

Shouting in space: promoting oral reading fluency with Spaceteam ESL

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Abstract. This study examined whether the pedagogical use of Spaceteam ESL (English as a Second Language), a digital *shouting* game, could contribute to the development of Oral Reading Fluency (ORF) among 71 English students in secondary schools in Mombasa, Kenya. Following a mixed-methods approach for data collection and analysis, we pre- and post-tested the participants on their ability to read aloud efficiently (*speed*) and accurately (*accuracy*) in three tasks: (1) phrases extracted from the game; (2) phrases not related to the game; and (3) an anecdote. Our findings indicate that participants who played Spaceteam ESL improved their ORF on all measures of *speed*, but no significant differences were observed in terms of *accuracy*. Overall, these findings corroborate our hypothesis that some of the affordances of Spaceteam ESL (e.g. speed reading) would contribute to the development of some aspects of ORF.

Keywords: Spaceteam ESL, digital game, oral reading fluency.

1. Introduction

For the development of reading fluency, Nation (2009) recommends that learners engage in proficiency-appropriate ‘speed reading’ activities, feel motivated to read, read intensively, and engage in activities involving other skills (e.g. speaking). However, because of the constraints that afflict the second language (L2) classroom (e.g. lack of time, focus on the teaching of new language features), these

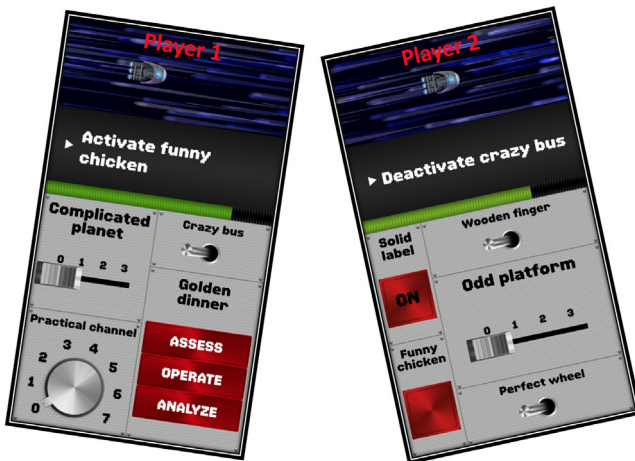
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recommendations are difficult to pursue. One way of mitigating these limitations is via out-of-class learning. Digital games such as Spaceteam ESL have the potential to address these constraints and, at the same time, promote all of Nation's (2009) recommendations.

Spaceteam ESL (Waddington & Cardoso, 2017) is a free multiplayer and team-building digital *shouting* game for mobile devices in which players pilot a spaceship by controlling a panel with knobs and dials listed with English words (organized by levels, based on word frequency and pronunciation complexity). To keep the spaceship afloat, players must complete tasks by giving (speaking) and receiving (listening) *time-sensitive* orders that require the manipulation of the knobs and dials on their screen (e.g. 'activate funny chicken', requiring team members to press the 'funny chicken' button). If successful, each team continues to the next level of increasingly difficult gameplay (see Grimshaw & Cardoso, 2018, or visit spaceteamesl.ca for details). Figure 1 illustrates the game's interface involving two players.

Figure 1. Spaceteam ESL: two players



One of the interesting affordances of Spaceteam ESL is that it addresses Nation's (2009) four recommendations to promote reading fluency. In addition, it encourages the practice of one type of reading fluency, assumed to contribute to text comprehension: ORF, or one's ability to read aloud connected text *quickly* and *accurately* (Rasplica & Cummings, 2013), without a concerted cognitive effort. We hypothesized that Spaceteam ESL could contribute to the development of this type

of oral fluency and, accordingly, asked the following question: can Spaceteam ESL contribute to the development of ORF in terms of *speed* and *accuracy*?

This study is part of a larger project financed by the Social Sciences and Humanities Research Council of Canada, which aims to improve teaching and learning through educational technology in sub-Saharan Africa.

2. Method

To investigate participants' improvement in oral/read-aloud fluency in terms of *speed* and *accuracy*, a mixed-methods approach to data collection and analysis was adopted consisting of both quantitative (using a pre-/post-test design to examine participants' ORF development in terms of speed and accuracy) and qualitative data (focus group).

Adolescent intermediate-level English learners (N=71) from three public schools in Mombasa (Kenya) were recruited to play Spaceteam ESL for a period of three weeks (three weekly sessions, each lasting approximately 45 minutes), as part of after-class extracurricular activities. Participants were pre-tested (audio recorded) on their ability to efficiently and accurately read aloud the following three tasks: ten phrases extracted from the game (n=38 morphemes, including free and bound forms), ten equivalent phrases not related to the game (n=112), and one 128-word anecdote (n=157). While *speed* was calculated in seconds using Audacity, *accuracy* was measured via a computation of the correct words read aloud in each task. At the end of the experiment, learners were post-tested using the same instruments (modified to avoid testing effects) and participated in focus group discussions that aimed to probe their perceptions of the experience.

