Tracking learner behaviour of non- and low-literate adults in an online literacy training environment

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Background

Growing number of low-and non-literate adults immigrating to highly literate countries: In 2015, 32,150 first time asylum applicants in Finland (+822% over 2014), mostly Iraqis (63%), Afghans (16%) and Somalis (6%) (1.)

Adult non-literacy a new phenomenon in Finland, the world's most literate nation (2.) = Lack of academic research on how non-literate adults acquire basic language and literacy skills in Finnish (3.)

Slow learning pace of non-literate speakers → basic courses often insufficient to achieve functional literacy, even in the very transparent Finnish orthography (4.)

Whole-group activities found to have a negative influence on non-literates' language development, computer-assisted language learning (CALL) → positive effect on reading scores & vocabulary development (5.)

One example of a CALL environment:

→ Systematic instruction in making sound-letter connections, decoding and word recognition.

 = intensive and extensive practice (increasing the quantity & quality of practice time + providing consistent, corrective feedback) → facilitating individual learning development

300 words in 15 sets of 6 different exercises types.

For example, 'Listen and…
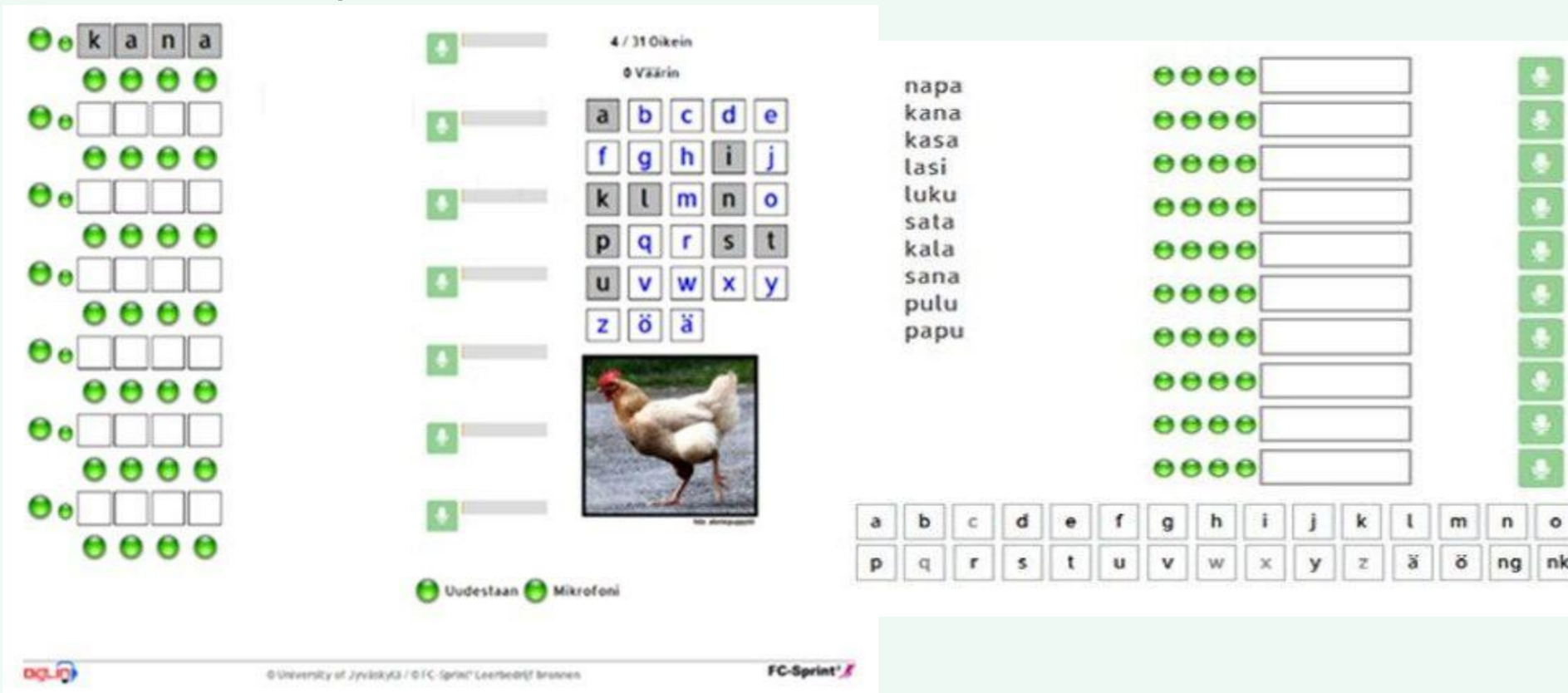
'… drag the letters' (DL), word set 1A   '… form the words' (FW), word set 1B

Participants

Country of origin	First language (L1)	L1 literacy	Gender	In Finland	Finnish classes	Finnish skills (CEFR)	DigLin Testing Time	Log files created for the participants
Iraq (3), Egypt, Somalia (2), Syria	Arabic (3), Somali (2), Kurdish, Turkmen	5 non-literates, 2 literate (self-reported)	6 females, 1 male	9-72 months	3-24 months	Sub-A1 (6 participants), A1 (1 participant)	16 ½ to 40 hours	261-620 = 3141 in total

Conclusion

Individual learning **Performance**, **Process** and **Progress** can be studied and reflected on holistically by investigating log file data.

