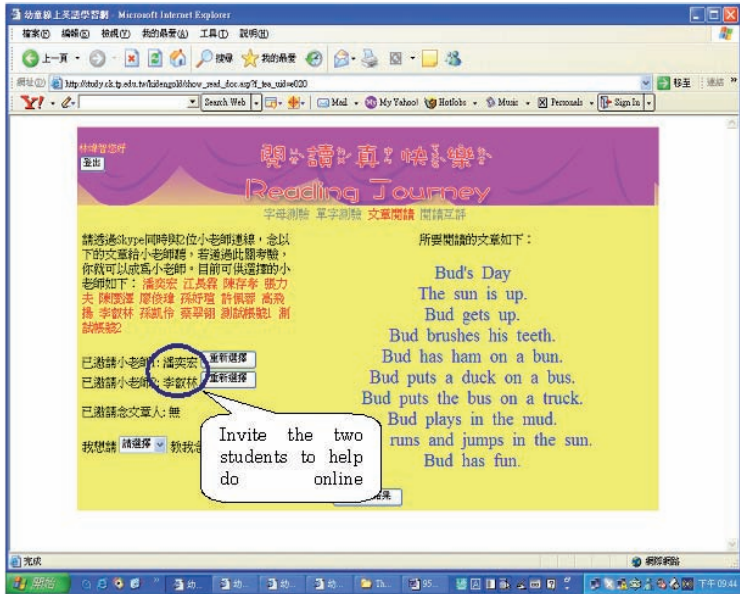


Figure 2b. An example of online peer assessment

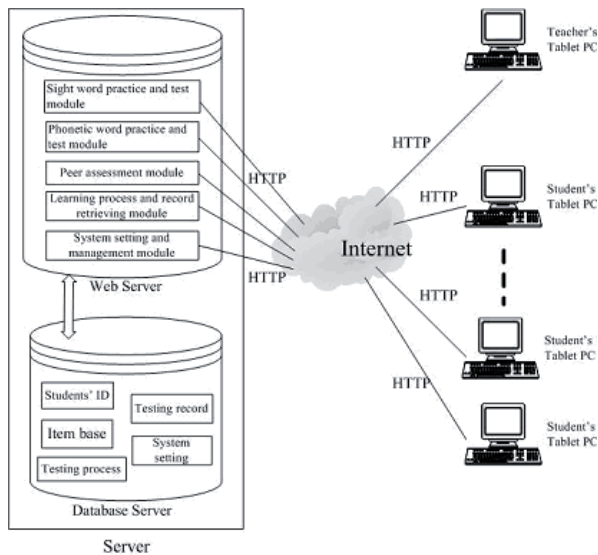


Figure 3. System architecture of MDPAL system.

Early EFL reading materials

In total, there were five teaching units were used in this study. Each unit contained both of the two components (phonological skill training materials and an oral reading text) described above. The phonics rules plus a set of common sight words made up the phonological skill training module. Based on the content of the phonological component, a carefully tailored written text was used as the oral reading material in the peer assessment module.

The Evaluation of MDPAL

Participants

The participants of this study were 52 third-grade students in 2 classes (each class had 26 students made up of 14 boys and 12 girls) from an elementary school in Taipei, Taiwan. One class was randomly chosen as the experimental group and the other as the control group. At the beginning, the participants were heterogeneously grouped in small reading groups based on their English achievement in the second grade. The grouping method was as follows. The students whose grade was A were classified as high reading ability students, while those whose grade was B or C were classified as medium reading ability students, and those whose grade was D or Fail were classified as low reading ability students. As a result, the experimental group had 6 high-ability, 11 medium-ability, and 9 low-ability students; and the control group had 7 high-ability, 10 medium-ability, and 9 low-ability students. After heterogeneously grouping students (one student with higher English achievement was coupled with two or three students with lower achievement), both the experimental and control groups had seven reading groups each (five groups with four members and two with three members).

Design

This study employed a concurrent triangulation approach. Both qualitative and quantitative data were collected concurrently. For qualitative data collection, we used field observation where both audio and video data of the students' collaborative and peer-assisted learning activities were collected in 5 weeks; and for quantitative data collection, we used a quasi-experimental design where all the members of each class (control and experimental) were individually pre-tested and post-tested.

Procedure

In order to understand EFL students' online peer-assisted reading behavior, we observed children during collaborative EFL reading during 5 two-class activities. In addition to this, because we wanted to simulate a situation in which students read with distributed learners (in a networked community) via the online phone calls, we treated each small reading group as though they were a virtual distributed class. Thus, in the experimental group (with the support of mobile devices), the inter-group reading behavior (peer-assisted reading and peer-assessment) must be done online, yet the intra-group reading behavior without this restriction was observed. On the other hand, in the control group (without the support of

mobile devices), if students had learning problems they were able to ask their group mates (intra-group) or go to other groups to ask for help (inter-group).

