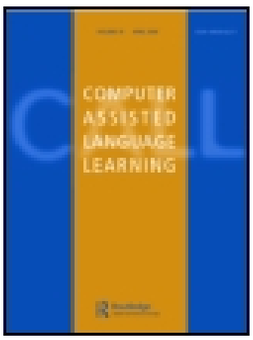

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Using gamification to support learning English as a second language: a systematic review

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ABSTRACT

Digital gamification has been argued to be a fun and enjoyable method to support Learning English as a Second Language (LESL) and to ease the gap between students' learning and educational practice. This systematic review presents an overview of the state of the art on the use of gamification for LESL in digital environments. Furthermore, this review study maps learning experiences of learners and their learning outcomes when they deal with LESL through gamification. For this systematic review, 22 publications dating from 2008 through 2019 were studied to highlight the foci of this field of research. Although, these studies reported positive effects of gamification on learners' learning experiences and their learning outcomes, none of the publications reported specific gamification elements associated to the learning experiences and outcomes. Being enjoyable, engaging, motivating and fun were positive learning experiences of gamified LESL environments. Content language learning, engagement, motivation, and satisfaction were targeted learning outcomes of gamified LESL. The results of this study provide suggestions on how to design digital gamification for students' LESL and their corresponding learning experiences and outcomes.

KEYWORDS

Gamification; LESL; learning outcomes; learning experiences; systematic review

1. Introduction

Learning English as a Second Language (LESL) is crucial for international, political, and cultural communication and also for communication and group work activities in international classroom settings (Behroozi & Amoozegar, 2014; Liu & Chu, 2010). With the advancement of new digital technologies, there has been a rapid escalation with regard to the need for learning LESL to communicate with learners from different nationalities (Golonka, Bowles, Frank, Richardson, & Freynik, 2014; Jin, 2018; Lin, & Lin, 2019; Shadiev, Hwang, & Huang, 2017; Sundqvist

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& Wikström, 2015; Rosell-Aguilar, 2018; Zou, Li & Li, 2018). Such rapid demand for LESL requires a shift from traditional to advanced learning methods (Dehghanzadeh, Salimi, Dehghanzadeh, & Azizi, 2016; Prensky, 2006; Renandya & Widodo, 2016). This shift is especially important since learners often complain that LESL is difficult, challenging, and stressful (Turgut & İrgin, 2009), especially when it comes to application of its various skills (e.g. speaking, writing, reading, listening) in real life situations (Akbari, 2015; Hwang, Hsu, Lai, & Hsueh, 2017).

Learners typically point out that learning and remembering English vocabularies and correct form of verbs are tedious learning activities (Castañeda & Cho, 2016; Chen & Chung, 2008; Montero Perez, Peters, & Desmet, 2018) since learners need to be physically, mentally, and emotionally involved in learning to be able to successfully acquire LESL (Ardoiz García, 2017). There are several other factors such as anxiety (Rafek, Ramli, Iksan, Harith, & Abas, 2014), motivation, attitude, and abilities (Liu, 2017) that could affect LESL processes and outcomes. For example, when students do not remember vocabularies or experience difficulties, their confidence would drop and as a result, they might lose their motivation and interest and thus disengage with LESL (Huang, Hew, & Lo, 2018). Scientific literature suggests that gamified environments for LESL could increase learners' motivation (Hanus & Fox, 2015), engagement (Clark et al., 2011), and provide them with freedom to fail without fear during their learning (Lee & Hammer, 2011). In this regard, it is important to consider learners' attitude and how they feel when dealing with gamification during LESL. Therefore, teaching methods and strategies should be designed in such a way as to consider learners' experiences and increase their motivation and interest to meet the need of ever increasing number of learners who are busy with LESL (Arndt & Woore, 2018; Chang, Tseng, Liang, & Yan, 2013).

The use of games in general and gamification in particular has been considered to be one of the most prominent instructional method to motivate students and increase their engagement and motivation during learning processes (see Jackson & McNamara, 2013; Millis, Forsyth, Wallace, Graesser, & Timmins, 2017; Noroozi, McAlister, & Mulder, 2016; Shaffer, 2007). Gamification is considered to be one of the most enjoyable, engaging, and effective method for LESL (Lui, 2014; Munday, 2016; Nahmod, 2017; Perry, 2015; Sundqvist & Wikström, 2015). The reason is that various elements (both dynamics and mechanics) embedded in the gamified environments can increases learners' motivation and interest to learn English (Wu & Huang, 2017), can reduce learners' anxiety and fear of speaking foreign language in front of others (Arnold, 2014), and finally can encourage them to attain a favorable type

of learning behavior (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011; Kapp, 2012; Werbach, 2014; Werbach & Hunter, 2012; Zichermann & Cunningham, 2011). Scientific evidence proofs that LESL through games is more effective than non-game learning environments (Zarzycka-Piskorz, 2016). In short, literature suggests that gamification for LESL can be linked to content language learning, engagement, motivation, satisfaction (see Deterding, Dixon, Khaled, & Nacke, 2011; Deterding, Dixon, et al., 2011; Kapp, 2012; Priebatsch, 2010; Schonfeld, 2010; Werbach, 2014; Werbach & Hunter, 2015).

