Gaming Grammar: Developing a digital game for foreign language grammar learning

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Outline

• Motivation for the project
• Games and practice
• The design of the game
• The evaluation
• Analysing the online play data: Results and conclusions
DESIGN   PRODUCE   EVALUATE

a digital game for foreign language grammar learning
Motivation

“understand basic grammar appropriate to the language being studied”

(DfE, 2013)
Teacher survey

Would you be interested in using a digital game for teaching FL grammar?

90% Yes; 10% Maybe
(N = 140)

Use at home  Independent learning  Competition
Aids learning  Individualised  Save time  Track progress
Engaging  Motivating  Lack of grammar games  Technology savvy
New and varied resources  Instant feedback  Makes grammar fun
Online digital gamed-based tools

Importance of meaningful practice to facilitate language development e.g. grammatical knowledge

Set within a communicative context
attention to meaning as well as form
(Cornillie et al., 2017; DeKeyser, 2007; Ortega, 2007; VanPatten, 2004)

Embed practice in wider context

Repetition without becoming repetitious (DeKeyser, 2007; Lynch & Maclean, 2001)

Key characteristics of a game: Goals, Interaction, Context, Feedback (Sykes & Reinhardt, 2012)
The underpinning learning theory

Form-Meaning Mapping practice (Input-based)
• Short grammar explanation PLUS
• Repeated practice via meaningful L+R activities

Push learners to focus on: FORM + MEANING

Numerous studies conducted with young and adult learners, a range of languages and grammar features

Marsden (2006):
• 13-14 year olds
• L2 French verb conjugation
• FMM activities > Enriched Input

Should you feed ONE robot or ALL of the robots?
Gaming Grammar: The Game

Series of mini-games
L2 French verb conjugation

<table>
<thead>
<tr>
<th>Number</th>
<th>Tense (+avoir)</th>
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<tbody>
<tr>
<td>1st person</td>
<td>-e vs. -ons</td>
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<tr>
<td>3rd person</td>
<td>-e vs. -ent</td>
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Evaluation: Research Questions

Does meaningful, game-based, grammar practice lead to learning?

Experimental, classroom-based study
• 6 primary school classes, 150 children (aged 8 to 11)
• L1 English, L2 French (beginners)

Weeks
1 to 4
Vocabulary training

Supplementary materials

5
Pre-test

6 to 8
Intervention

vs. Control group

9
Post-test

15
Delayed post-test
Evaluation: Research Questions

Frequency of play
How much practice and how often?
• Limited time available within the language classroom (Tinsley & Board, 2017)
• Technology offers more flexibility

Mixed findings from previous studies
• Longer spacing > short spacing (e.g. Bird, 2010; Rogers, 2015)
• Longer spacing = < shorter spacing (e.g. Suzuki & DeKeyser, 2015; Suzuki, 2017)

Is the learning effectiveness of the game mediated by frequency of play?
Evaluation: Implementing variables

Frequency of play

1st person singular vs. plural -e vs. -ons
3rd person singular vs. plural -e vs. -ent
1st person present vs. past je vs. j’ai
3rd person present vs. past il/elle vs. il/elle a
1st vs. 3rd person past j’ai vs. il/elle a

Recap

One 60-minute session /week
6 question sets /session

Two 30-minute sessions /week
3 question sets /session
Evaluation: Group allocation

Class 1
Class 2
Class 3
Class 4
Class 5
Class 6

30-minute
$N = 74$

60-minute
$N = 76$
Explicit information & Feedback

One mini-game per grammar feature
3 question sets (Reading and Listening / Reading only / Listening only)
12 items per question set

Tutorial:
R&L; Qs 1 & 2

The verb *mange* ends in *e*.
The "e" ending is used with "je" which means "I".

Feedback:
Reminder of grammatical rule

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Reward:
Star rating

3 mistakes = lose
Opportunity to replay (once)
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34,467 data points collected through gameplay
Global game accuracy
(Total questions correct / Total questions answered)

Overall accuracy was high for both groups

Higher accuracy for learners who completed two 30-minute sessions per week

\( (p = 0.047, d = 0.39) \)
Results: Mini-game data

Similar trajectory across mini-games

Transfer of knowledge 1\textsuperscript{st} to 3\textsuperscript{rd} person for \textbf{number} and \textbf{tense}

Difficulty with 1\textsuperscript{st} vs. 3\textsuperscript{rd} person past tense
Question set data

- **60-minute group (n = 66)**
  - Reading & Listening (incl. Tutorial): 63.6% Pass, 36.4% Fail
  - Reading only: 86.3% Pass, 13.7% Fail
  - Listening only: 95.5% Pass

- **30-minute group (n = 73)**
  - Reading & Listening (incl. Tutorial): 61.6% Pass, 38.4% Fail
  - Reading only: 83.3% Pass, 16.7% Fail
  - Listening only: 90.4% Pass

1. **% learners passing 1st play through**
2. Similar performance between groups
3. Majority of learners applying rule correctly
4. Transfer of knowledge between R&L and R only question sets
5. Listening problematic (je vs. j’ai)
Question set data

For players who lost (3 mistakes) on 1st play through → Increase in accuracy on 2nd play through

1st person present (je) vs. past (j’ai)
Conclusions

Meaningful, game-based, grammar practice did lead to learning

• Overall accuracy was high
• Some mini-games / grammar features more challenging than others
• Increase in accuracy over question sets (R&L \(\rightarrow\) R)
  • Difficulty transferring between skills (R \(\rightarrow\) L)
  • More opportunity to practice listening

Frequency of play (two 30-min sessions vs. one 60-min session per week) did not impact learning effectiveness

• Accuracy marginally higher for 30-min group
• Similar learning trajectories followed by both groups
Future directions

Variation in individual performance
• Rate and extent of knowledge development for sub-groups and individual learners
• Amount of practice needed (e.g. 1\textsuperscript{st} vs. 2\textsuperscript{nd} play through)

Adapt instruction to suit individual learners
• Amount and nature of explicit information
• Amount of practice

Integration of game-based practice within normal classroom practice
Pupil comments

“That’s the best score I’ve ever got!”

“I got three stars in that game!”

“I actually get it now!”

“I only got one wrong that time!”

“If it’s got –ons it means all of them.”

“I learnt when it’s j-a-i, it has already happened.”
References