In the experimental group, each student was given a TabletPC with a touch stick and a micro-earphone set. In each of the two-class activities, they logged in to MDPAL, and firstly attempted the phonological skills training activities with the support of MDPAL. After passing this level, they then continued with text reading. In addition to the text shown on the screen, they were also given a printed version of this text to easily mark the words they were unable to read. Whenever they had problems in oral reading or meaning comprehending, they could receive help from either their group mates or the online helpers. In addition, it was possible that two or three students dynamically formed a learning group via making an online phone call (by *Skype*) when they did the online peer-assessment activity or the peer-assisted reading. All of the students had the same role, and had an opportunity to be each others' online helper.

In contrast to the experimental group, the students of the control group first of all learned the identical materials as the experimental class (sight words and phonetic words) through direct instruction and whole class tests given by the EFL teacher. Then they were asked to collaboratively read a printed text with their peers. Finally, they were asked to read the text to two peers (peer-assessment). Students who passed the peer-assessment were given a paper crown and their names were printed on the blackboard to announce they were the helpers and everyone could go to them for help or assessment. Similar to the treatment in experimental group, the EFL teacher's was the first name on the helper list.

Data analysis

For qualitative data, our approach was to watch the videotapes, and to focus on the students' behavior (see Appendix A) and the users' behavior towards other students belonging to different learning groups (the virtual distributed classes). Each identified behavior was re-analyzed and the frequency of each observed behaviors was calculated. For quantitative data, we conducted an analysis of covariance (ANCOVA). The dependent variable was early reading scores and the covariate was the students' scores in EFL in the previous semester.

Results & Discussion

In-class observation

The EFL reading behavior was categorized as learning-related and learning-unrelated. In addition, the learning-related behavior included three kinds of reading behaviors: individual, inter-group, and intra-group behavior. We counted the frequency of each category of behavior and computed the percentages of the frequency of each observed behavior categories. The results are shown in Table I.

Table I shows that students concentrated more on the EFL reading activities with the support of MDPAL, as indicated by the number of learning-unrelated instances. It also shows that MDPAL benefited students' collaborative reading behavior (both inter- and intra-group), but more particularly the inter-group behaviors. We found that it took the

Table 1. EFL reading behaviors

Group reading behaviors	Class	
	Experimental (%)	Control (%)
Learning-related		
Individual	24.5	23.0
Inter-group	27.2	8.4
Intra-group	34.8	28.9
Learning-unrelated	13.5	39.7

students of the control group more time to wait for intra-group learning help (about 4.6%) than those of the experimental group (about 1.3%) even when the helpers were available for providing support. In contrast, the students of the experimental group liked to ask online helpers for learning support when their group mates were busy.

From the video-data observation, we also found that students preferred face-to-face social interaction (communication, discussion, sharing, interactivity, and coordination). When they did peer-assisted reading activities with the virtual distributed peers via *Skype*, they liked watching their peers. We also found that they preferred online peer-assisted learning, as indicated by the fact that even when making online phone calls was not required, they did so when they collaboratively learned with their group mates.

Through further observation of the video-data, we found that the students of the experimental group demonstrated more collaborative learning behavior (both intra- and inter-group) than those of the control group did when they were asked to read the assigned text (this also can be seen in Table 1). We also found that the students of the control group had more learning-unrelated behaviors when they had reading problems and without real-time learning support. By contrast, the students of the experimental group demonstrated more individual learning instances with the support of MDPAL when they were waiting for help from their group mates or online helpers.

Furthermore, we found that students usually began to perform learning-unrelated behavior in the following circumstances: in the control group, students were getting bored when waiting for help for a long time; in the experimental group, technological restrictions of the devices (having problems in using the touch stick) and that of the wireless network (unable to hear the words' sounds pronounced by MDPAL, as well as being bothered by the noise while talking with online peers).

Early reading abilities

Before and after the treatment, all students were given an individual test on their reading abilities. The alpha level was set at .05 and the results are shown in Table 2.

The test of homogeneity of regression coefficients was not significant ($F(1,48) = 0.00, p > .05$). The result of ANCOVA shows that the effect of group is not significant ($F(1,48) =$

Table 2. Adjust Means (μ) and standard deviation (σ) of the pretest and posttest results

	Experimental		Control	
	Pretest	Posttest	Pretest	Posttest
	M	M	M	M
μ	19.3	25.3	20.5	23.5
σ	8.5	8.3	8.8	9.27

Note. For each group, $n = 26$.