Gamification is different from terms such as serious game and educational game (Kapp, 2012; Werbach & Hunter, 2015). Gamification is relatively a new term often referred to the use of game elements in non-game situations to create enjoyable, fun, and motivating learning experiences for learners (Baptista & Oliveira, 2018; Deterding, Dixon, et al., 2011; Deterding, Dixon, et al., 2011; Kapp, 2012; Priebatsch, 2010; Schonfeld, 2010; Werbach, 2014; Werbach & Hunter, 2015). Gamified learning environments apply game mechanics and dynamics (see Hunicke, LeBlanc, & Zubek, 2004; Werbach & Hunter, 2015; Zichermann & Cunningham, 2011) to non-game context to enhance learners' deep learning and critical thinking (Kapp, 2012) and to guide them follow specific behaviors (Bunchball, 2010; Rachels & Rockinson-Szapkiw, 2018).

The term serious games are introduced by Abt (1970) that primarily focus on learning rather than mere entertainment and provide ample opportunities for connecting education to the daily life experiences of students (Alvarez & Djaouti, 2011; Lamb, Annetta, Firestone, & Etopio, 2018; van der Linden & van Joolingen, 2019). Educational game follows game mechanisms that can stimulate participants' interest (Lamb et al., 2018; Song & Zhang, 2008). Both serious games and educational games can be used for developing the skills and knowledge of the players through game play (Stege, Van Lankveld, & Spronck, 2011). Educational content of serious games can be represented implicitly in the gameplay whereas in educational games such content is presented explicitly in the gameplay (Johnson, Vilhjalmsson, & Marsella, 2005). In gamification, game elements are used to engage learners with the content and to progress toward a goal. For example, when somebody logs into a computer application correctly, she/he receives a badge. Receiving a badge is an element of a game but in this case such action is not related to other game activities e.g. moving to a new level, solving a puzzle, or matching two or more items (see Kapp, 2012).

Bunchball (2010) describes game mechanics as the fundamental actions, processes, and control mechanisms that are applied to 'gamify' an activity and to create engaging experiences for learners. Game mechanics include but not limited to point, level, badges, leaderboard,

charity and gifts, challenge, space, storytelling, and virtual goods (Bunchball, 2010; Caballé & Clarisó, 2016). Game dynamics trigger, stimulate, and drive the emotions of the learners to experience the game. Game dynamics include but not limited to status, achievement, reward, self-expression, competition, altruism, challenge, fun, and satisfaction (Bunchball, 2010).

There are both conceptual and empirical studies on the positive effects of gamification on learning processes and outcomes in general (Dicheva, Dichev, Agre, & Angelova, 2015; Jackson, 2016; Kiryakova, Angelova, & Yordanova, 2014), engagement (Huang et al., 2018; Looyestyn et al., 2017) and motivation (Hanus & Fox, 2015; Hasegawa, Koshino, & Ban, 2015), and LESL (Flores, 2015; Uzun, Çetinavci, Korkmaz, & Salihoglu, 2013). There are also systematic review studies on gamification and education in general (see de Sousa Borges, Durelli, Reis, & Isotani, 2014; Dicheva et al., 2015; Nah, Zeng, Telaprolu, Ayyappa, & Eschenbrenner, 2014), however, there is not yet conclusive evidence in the form of a systematic review on the use of gamification for LESL. The picture is even more unclear when it comes to the effectiveness of various elements of gamification and LESL in relation to learners' experiences and outcomes. This is striking since each specific gamification element has specific goal that would enable students to engage in meaningful learning processes and thus achieve intended learning outcomes (see Jackson, 2016).

