# “Can we use the iPads?”

## Using Lingokids in the Classroom

LINGOKIDS

in collaboration with

University of Central Lancashire
UCLan

## BACKGROUND

This study is the result of a collaboration between UCLan and LingoKids to evaluate the LingoKids product with Pre-School (age 3 – 4) and Reception (age 4 – 5) children in classrooms in the UK.

The intention was to compare the game based learning app with other learning modes. A series of Zoom meetings established the basics of the evaluation protocol which was that children would be allocated to groups (A, B, C) who would meet the same content on two non-consecutive days in a single week delivered via a specially prepared version of the game based learning app (Learning mode 1), teacher led classroom instruction using pre-prepared PowerPoint slides (Learning mode 2), or via worksheets which were intended to require minimum assistance from a supervising adult (Learning mode 3).

To mitigate against any 'group' effects, children would rotate groups in such a way that each child would have two weeks exposure to each of the learning modes.

This can be understood in the following table

**Table 1 - Study organisation**

| | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 | WEEK 5 | WEEK 6 |
|---|---|---|---|---|---|---|
| Game | A | C | B | A | C | B |
| Taught | B | A | C | B | A | C |
| Worksheet | C | B | A | C | B | A |

Evaluations were to be made of learning. Following consultation of the literature and conversations with academics and Pre-School and reception teachers, a decision was made to consider three independent measures to provide a judgement on learning. The measures taken were to measure:

- The expectations and reported fun from the children - measured before and after the learning session - research suggests a correlation between fun and learning ([1])
- The engagement of the children in the session - reported by the teacher - this being a measure of the 'process' or learning ([2], [3])
- The momentary learning measured by results of a 'test' at the end of each week - this being a measure of the 'in-the-moment' outcome of learning ([2], [4])

## INSTRUMENTS

Learning content was prepared by the LingoKids team who prepared content for the game based learning that was mirrored in worksheets and PowerPoint supported teaching activities. Two sets of material were produced, one for Pre-School children and one for Reception children.

Evaluation material was prepared by the UCLan team.

We used two Smileyometers [5] – one before, one after – to **measure fun** with the children. These were presented together, and the child ticked one face before the activity and then – turning over the Smileyometer – ticked another face afterwards. The ratings they gave – in relation to the question "How much fun will this be / was that?" were scored from 1 – 5 with 5 being 'Brilliant' and 1 being 'Awful'.

We used the Leuven scale[1] [3] to **measure engagement / involvement** in the learning activity. The teacher or researcher completed this for the children in their group. Whilst this gave a set of ratings for the group – it did not attribute ratings to individual children within that group. Each learning session resulted in a set of N scores, with 5 relating to most engaged and 1 to least engaged, where N referred to the number of children in the group.

To **measure learning outcomes** (momentary learning performance) we did not want to use individual tests for children (see critique from [6] and there are many others) and wanted to only measure the performance from the group. For that reason, we devised a set of twelve 'bespoke' Rapid Test Activities (RTAs) that kept the anonymity of children, that were testing learning outcomes, easy to manage in the time we had, and that were fun to complete. These activities were untested before this evaluation study, and we intend to write about their function and functionality in an academic paper which the Lingokids team will contribute to. We scored each on the basis of correct answers per group and we report a ratio score that refers to the number of correct answers given as a fraction of the total number of answers given by that group on that occasion.

## PROCEDURE

The study described here took part over a period of three months with children in two preschools and one school. The Pre-Schools were in Preston and Lancaster and the school was in Bolton. Children attending the study had diverse backgrounds and a range of abilities and so the study covered typical children from non-selective situations.

It is worth noting that recruitment of schools was more difficult than we expected given the nature of the study (six weeks, twice a week).

In the three locations, staff from UCLan worked with preschool / teaching staff to ensure that in all situations, children were comfortable. Across the 36 sessions delivered (12 in each venue), seven different UCLan staff engaged with the children but at least one from a core group of four attended every session – this ensured consistency of approach.

In the first session of each week, children engaged with one of the three learning modes (game, taught, worksheet) and completed a Smileyometer before and after engagement. In the second session of each week children again completed a Smileyometer before and after but also completed a rapid test activity (RTA) that allowed the UCLan team to establish if there were any similarities or differences in the child's

[1] https://learningjournals.co.uk/what-is-the-leuven-scale-and-how-to-use-it/

momentary learning from the different 'learning modes. Learning was also measured by having adults working with the children score overall engagement of the children during each learning activity.