"Sometimes the absence of an activity can be as revealing as its presence" (9.)
= learners did not always do what they were expected to do.

Learners did not make use of all provided resources (word sets, exercises and help tools)
→ CALL application's design, its significance and effectiveness.

Weaker users should be supported by providing more instruction and help regarding the employment of successful strategies → → → progression towards a more independent learning behaviour.

Research focus

Learning process of establishing phoneme-grapheme connections and decoding & recognition skills necessary for reading development in Finnish (6.)
What can log files reveal about the learner?
Looking at "what learners actually do, not what the researcher assumes instructions and task demands will lead learners to do" (7.)

Log files: what? why?

- automatically created, time-stamped documentation of user-computer interaction.

- temporally accurate, detailed, consistent, objective tracking data

= empirical evidence, enabling researchers to examine student behaviour post-activity.

→ inferences about learner knowledge, strategies & processes can be made/ assessed (8.)

7632;["""04FIN""""314""]";"FIN";"2014-10-30 09:21:20";"2014-10-30 09:23:58";"Drag the letters 4a";"[{""type"":""play_word_sound"" data"":""sauna""   timestamp"":""2014-10-30 09:21:20""   data_extra"":""""} {""type"":""hide_word_picture""   data"":"""" timestamp"":""2014-10-30 09:21:21""   data_extra"":""""} {""type"":""show_word_picture""   data"":""""   timestamp"":""2014-10-30 09:21:21""   data_extra"":""""} {""type"":""letter_drag""   data"":""s"" timestamp"":""2014-10-30 09:21:26""   data_extra"":""""} {""type"":""letter_drag_right"" data"":""""   timestamp"":""2014-10-30 09:21:28"" data_extra"":""""} {""type"":""letter_drag""   data"":""a"" timestamp"":""2014-10-30 09:21:32""   data_extra"":""""} {""type"":""letter_drag_right"" data"":""""   timestamp"":""2014-10-30 09:21:34"" data_extra"":""""} {""type"":""letter_drag""   data"":""u"" timestamp"":""2014-10-30 09:21:34""   data_extra"":""""} {""type"":""letter_drag_right"" data"":""""   timestamp"":""2014-10-30 09:21:42"" data_extra"":""""} {""type"":""letter_drag""   data"":""n"" timestamp"":""2014-10-30 09:21:44""   data_extra"":""""} {""type"":""letter_drag_right"" data"":""""   timestamp"":""2014-10-30 09:21:45"" data_extra"":""""} {""type"":""letter_drag""   data"":""a"" timestamp"":""2014-10-30 09:21:49""   data_extra"":""""} {""type"":""letter_drag_right"" data"":""""   timestamp"":""2014-10-30 09:21:49""

Extract of a DigLin log file, showing the user's interactions in 'Drag the letters'. The documentation (workload) can be enormous, here 29 seconds!

Methodology

The 7 participants of this study used the 'Digital Literacy Instructor' in class for 4-6 months.

During this time, the learners' use of the software was tracked by log-files. The computer documented all mouse/keyboard movements & microphone recordings = log files.

The web-based log file database of DigLin's Finnish dataset provided empirical data (6.) → Quantitative analysis.

This study's log file dataset chosen for Qualitative analysis: 133 log files for two exercise types (DL & FW) in 3 word sets.

Quantitative results

→ User profiles

Learner engagement: on- or off-task?
• learners highly engaged, spending their time on-task (sessions ca. 60 min).

Learner preference: popular exercises?
• 'Listen to words' and LD (data amount).

Learner performance: s-a-u-n-?
• overall high success rate, 70% in DL, (system feedback).

Learner productivity: more, better?
• amount of completed words ≠ decoding success, the most industrious decoder not the most successful → productivity ≠ performance

Qualitative results

→ Process outlines

Learner proactivity: employing resources and help tools?

- increased use seems to contribute to decoding success, minimal use to lower success rates.

Learner strategies: various ways to solve tasks!

- not every strategy equally well-suited for every participant; lack of successful strategies =/→ inability to learn independently.

- increase of efficient strategies/deviations → increased autonomy, decoding proficiency.

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