In general, potential benefits and implications of the use of digital games, computer games, and serious games for LESL (Peterson, 2013; Philips, 1987; Reinhardt, 2019; Reinhardt & Thorne, 2016) and also their challenges and critics (see Bogost, 2011) have been widely acknowledged and discussed in the literature. However, there is no conclusive evidence with regard to the use of gamification and its effects on various aspects of learning processes and outcomes for LESL. This systematic review aims to present an overview of the current state of the art of the literature on gamification for LESL. Also, the aim is to find out how various gamification elements are used for LESL. Additionally, this review aims to explore learners' learning experiences (feelings and attitude) and various learning outcomes (content language learning, engagement, motivation, satisfaction) of gamified LESL in digital environments.

2. Method

2.1. Databases and search strategy

Figure 1 shows the selection process of scientific publications for this systematic review. To identify relevant publications, a systematic search strategy was executed in the bibliographic databases such as Scopus,

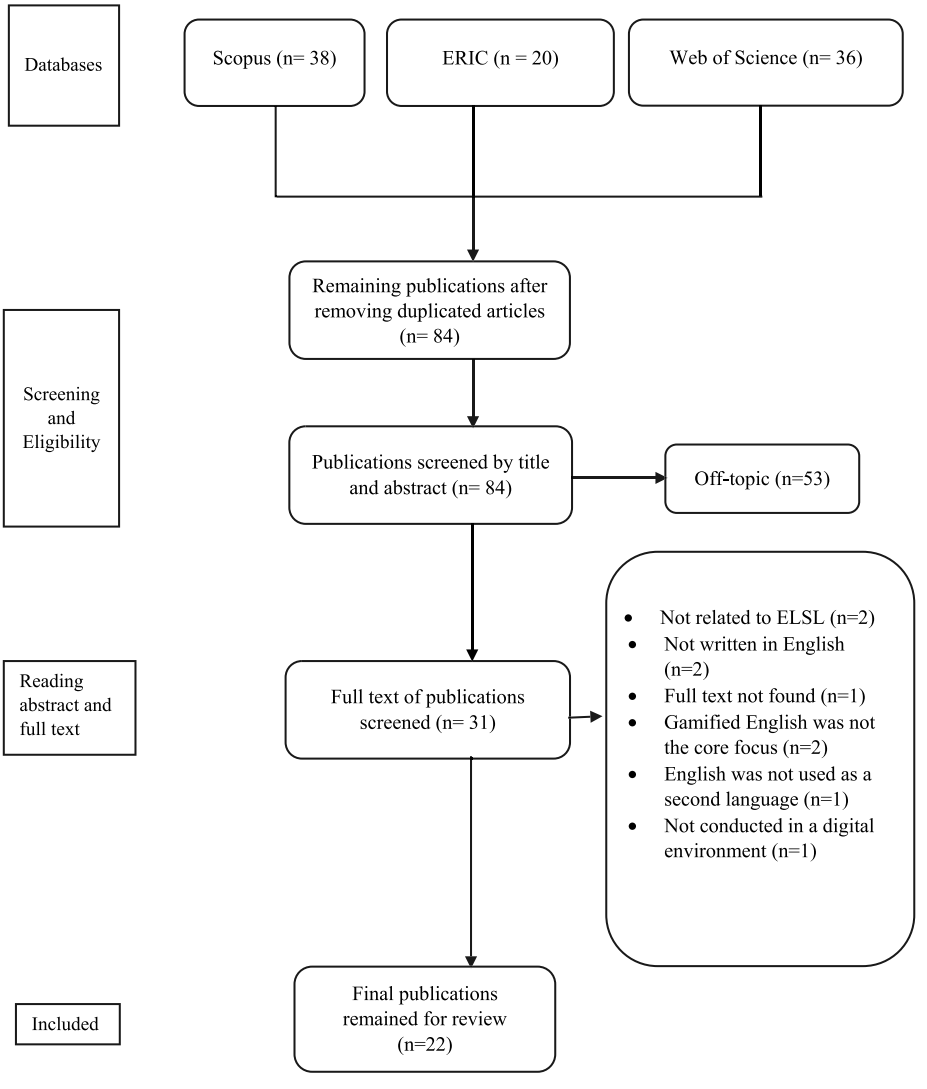

Figure 1. Flowchart process selection.

ERIC, and Web of Science. The search terms used in this study included 'Gamification and English Language Learning', 'Gamification and English Language Teaching', 'Gamification and English Language Instruction', 'Gamification and English as a Second Language', 'Gamification and English as a Foreign Language'. These keywords were based on relevant literature on LESL and gamifications. Since gamification was mainly used in educational settings from 2008 (see Jakubowski, 2014), the search period of this systematic review was limited to 2008 until 2019 to capture the most relevant and up to date literature in the field. Only English publications were included.