## RESULTS

All the children we worked with enjoyed their engagement with the project and all the school staff were accommodating but also enthusiastic about the project. There were some technical and organisational difficulties which we mainly managed to mitigate against, but we did have a problem with one of the Pre-School sessions where no children completed the 'taught' activity on week 5. This is shown in table 5 below as an empty space.

Across the study we have gathered attitudinal data from children (Smileyometer before and after), engagement data as reported by adults and learning scores from the end of week learning tests.

A small percentage of the Smileyometer data could not be used as children had coloured in multiple faces! We also did not include Smileyometer data if a child had not completed both before and after scores.

## Quick summary

Taking a mean average of all the 'before' Smileyometer scores, it can be seen that, across both groups, **children expected the game to be more fun** than the other two learning modes. This is significant, based on statistical tests and so is NOT caused by chance.

Across both groups, experienced **fun was also highest for the game,** this was significant in the case of the Pre-School children. We can conclude that 'learning with the game is more fun than learning in the other two ways'

For the older children **engagement was shown to be highest in the game,** as compared with the other two methods and this was significant. Given that engagement is a correlate for learning with children at this age we can surmise that children were engaged with learning.

In terms of measures of momentary learning, there were no significant differences across any of the learning modes which suggests that there were no differences across the modes. It can be construed that children learned as much with the game as they did with the other two learning modes.

## Reception aged children

**Table 2 - Summary Results from Reception aged children (N = 43)**

| | Anticipated fun | Experienced fun | Engagement | Learning |
|---|---|---|---|---|
| Game | **4.61** | **4.16** | **4.32** | 0.81 |
| Taught | 3.72 | 3.72 | 3.52 | 0.83 |
| Worksheet | 4.06 | 3.93 | 3.34 | 0.84 |

Table 2 shows that children had high expectations of the game but also were keen to do the other activities. This is important, as it highlights that the study was not presenting one or more of the three options in a poor light. Engagement with the iPads/game was the highest overall (and was statistically significant); observations from the taught sessions were that some children, in a group of 15, got distracted by their peers - which disengaged them from the taught content - and with the worksheets, some children found the task high in effort.

The overall scores for learning based on the after-event RTAs for the Reception aged children show no significant difference across the three learning modes but are all relatively high. Table 3 shows how these scores varied across the different weeks.

**Table 3 - Week-by-week Learning from Reception Children (N = 43)**

| | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 | WEEK 5 | WEEK 6 | MEAN |
|---|---|---|---|---|---|---|---|
| Game | 0.88 | 0.52 | 1.00 | 0.78 | 0.76 | 0.90 | 0.81 |
| Taught | 0.69 | 0.67 | 1.00 | 0.91 | 0.87 | 0.83 | 0.83 |
| Worksheet | 0.81 | 0.46 | 1.00 | 0.78 | 0.97 | 1.00 | 0.84 |

The learning scores for weeks 1, 4, 5 and 6 refer to sessions where the learning of vocabulary was important. We observed children being unsure about words when they did the tests for word learning. In week 2, the activity was around recycling. The colours and allocation of items in the bins in Horwich, UK were NOT the same as those in the game and in the taught materials and we suspect that this confusion contributed to the overall low scores for that week which, overall, were significantly lower than those for the other five sessions. In week 3, the aim was for children to learn about the Lunar New Year – children were asked to draw something they had learned about and post it in a post box – every child drew a relevant item.

## Pre-School children

**Table 4 Summary Results from Pre-School aged children (N = 26)**

| | Anticipated fun | Experienced fun | Engagement | Learning |
|---|---|---|---|---|
| Game | **4.23** | **4.30** | 3.52 | 0.76 |
| Taught | 3.42 | 3.81 | 3.29 | 0.76 |
| Worksheet | 3.00 | 3.45 | 3.80 | 0.75 |

Table 4 shows that children in this younger age group also expected the activities to be fun and they reported the highest scores for the game activity. These high scores were significantly higher than the other scores. Engagement was highest for the worksheets, and whilst not statistically significant, this needs some explanation. In the Pre-Schools, children doing the worksheets sat at a table with the 'researcher / teacher'. In MOST cases, the children could not complete the worksheet on their own and they needed help. Given that they found working on the worksheet difficult, they often were just colouring in the sheets hence they were all actively engaged – but probably not learning what was intended.

The scores for learning based on the after-event RTAs with the pre-school children show no significant difference across the three learning modes. Table 5 shows the week by week results.

