

Table 1. Learning tool used in the study

Paper (authors, year)	Learning application/tool
(Liu, Holden & Zheng, 2016), (Perry, 2015), (Cardoso, Rueb & Grimshaw, 2017), (Palomo-Duarte et al., 2016), (Berns et al., 2016)	Self-created gamified learning App
(Bustillo et al., 2017), (Gafni, Achituv & Rahmani, 2016), (Munday, 2016),	Duolingo
(Hung, 2017), (Iaremenco, N. V., 2017), (Mateo-Gallego & Ruiz-Yepes, 2018)	Kahoot
(Barcena, & Sanfilippo, 2015)	Voki
(Kétyi, 2016)	Busuu and Lifeline
(Castañeda & Cho, 2016)	Conjugation Nation

Table 2. Subjects of study, variables observed in students and results

Paper (authors, year)	Subject of study (related to the research questions)	Variables observed in students	Results
(Barcena, & Sanfilippo, 2015)	Effects of a gamification component (avatar on <i>Voki</i>) on L2 (English, German, French, Italian) student's acceptance	Psycho-behavioural	Positive towards gamification (avatar)

(Gafni et al, 2016)	Effects of a gamified app (<i>Duolingo</i>) on L2 (English) students' attitudes towards a mobile the app	Psycho-behavioural	Positive on attitude towards gamification
(Iaremenco, 2017)	Effects of a gamified app (<i>Kahoot</i>) L2 (English) students' perception of on fun, competition and intrinsic motivation	Psycho-behavioural	Positive on engagement
(Liu et al., 2016)	Effects of an Augmented Reality game (<i>Guardians of the Mo'o</i>) on L2 (English) student's engagement	Psycho-behavioural	Positive on engagement
(Munday, 2016)	Effects of a gamified app (<i>Duolingo</i>) on L2 (Spanish) students' satisfaction	Psycho-behavioural	Positive on attitude towards gamification in level A1 but ambiguous in level B2
(Perry, 2015)	Effects of a gamified AR self-designed platform (<i>Explorez</i>) on L2 (French) students' motivation	Psycho-behavioural	Positive on attitude towards gamification
(Berns et al., 2016)	Effects of a gamified app (<i>VocabTrainerA1</i>) on L2 (German) student's motivation, attitudes, perceived learning and language achievement (grammar and vocabulay).	Psycho-behavioural and Cognitive	Positive both on learning and attitude towards gamification
(Bustillo et al., 2017)	Effects of a gamified app (<i>Duolingo</i>) on L2 (English) acquisition and student's attitude towards using digital apps in learning	Psycho-behavioural and Cognitive	Positive both on learning and attitude towards gamification

(Castañeda & Cho, 2016)	Effects of a gamified app (<i>Conjugation Nation</i>) on conjugation accuracy and confidence in L2 (Spanish)	Psycho-behavioural and Cognitive	Positive both on learning and on attitude towards gamification
(Hung, 2017)	Effects of a gamified app (<i>Kahoot</i>) on L2 (English) students' learning, self-perception and attitudes towards the gamified app	Psycho-behavioural and Cognitive	Positive both on learning perception and attitude towards gamification
(Kétyi, 2016)	Effects of gamified apps (<i>Busuu, Lifeline</i>) on L2 (English, German, Spanish, Italian) student's learning outcomes and motivation	Psycho-behavioural and Cognitive	Positive on learning and motivation but with no correlation
(Cardoso et al, 2017)	Effects of a self-designed digital game (<i>Prêt à Négociier</i>) on L2 (French) speaking skills (comprehensibility, fluency and pronunciation)	Cognitive	Negative on learning
(Mateo-Gallego & Ruiz-Yepes, 2018)	Effect of a gamified App (<i>Kahoot</i>) on L2 (Spanish) error processing and self-reflections on mistakes	Cognitive	Ambiguous: positive on error correction, negative on self-reflections

Table 3. Measurement instrument, research methodology, sample and duration

Paper (authors, year)	Measurement instruments	Research methodology	Sample	Duration
(Barcena, & Sanfilippo, 2015)	1) Pre- survey on e-learning platform user preferences and 2) Post- satisfaction questionnaire	Quantitative and qualitative	273 university e-learning students (aged 23-58)	4 months
(Berns et al., 2016)	1) Pre- and post- questionnaires on student's language achievement 2) focus group interviews to assess students' learning experience	Quantitative and qualitative	104 university students (A1 level)	4 weeks
(Bustillo et al., 2017)	1) Pre- and post- test son listening comprehension and 2) Post survey on students' attitude towards Duolingo	Quantitative	12 students (5 females and 7 males aged 19)	2 months
(Cardoso et al, 2017)	1) Pre and post tests on pronunciation (corrected by 16 graders)	Quantitative	34 pre-university students (average age 20) grouped in an experimental and a control group	4 weeks

(Castañeda & Cho, 2016)	<ul style="list-style-type: none"> 1) Pre- and post- tests on conjugation 2) Post- quiz to measure accuracy 3) Pre- and post- surveys on confidence 4) Post- open-ended questions on attitudes towards the gamified app 5) Post-interview on overall student's experience 	Quantitative and qualitative	80 university students of Spanish (41 females and 39 males in elementary and intermediate levels)	8 weeks
(Gafni et al, 2016)	1) Pre- and post- tests on attitudes towards language learning apps	Quantitative	89: 58 ESL students (male 35, female 23) and 31 high school pupils (male 10, female 21)	1 week
(Hung, 2017)	<ul style="list-style-type: none"> 1) Pre- and post- learning achievement tests 2) Post- perception survey 3) Semi-structured individual interviews on student's overall experience 	Quantitative and qualitative	44 university students (English majors aged 20-22, 35 females, 9 males) grouped in an experimental and a control group	3 <i>Kahoot</i> sessions of 10-12 questions
(Iaremenco, 2017)	1) Post- questionnaire on engagement	Quantitative	120 university students (76 males and 44 females) with an upper-intermediate level	"After a series of classes" Doesn't provide the exact duration

(Kétyi, 2016)	1) Pre- and post- tests on language achievement and 2) Pre- and post- questionnaires on motivation	Quantitative and qualitative	94 higher education students (67.7% females 32.3% males, in control and experimental groups)	8 weeks
(Liu et al., 2016)	1) Pre- and post- interview on student's overall experience and 2) Recorded videos throughout the experiment	Qualitative: Conversation Analysis and Multimodal Analysis	3 adult students (2 females, 1 male)	One day
(Mateo-Gallego & Ruiz-Yepes, 2018)	1) Pre-, middle and post- tests on academic results 2) Post-test on self-reflection on mistakes	Quantitative and qualitative	2 groups of German university students (19-25 years old) of L2 (Spanish), in control and experimental groups	4 sessions
(Munday, 2016)	1) Post- questionnaire with closed-ended and open-ended questions on student's satisfaction	Quantitative and qualitative	62 university students (46 of A1 level, 16 of B2 level)	1 semester
(Palomo-Duarte et al. 2016)	1) 1 Pre-test and 3 post- tests on word definitions	Quantitative	100 university students (A1 level)	4 weeks