2.2. Criteria for inclusion

The initial search with our key words yielded 94 publications. Ten publications appeared to be duplicated and thus removed from further analysis. Then we read the abstracts and if necessary, the whole text of the publications to further eliminate those publications that were not relevant based on the scope of our research. Specifically, the following inclusion and exclusion criteria were used to limit the scope of the study and ensure the quality of the included publications.

- Publications were included only when gamification was used for LESL. This impleis that publications focused on educational games, video games, and serious games were excluded because as discussed before they are different terms (Kapp, 2012).
- In this studies there was not an exclusion criteria with regard to the methodology of the publications, meaning that studies could be qualitative, quantitative, and mixed methods.
- Publications were included only when gamification was used for LESL in a digital environment.
- Only publications that were conducted in a digital environment were included.
- Publications were included only when gamification was used for learning English language and not any other language (Spanish, Chines, etc.) as a second language.

Studies that did not have one or more of the above criteria were excluded from further analysis. After applying the inclusion and exclusion criteria, 22 articles remained to be included in the systematic review.

3. Results

3.1. current state of the art with regard to the use of gamification for LESL

Table 1 provides an overview of the included publications in terms of authors, year of publication, publication source, learning environment, educational level, methodology, data collection method, nature of the study (experimental or none-experimental), duration of the gamified task, number of participants, gamification element(s), learning experiences (feelings and attitude), learning outcomes (content language learning, engagement, motivation, satisfaction), and statistical information (p-value).

Table 1. Quantitative description of the scientific research into gamification for LESL.

									Learning experiences		Learning outcomes		Statistical information
Authors	Publication source	Learning environment	Educational level	Methodology	Data collection method	Experimental	Duration	N	Gamification element(s)	Learning experience(s)	Attitude	Various learning outcomes	Content language learning	P-Value
Abrams and Walsh (2015)	Adolescent & Adult Literacy	–	High school	Qualitative	Observation Interview	No	435/495 minutes	31	Progress bar, feedback, medal, challenge, reward	Promoting Playful engagement Self-directed Customize learning Enjoyable Fun Entertaining Mastering learning Individualization Interaction Motivating	+	Motivation Engagement	Vocabulary	–
Baldauf et al. (2017)	Proceedings of the 16th International Conference on Mobile and Ubiquitous Multimedia	–	Elementary	Quantitative	Questionnaire	Yes	5 weeks	62	Leaderboard, challenges, feedback	Enjoyable Fun Interesting Appreciating Collaborative Motivating	+	Motivation Engagement	Vocabulary Speaking Pronunciation Writing Grammar Listening	–
Bustillo, Rivera, Guzmán, and Acosta (2017)	Sistemas & Telemática	Duolingo	High school	Quantitative	Questionnaire	Yes	2 months	12	Reward, level-system, badge, point, challenge, instant feedback, progress bar	Fun Interesting Playful Motivating	–	Motivation	Listening	–
Flores (2015)	Digital Education Review	Brainscap	–	Qualitative	Written Journals	No	–	–	Track progress, automatic feedback, reward, specific phrases	Collaborative Interactive Fun Enjoyment	–	–	Vocabulary	–
Gaikwad and Jain (2017)	Proceedings of the 2017 Conference on Interaction Design and Children	Feelbot	Elementary	Qualitative	Observation	No	30 minutes	34	Score, challenge, appreciation, reward, leaderboard, feedback	Enjoyable Fun Interesting	+	–	Vocabulary	–
Girardelli (2017)	Communication Teacher	–	High school	Mixed-method	Questionnaire Debriefing	Yes	75 minutes	24	Freedom to fail, rapid feedback, storytelling	Increasing confidence Organizing learning Increasing	–	Engagement	Vocabulary Speaking Pronunciation	–

(*continued*)

Table 1. Continued.