3. Results

Using paired-samples t-tests, the participants' performances in read-aloud speed and accuracy before (pre-test) and after playing Spaceteam ESL (post-test) were analyzed for three tasks: ten phrases extracted from the game, ten equivalent phrases not related to the game, and one anecdote. The results are summarized in [Table 1](#) below.

In terms of *speed*, participants read aloud Task 1 at a faster speed after playing Spaceteam ESL ($M=17.14$, $SD=3.52$) as opposed to before playing the game

($M=19.46$, $SD=3.66$). This difference, 2.32, BCa 95% CI [1.55, 3.08], was significant, $t(70)=6.03$, $p<.001$, and represented an effect of $d=0.65$.

Relatively similar results were observed for Task 2, wherein participants read the target phrases at a faster speed after playing Spaceteam ESL ($M=40.17$, $SD=10.21$) than on the pre-test ($M=44.03$, $SD=9.18$). This difference, 3.85, BCa 95% CI [2.51, 5.20], was once again significant, $t(70)=5.73$, $p<.001$, and represented an effect of $d=0.40$.

Finally, for Task 3, participants also read the 157-word passage at a faster speed after playing Spaceteam ESL ($M=54.92$, $SD=11.06$) than what was observed on the pre-test ($M=60.96$, $SD=11.34$). This difference, 6.05, BCa 95% CI [4.25, 7.85], was significant, $t(70)=6.69$, $p<.001$, and represented an effect of $d=0.54$. Overall, these results indicate that participants improved their speed in all tasks after the treatment period.

Table 1. Comparison of speed and accuracy rates by task

Task	N	Speed (in seconds)					Accuracy (morpheme)				
		Pre-test		Post-test		p<	Pre-test		Post-test		p=
		M	SD	M	SD		M	SD	M	SD	
1	71	19.46	3.66	17.14	3.52	.001	36.31/38	1.72	36.62/38	1.65	.101
2	71	44.03	9.18	40.17	10.21	.001	106.54/112	5.38	106.27/112	6.41	.525
3	71	60.96	11.34	54.92	11.06	.001	153.34/157	3.86	155.55/157	4.30	.670

These findings are corroborated by the participants’ statements during the focus group discussions, in which they reported that playing Spaceteam ESL helped improve their oral fluency: “it makes your brain to be faster, it makes you speak faster, it makes you read more fast than usual” and “[it helped me] getting quick in English and reading”.

Regarding *accuracy*, paired-samples t-tests showed no significant differences from pre- to post-test in any of the tasks: $t(70)=-1.66$, $p=.101$ for Task 1; $t(70)=0.64$, $p=.525$ for Task 2; and $t(70)=-0.43$, $p=.670$ for Task 3. These results suggest that the proposed game-based pedagogy had no effect on improving the participants’ ORF performance in terms of accuracy.

A thematic analysis of the qualitative data did not yield any obvious statements reflecting the game’s potential to improve accuracy, thus validating the statistical results.

4. Discussion and conclusion

The goal of this study was to examine the effects of Spaceteam ESL on the development of ORF in terms of *speed* and *accuracy* – two measures of oral fluency (Rasplica & Cummings, 2013). Our findings suggest that while speed was significantly affected by gameplay, accuracy was not.

As hypothesized, the improvements observed in *speed* can be attributed to one of the affordances of Spaceteam ESL, a game that capitalizes on efficiency (fast speaking, reading, and listening) for successful gameplay. Interestingly, efficiency is the dominant feature in Nation's (2009) recommendations for fluency development. According to the author, to achieve fluency, L2 students should be involved in activities such as speed reading practice, repeated reading, paired reading, and scanning; they should also read a lot and feel motivated to read. We believe that Spaceteam ESL accomplishes all of these goals, *mutatis mutandis*.

The non-significant results involving accuracy can be explained by our (based on Nation's 2009) assumption that for fluency development, students should engage with “material that is very familiar and contains no unknown language features” (p. 8). Because students already knew the intricacies of the grapheme-to-phoneme rules of English orthography (a condition to participate in the study), their level of reading accuracy was already highly developed. This is confirmed by the high values observed on the pre-test in all accuracy tasks (e.g. 36.1/38 for Task 1 and 106.54/112 for Task 2), indicating a ceiling effect.

Despite these encouraging results, there are many limitations that need to be acknowledged and, accordingly, addressed in further investigations. The most serious one is the lack of a control group to be used as a benchmark to reliably measure the effects of gameplay on ORF development. Another limitation relates to the short duration of the experiment.

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