0.02, $p > .05$) but the effect of test is significant ($F(1,50) = 27.55, p < .05$). The interaction of group and test is not significant ($F(1,50) = 3.17, p > .05$). The simple main effect analyses indicate that the pretest of the two groups is not significant ($F(1,49) = 0.35, p > .05$), and that of the posttest of the two groups is not significant either ($F(1,49) = 0.65, p > .05$). However, the simple main effect analyses shows that the pre- and post-test of the experimental group is significant ($F(1,50) = 24.70, p < .05$), and that of the control group is also significant ($F(1,50) = 6.023, p < .05$). The results show that the experimental group made a larger improvement than the control group did although students of both groups demonstrated improvement in the scores on this reading test.

Conclusion

The evaluation of MDPAL helped us understand young EFL learners' collaborative reading behaviors in a wireless environment. The results showed that the use of mobile devices in collaborative EFL reading activities opens a new world of possibilities. With the support of MDPAL, students were able to concentrate on learning activities. In addition, they were able to do more effective individual learning activities with the support of mobile devices even when they were waiting for learning support. Also, MDPAL effectively promoted the opportunities of social interactions and peer-assisted learning. Students liked learning with online peers. With the support of MDPAL, students made greater progress in learning to read compared with those who did not use the system. However, technological restrictions of the wireless network and technological characteristics of the devices require further research to overcome the problems to enhance the learning effectiveness in a real distributed community. It should be noted that the present study was only a simulation in that all of the online learning was implemented in a single EFL class. Further understanding about the effects of MDPAL on EFL learners' online collaborative behaviors can only be obtained through practical evidence from a real distributed EFL learning community.

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Appendix A: In-Class Observation Checklist

Date: _____ Unit: _____ Observed group: _____

Observed behaviors	Observe intervals		1st				2nd				9th			
	Time		□				□				□			
	Students' numbers		1	2	3	4	1	2	3	4	1	2	3	4
Learning-related behaviors	individual	Set up or operate the TabPCs	□	□	□	□	□	□	□	□	□	□	□	□
		Do practice	□	□	□	□	□	□	□	□	□	□	□	□
		Do test	□	□	□	□	□	□	□	□	□	□	□	□
		Use Skype	□	□	□	□	□	□	□	□	□	□	□	□
		Idle helper (ignore help request)	□	□	□	□	□	□	□	□	□	□	□	□
	inter-group	Peer-assessment	□	□	□	□	□	□	□	□	□	□	□	□
		Teach another to learn materials	□	□	□	□	□	□	□	□	□	□	□	□
		Teach another to use TabPC	□	□	□	□	□	□	□	□	□	□	□	□
		Be taught to use TabPC	□	□	□	□	□	□	□	□	□	□	□	□
		Be taught to learn materials	□	□	□	□	□	□	□	□	□	□	□	□
		Waiting for peer-assessment	□	□	□	□	□	□	□	□	□	□	□	□
		Ask for help	□	□	□	□	□	□	□	□	□	□	□	□
		negotiation	□	□	□	□	□	□	□	□	...	□	□	□
		communication	□	□	□	□	□	□	□	□	□	□	□	□
	discussion	□	□	□	□	□	□	□	□	□	□	□	□	
	intra-group	Peer-assessment	□	□	□	□	□	□	□	□	□	□	□	□
		Teach another to learn materials	□	□	□	□	□	□	□	□	□	□	□	□
		Teach another to use TabPC	□	□	□	□	□	□	□	□	□	□	□	□
		Be taught to use TabPC	□	□	□	□	□	□	□	□	□	□	□	□
		Be taught to learn materials	□	□	□	□	□	□	□	□	□	□	□	□
		Waiting for peer-assessment	□	□	□	□	□	□	□	□	□	□	□	□
		Ask for help	□	□	□	□	□	□	□	□	□	□	□	□
		negotiation	□	□	□	□	□	□	□	□	□	□	□	□
		communication	□	□	□	□	□	□	□	□	□	□	□	□
		discussion	□	□	□	□	□	□	□	□	□	□	□	□
		Sharing with group mates	□	□	□	□	□	□	□	□	□	□	□	□
	Encouraging group mates	□	□	□	□	□	□	□	□	□	□	□	□	
	Watching group mates	□	□	□	□	□	□	□	□	□	□	□	□	
	Learning-unrelated behaviors	Students' numbers	1	2	3	4	1	2	3	4	1	2	3	4
		Chatting with others	□	□	□	□	□	□	□	□	□	□	□	□
Playing with others		□	□	□	□	□	□	□	□	□	□	□	□	
Moving around		□	□	□	□	□	□	□	□	□	□	□	□	
Catnapping		□	□	□	□	□	□	□	□	□	□	□	□	
Playing alone		□	□	□	□	□	□	□	□	...	□	□	□	
Abstracted		□	□	□	□	□	□	□	□	□	□	□	□	
Leaving seat		□	□	□	□	□	□	□	□	□	□	□	□	
Looking around		□	□	□	□	□	□	□	□	□	□	□	□	
Other behaviors		□	□	□	□	□	□	□	□	□	□	□	□	