Authors	Publication source	Learning environment	Educational level	Methodology	Data collection method	Experimental	Duration	N	Gamification element(s)	Learning experiences		Learning outcomes		Statistical information
										Learning experience(s)	Attitude	Various learning outcomes	Content language learning	P-Value
										awareness				
Guaqueta and Castro-Garces (2018)	English Language Teaching	Duolingo	High school	Mixed-method	Questionnaire Interview	Yes	6 months	20	Reward, leaderboard, level- system, badge, point, challenge, instant feedback, progress bar	Fun Engaging Enjoyment Enjoyable Fun Interesting Involving Organized learning Playful Entertainment Concentrating Motivating	+	–	Vocabulary	–
Hasegawa et al. (2015)	Springer Plus	–	Higher education	Quantitative	Questionnaire	Yes	1 week	56	Character system, timer, question, leaderboards system, level, result, point, Feedback	Enjoyable Fun Interesting Visualization of learners' skills and efforts Playful Self-growth Self-sufficient learner	+	Motivation	Vocabulary	–
Homer et al. (2018)	Educational Technology & Society	ClassDojo	Elementary	Quantitative	Questionnaire	Yes	3 months	120	Badge, avatar, point, leaderboard, immediate feedback	Enjoyable Fun Interesting Sense of progression, Sense of pervasiveness	–	Engagement	Speaking Reading	Speaking= .013 Reading= .893 Engagement=.02
Hung (2017)	Interactive Learning Environments	Kahoot	Higher education	Mixed method	Questionnaire Interview	Yes	2 weeks	44	Points, leaderboard, time limits, sound effect, nickname, rank, score, Feedback	Fun Interactive Motivating Attentive Ease of use Convenience	+	Motivation Satisfaction	–	–
Ketyi (2016)	Proceedings of 64 the ISERD International Conference	Lifeline	High school	Quantitative	Questionnaire	Yes	2 weeks	94	Reward, point, challenge, instant feedback, chatting with user	Enjoyable Fun Motivating Interesting Exciting Cooperative	+	Motivation	Vocabulary Speaking, Pronunciation Writing Grammar Listening	Vocabulary =.013 Motivation = .02

(*continued*)

Table 1. Continued.

Authors	Publication source	Learning environment	Educational level	Methodology	Data collection method	Experimental	Duration	N	Gamification element(s)	Learning experiences		Learning outcomes		Statistical information
										Learning experience(s)	Attitude	Various learning outcomes	Content language learning	P-Value
Kingsley and Grabner-Hagen (2018)	The Reading Teacher	–	High school	Qualitative	Observation	No	27 minutes	21	Challenge, quest, reward, point, level, narration, story, badge, achievement, progression, feedback	Playful Explicit instruction Contextualizing learning Active interaction Autonomy Mastery	–	Engagement	Vocabulary	–
Lui (2014)	4th CELC Symposium Proceedings	Jeopardy	Higher education	Quantitative	Questionnaire	Yes	10 minutes	91	Character system, reward, help, challenge, point, time pressure, feedback	Sense of positive attitudes toward learning Deep but effortless engagement Sense of control over their learning Attending Repeating failures for learning Fun Exciting Facilitating retention	+	Satisfaction	Vocabulary	0.92
Mchucha, Ismaeil and Tibok (2017)	Carnival on E-Learning (IUCEL)	–	Higher education	Qualitative	Interview	No	25 minutes	5	Challenge, point, feedback	Interesting Engaging Improving level of attention and persistence Reducing tension and anxiety Facilitating accuracy Motivating	–	Motivation	Vocabulary	–
Medina and Hurtado (2017)	Revista Publicando	Kahoot	Higher education	Quantitative	Questionnaire	Yes	10 weeks	70	Uploading videos, pictures and music, challenge,	Enjoyable Fun Interesting Peer-to-peer	+	Satisfaction Engagement	Vocabulary	–

(*continued*)

Table 1. Continued.

Authors	Publication source	Learning environment	Educational level	Methodology	Data collection method	Experimental	Duration	N	Gamification element(s)	Learning experiences		Learning outcomes		Statistical information
										Learning experience(s)	Attitude	Various learning outcomes	Content language learning	P-Value
									leaderboard, feedback, point, emotions, like or dislike, time pressure, reward, , badge, competition	interactions Attention Autonomy				
Purgina, Mozgovoy, and Blake (2019)	Educational Computing Research	WordBricks	High school	Quantitative	Questionnaire	Yes	5 weeks	21	Feedback, chunking	Discovering learning Enjoyment Fun Engaging	+	–	Grammar	0.00026
Sevilla-Pavón and Osca (2017)	Revista Iberica	Business English course	High school	Mixed method	Questionnaire Interview	Yes	14 weeks	50	Point, performance graph, quest, avatar, reward system, peer assessment, the use of social media , feedback	Beneficial Motivating Interesting	+	Motivation	–	–
Sun and Hsieh (2018)	Educational Technology & Society	Interactive response system (IRS)	High school	Quantitative	Questionnaire	Yes	2 weeks	144	Background sound effects, time pressure, challenge, fantasy, curiosity, control, feedback	Enjoyable Fun Interesting Attractive Highly interactive Challenging Autonomy Teacher-student and student-student interactions	–	Motivation Engagement	Vocabulary	Motivation =.002 Engagement= .01
Yan, Udjaja, and Sari (2017)	Procedia Computer Science	–	Elementary	Qualitative	Observation Interview	Yes	34 minutes	6	User guidance, timer, score, error typing, answer question, warning signal, save features for name, error typing, feedback assessment	Competitiveness Enjoyable	–	–	Vocabulary	–
		SNS		Quantitative	Questionnaire	Yes	6 weeks	52			+			–

(*continued*)

Table 1. Continued.