**Table 5 - Week-by-week Learning from Pre-School aged Children (N = 26)**

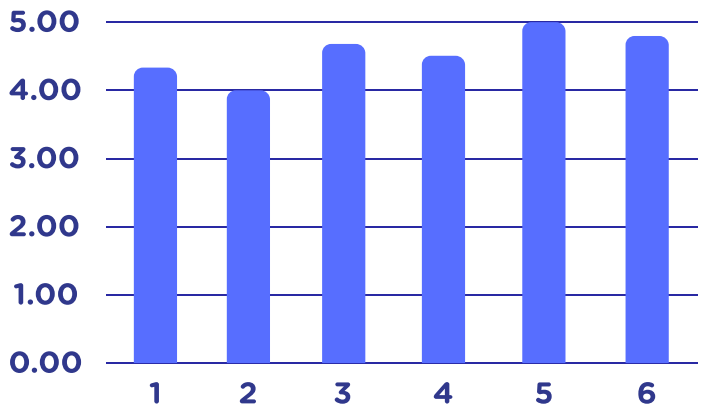
| | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 | WEEK 5 | WEEK 6 | MEAN |
|---|---|---|---|---|---|---|---|
| Game | 0.61 | 0.47 | 0.87 | 0.88 | 0.93 | 0.79 | 0.76 |
| Taught | 0.70 | 0.74 | 0.80 | 1.00 | | 0.55 | 0.76 |
| Worksheet | 0.77 | 0.68 | 0.96 | 0.88 | 0.72 | 0.48 | 0.75 |

Similar to with the older children, the weeks each had different objectives. Week 6 did not have key vocabulary and the (low) scores for that week probably reflected the difficulty of finding a way to evaluate this content which was about hand washing. Week 2 was numbers and many of the children struggled with this.

## DISCUSSION

Overall, the children clearly preferred to use the iPads and the Game than the other activities. The children always loved it when it was 'their turn for the iPads'. Some of the younger children became visibly upset when they couldn't use the iPads and so we have determined, as a group, that in future, if we work with Pre-School children, we will have them all, or none, using iPads. The Reception aged children were more resilient and understood turn taking so whilst they were excited when they got to use iPads they were able to understand when it wasn't their turn.

**Table 6 – Pre-School children's Ratings of the Game activity**




Children had high expectations and experiences of the iPad /game activity. As an example, over the weeks, the ratings remained high as shown in Table 6. This shows evidence of curiosity and engagement with the Lingokids product.

## CONCLUSION

In a controlled study with 69 children we have shown that children found learning with the game based app more fun than other kinds of learning, and for the older children, engagement was significantly higher when using the game based app than with other learning modes. Overall the results suggest that the aim of the LingoKids game, which, as we understand it, is to encourage learning through playful, interactive content embedded in games, is effective. The game based delivery (what they refer to as PlaylearningTM), in the test cases we used in this study appeared to be more engaging, and at least as effective, as other modes of learning. The design of the app supports the idea of learning through a range of casual interactions with words and language [7]. Whether the children were motivated to play simply because the game was on the iPads, or were remembering their earlier experience of the game, cannot be explicitly stated but the one without the other would not be engaging and so we can say that the 'product' was attractive to the children. Literature tells us that the more children are engaged, the higher their intrinsic motivation and thus, with the appropriate content in place, learning is more likely to occur [8].

There are some limitations in this study. The inherent difficulties of doing research with Pre-School children, several of whom could not read at all, does raise some questions about the validity of both their own scores using the Smileyometers and of the test results in their case. However, as shown in Table 6, overall children were consistent and so were overall probably able to express ratings. We have high confidence in the teacher rated engagement scores with that cohort and we believe that the design of the RTAs, which precluded copying and did not reveal to children if they were right or wrong - thus didn't put them under any stress, provided as reliable data as we could get with these children. The Reception aged children were easier to manage and, having completed eight months of formal education, were much more capable linguistically and expressively. The data from that group, with a large cohort, is strong.

Children may have already known about many of the things we introduced to them. We chose to not measure prior knowledge as this can itself produce a confound and is not recommended for this style of study. The approaches we took to measure in-the-moment learning allowed for comparison across (learning mode) groups and in so doing took account of any prior knowledge that children might have had since it can be assumed (albeit not tested here) that across a single group of children (especially from the large reception class), roughly the same numbers of children might have known / not known concepts in each of the groups.

## FURTHER WORK

Further study would evaluate the app in situ over time and use a wider range of methods to evaluate learning over time. The UClan staff who 'managed' the app experience with the children are also interested in reporting back to LingoKids about some of the Usability and Playability of the app from an expert and observational perspective.

## REFERENCED WORK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