Authors	Publication source	Learning environment	Educational level	Methodology	Data collection method	Experimental	Duration	N	Gamification element(s)	Learning experiences		Learning outcomes		Statistical information
										Learning experience(s)	Attitude	Various learning outcomes	Content language learning	P-Value
Won and Kim (2018)	International Journal of Mobile and Blended Learning		Higher education						Profile, wall, status, message, like or dislike, new feed, feedback	Interesting Collaborative Effective More efficient		Satisfaction Motivation	Speaking Listening, Reading Writing	
Zarzycka-Piskorz (2016)	Teaching English with Technology	–	Higher education	Quantitative	Questionnaire	Yes	3 weeks	112	Like or dislike, level, rules, leaderboard, Emoticons, feedback	Attending Cooperation Autonomy Fun Competitiveness Enjoyable Observing progress Mastering learning	–	Motivation Engagement	Grammar	–
Zhou, Yu and Shi (2017)	International Conference on HCI in Business, Government, and Organizations	Adventure	High school	Qualitative	Focus group	No	25 minutes	6	Challenge, achievement, level, missions, progress, virtual credits, reward, feedback, curiosity, correctness bar, narration	Enjoyable Fun Interesting Immersive Motivating Attractive User-friendly Freedom to fail	+	Motivation Engagement	Vocabulary Pronunciation Reading Grammar	–

Table 1 indicates that the use of gamification for LESL is still limited with only 22 articles that matched our search criteria. Reviewed publications were published from 2014 to 2019 which indicates that the use of gamification for LESL is relatively a new field of research. Various types of digital learning environments (e.g. WordBricks, Duolingo, Kahoot, Babbel, Jeopardy, ClassDojo, Lifeline, Feelbot, Brainscap) have been used to gamify LESL which indicates that language learning can easily be gamified with simple digital tools. In terms of educational level, most gamified LESL were used in high schools with ten frequencies followed by higher education (7) and elementary schools (4). Both quantitative (11), qualitative (7), and mixed (4) methods have been used for studying gamification for LESL. Survey (15), interview (6), observation (4), and focus group (1) were, respectively, the most commonly used type of data collection methods for gamifying LESL. As can be seen in Table 1, the intervention period of the reviewed publication varied substantially from 10 minutes to 6 months. Most reviewed publications (16 out of 22) were experimental in nature. Only five publications included a pre-test post-test control group design while 11 publications included a control group but without a pre-test post-test design. The remaining reviewed studies (six publications) did not have an experimental design. The methodology of the included publications varied in terms of number of participants ranging from only five up to 144 participants.

3.2. Gamification elements for LESL

The reviewed publications used a variety of game elements (both dynamics and mechanics) for LESL in digital environments. The most commonly used elements for gamifying LESL were feedback, challenge, point, reward, leaderboard, and level. The least frequently used game elements for gamifying LESL environments were curiosity, warning signal, medal, chunking, avatars, and virtual credits. Table 2 presents a general overview of the gamification elements and the frequency of each game element that is used for gamifying LESL in the reviewed publications.

3.3. Learners' experiences of gamification for LESL?

Almost all the reviewed studies reported that the use of gamification for LESL was beneficial in terms of learners' experiences (see Table 1). The most commonly used describing words for gamified LESL environments were 'enjoyable', 'fun', 'attractive', 'interactive', and 'interesting'. Among all publications, 13 articles reported that the learning experiences of learners for gamified LESL were 'positive'. In other studies, there was no

Table 2. The gamification elements used for LESL.

Gamification elements	Frequency (*N*)	Gamification elements	Frequency (*N*)	Gamification elements	Frequency (*N*)
Feedback	22	Challenge	12	Point	11
Reward	11	Leaderboard	8	Level	7
Time pressure	6	Progress bar	6	Badge	5
Like or dislike	3	Score system	3	Story	2
Character system	2	Narration	2	Achievement	2
Curiosity	2	Answer question	2	Avatar	2
Background sound effect	2	Quest	2	Rule	1
Emoticon	1	Control	1	Specific phrases	1
Fantasy	1	Appreciation	1	Competition	1
Mission	1	Freedom to fail	1	Uploading videos, pictures and music	1
Virtual credit	1	Chatting with users	1	Chunking	1
Medal	1	Help	1	Correctness bar	1
Performance graph	1	Message	1	Peer assessment	1
Use of social media	1	User guidance	1	Error typing	1
Warning signal	1	Save features for name	1	Profile	1
Wall	1	Status	1	New feed	1

specific use of words like 'positive', 'neutral' or 'negative'. This implies that there was no single study with negative findings for the use of gamification for LESL in terms of learning experiences.

3.4. Learners' outcomes of gamification for LESL?

Content language learning was the most frequently reported positive learning outcomes of the gamification for LESL (see Table1). Learning vocabularies (15 publications), grammar (5), pronunciation (4), speaking (5), writing (3), listening (4) were, respectively, the most frequently reported positive learning outcomes for gamified LESL environments. Next to content language learning, 17 articles also reported other learning outcomes (engagement, motivation, satisfaction). Engagement with nine frequencies, motivation with 12 frequencies, and satisfaction with four frequencies were, respectively, the most commonly reported positive learning outcomes of the gamification for LESL.

4. Discussions

This systematic review aimed to provide readers with the current state of the art on the use of gamification for LESL in digital environments. To do so, a specific search strategy was conducted with relevant key words from different databases which resulted in 22 publications to be included

in this systematic review. We then analyzed these publications from different perspectives and provided quantitative description of the scientific research into this field of research. The reviewed publications showed that also game in general and gamification in particular have been used for various reasons in educational settings with positive learning outcomes (see Jackson & McNamara, 2013; Millis et al., 2017; Noroozi, McAlister, et al., 2016; Shaffer, 2007), the use of gamification for LESL is relatively a new field of research (see Garland, 2015). This reason also justifies the relatively low number of publications that matched the inclusion criteria for this systematic review. Most studies on this field of research have been published since 2014 with a rising number from the last 3 years. Such rise in the recent years could be attributed to the growing popularity of this field and certain benefits it could bring to LESL.

Our review also showed that the reviewed publications of gamification for LESL is quite diverse in terms of methodology. Research on gamified LESL has attracted research scholars with various types of methodology (e.g. quantitative, qualitative, and mixed methods), different types of data collection (e.g. survey, interview, observation), and small to large number of participants. Such diversity of methodology might be due to the impetus to thoroughly explore the potential of the gamification for LESL.

Gamified LESL has been applied in different educational levels ranging from primary to higher education with a slight favor for the high school (secondary education). This again shows the growing popularity of this field of research across different level of education. Likewise, diverse digital learning environments in the forms of web applications have been used for LESL through gamification. Such diversity implies that research in this field of research and the use of gamification for LESL is likely to be promising in coming years.

Next, we focused our attention on the type of gamification elements that have been used for LESL. Although various game elements have been used for LESL, there was not a specific pattern as to what types of game elements can be most useful for what aspects of learning processes and outcomes. The most commonly used elements for gamifying LESL were presence of feedback. This is not surprising as feedback is a powerful tool that is used frequently not only for the field of gamified LESL but also for other learning purposes, for example, for development of students' argumentation, critical thinking and reasoning behavior (see Noroozi, Biemans, & Mulder, 2016; Noroozi, McAlister, et al., 2016; Noroozi, Kirschner, Biemans, & Mulder, 2018; Noroozi, Weinberger, Biemans, Mulder, & Chizari, 2012).

We also explored learners' experiences and various learning outcomes of gamified LESL in digital environments. In general, the learners'

experiences were positive when dealing with gamified LESL. Students often expressed that engaging in gamified LESL environments is enjoyable, fun, attractive, interactive, and interesting (Baldauf, Brandner, & Wimmer, 2017; Gaikwad & Jain, 2017; Guaqueta & Castro-Garces, 2018; Hasegawa et al., 2015; Homer, Hew, & Tan, 2018; Ketyi, 2016; Medina & Hurtado, 2017; Sun & Hsieh, 2018; Zhou, Yu, & Shi, 2017), because it provides them with an opportunity to psychologically get involved in the learning processes (Guaqueta & Castro-Garces, 2018) and have a sense of control over actions, progression, and pervasiveness (Homer et al., 2018; Lui, 2014).

Learning vocabularies was the most commonly reported positive learning outcomes of the gamification for LESL. Almost most of the reviewed publications targeted content language learning in terms of learning vocabularies. Next to this, gamified LESL environments also targeted other language skills (e.g. writing, speaking, listening, reading) and components (pronunciation and grammar). Furthermore, most reviewed publications also tended to report positive outcomes in terms of students' engagement, motivation, satisfaction (see Hasegawa et al., 2015; Homer et al., 2018; Ketyi, 2016; Medina & Hurtado, 2017). Such diverse targeted learning outcomes point out to the potential benefits of the gamified LESL.

5. Conclusion, limitations, and suggestions for future research

This systematic review presents an overview of the current state of the art on the use of gamification for LESL in digital environments. Such timely systematic review is indeed needed because gamified LESL environments have started to become a promising field that attract both researchers, scholars, and teachers who are keen to gamify their learning environments. This review intends to contribute to a growing body of knowledge on designing gamified LESL environments. It provides interested scholars with information on how to take advantage of potential benefits of gamification for LESL and how to design digital environments to improve students' learning processes and their corresponding learning experiences and outcomes.

This systematic review covers a selected time span, language, variety of relevant databases, and adopted a search strategy that provides a moderate representation of this field of research. The focus of this study is on the use of gamification (only) for LESL, however, next to gamification, game-based learning such as educational games, serious games, and video games could bring added value to this field of research. Despite vast research on educational and serious games for various aspects of

learning, the picture is not clear with regard to the use of gamification as such for LESL. Furthermore, challenges with regard to the methodology, design, procedure, and measurements of the most reviewed publications make scholars treat the findings of these studies cautiously. Examples include but not limited to the lack of control group, lack of pre-test post-test design, self-reported measurements, short study duration, and small sample size of the reviewed publications. All these challenges and weaknesses in the reviewed publications imply that there is a need for more robust empirical studies in this field of research. Future research should thus tackle these issues and conduct empirical research in the field of gamification for LESL under more stringent conditions (regarding experimental design, inclusion of the control group, use of more advanced and combined data collection methods, use of longer duration of the gamified tasks with bigger sample size) to provide scholars with robust findings that could also be generalized to other learning situations.

We mostly provided quantitative results based on the scope of this study. Basically, quantitative analysis was more suitable than qualitative analysis for meeting the aims of this systematic review. It would be interesting to go beyond the scope of this study and qualitatively investigate how gamified tasks and activities have been designed and integrated in each study and what are their relations with various dependent learning outcomes.

Our review study revealed that majority of studies on the use of gamification for LESL in digital environments are descriptive in nature. For example, none of the included articles has reported which game elements can exclusively be used for improving which specific learning outcome. It is not clear what game elements are more effective for improving various aspects of the learning experiences and outcomes of LESL. This can be seen as a major weaknesses of the reviewed publications because they did not establish clear linkages between gamification features and specific learning outcomes. One direction for future research to tackle this issue is to investigate how each single game element at a micro level could contribute to each aspect of the learning outcomes. This would enable scholars to discover the potential benefits, advantages and disadvantages of gamification elements and thus provide suggestions on when and how to use each single element for specific purpose of LESL. Furthermore, we recommend future research to focus on the relations between various gamification features and specific learning outcomes as outlined in this study. This could be done through empirical studies that would separately or in combination apply gamification features with different functions and purposes in their design and link them to different learning outcomes.

In this study, most reviewed publications used self-reported data collection methods such as survey, interview, and focus group discussions. This implies that most findings obtained in this review study are purely based on the perceptions of the language learners and not actual learning as such. This is striking since learners' perceptions of learning are not always compatible with actual learning (see Noroozi et al., 2018).

Such self-reported outcomes of the reviewed publications should be treated with cautious as there could be an effect of social desirability bias inherent in self-reporting responses (Huber & Power, 1985). Future research could focus on other types of objective measurements such as performance, rubric, observation, and exam to mitigate the effect of social desirability bias inherent in self-reporting responses, such as those elicited by a questionnaire (see Noroozi, Biemans, Weinberger, Mulder, & Chizari, 2013). This would enable scholars to see whether the learning outcomes of the gamified LESL environments measured by different types of instruments would be the same or whether we need to use advanced data collection methods such as multimodal data methods to have an accurate measurement (see Noroozi et al., 2019).

And finally, we did not report common affordances and hindrances that are inherent to gamified LESL environments. Gamified environments typically provide learners with various affordances that can be used with the help of ICT tools (see Conole & Dyke, 2004). Similar to any instructional methods, there are challenges and hindrances that could affect the use of gamification for LESL. For example, technological affordances such as the Internet disconnections can be a counterpoint for the use of gamification for LESL in digital learning environments (Guaqueta & Castro-Garces, 2018). More research is needed to shed light on the possible affordances and hindrances that are important and even inherent to the use of gamification for LESL.

Disclosure statement

No potential conflict of interest was reported by the author.

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