



Available online at:  
<https://dergipark.org.tr/eltri/>  
*International Association of Research  
in Foreign Language Education and  
Applied Linguistics*  
ELT Research Journal  
2023, 12(2), 159-173  
e- ISSN: 2146-9814

## Duolingo in University Settings: Fostering English Language Acquisition Among Adult and Senior Learners

Giulia BURLANDO<sup>a 1</sup> ,

<sup>a</sup> University of Genoa, Genoa, Italy

Research Article

Received: 20/10/2023 Accepted: 01/02/2024

---

**To cite:** Burlando, G. (2023). Duolingo in university settings: Fostering English language acquisition among adult and senior learners. *ELT Research Journal*, 12(2), 159-173.

---

### Abstract

Duolingo is a popular language-learning platform that offers a gamified and interactive approach to language acquisition. This case study discusses the use of Duolingo as a tool for teaching English as a foreign language (EFL). Specifically, it describes a 40-hour course held at the University of Genoa, Italy, which relied on Duolingo as the primary teaching approach. The course was delivered to a class of adult and senior learners aged 54 to 83, with a median age of 65. The English proficiency level of the class improved from an initial average of A0 to an average of A1 on the CEFR scale. Moreover, the study found that students experienced increased motivation and engagement, with evidence of successful language acquisition. Additionally, the course established the groundwork for sustained individual language improvement, highlighting the platform's potential for fostering language learning among mature learners. The research underscores the importance of a structured learning framework when using Duolingo for EFL instruction.

© 2023 ELT-RJ & the Authors. Published by *ELT Research Journal (ELT-RJ)*. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (CC BY-NC-ND) (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Keywords:** EFL; Duolingo in academia; Duolingo for adult learners and seniors; Gamified language learning; Mobile learning

---

---

<sup>1</sup> Corresponding author

E-mail address: [giulia.burlando@unige.it](mailto:giulia.burlando@unige.it)

## **Introduction**

Duolingo is a smartphone app and online platform that aims to make language learning 'fun, free, and effective'. After its launch in 2012, Duolingo has amassed an active user base of over 74 million (Duolingo, 2023). Its gamified approach to language learning can enhance learner motivation and engagement. As the platform continuously evolves and optimizes its features, various techniques have been introduced to enhance user satisfaction and efficacy. The user is presented with short, easily digestible lessons that follow a communicative language teaching approach, adhering to a learn-by-doing philosophy that promotes active knowledge retention and application.

This case study centers on a 40-hour English language course conducted at the University of Genoa, Italy, during the 2022/2023 academic year. The course catered to a group of adult and senior learners aged 54 to 83 with an average age of 65. Almost all these students began the course as complete beginners in English. Only two students, who had taken English courses before, possessed language skills that the researcher deemed comparable to an A1 level at the course's outset. All the students were native Italian speakers. By the end of the course, the researcher determined that, on average, the class had successfully reached an A1 level. Furthermore, the students' language acquisition process persisted beyond the course's end in May, extending into the summer months until September.

## **Literature Review**

Numerous studies have explored the effectiveness of Duolingo in teaching English to EFL learners. For instance, various studies have found that Duolingo can significantly improve learners' receptive language skills in the areas of vocabulary acquisition (Aulia, Wahjuningsih, & Andayani, 2020; Cesarini, Sulaeman, Mulyana, & Yolandi, 2021; Faradisa, Afrila, Faroh, & Choirunnisa, 2022; Nurhisyam, Usman, Agussatriana, & Rofiqoh, 2023; Vinh, 2020; Warman, 2019), reading and comprehension (Ajisoko, 2022; Jiang, Portnoff, Plonsky, & Pajak, 2022; Jiang, Rollinson, Plonsky, Gustafson, & Pajak, 2021b), and listening (Jiang & Pajak, 2022; Putri & Islamiati, 2018; Sukarya, Kamil, & Utami, 2022).

Additionally, some research also indicates improvements in learners' productive skills, such as speaking (Alfuhaid, 2021; Jiang, Rollinson, Chen, Reuveni, Gustafson, Plonsky, & Pajak, 2021a) and writing (Syahputra, 2019). A study by Vesselinov and Grego (2012)

compared Duolingo to traditional language learning methods, reporting that Duolingo can be as effective as classroom instruction.

One distinctive advantage of Duolingo is its gamified nature, which can boost learner motivation and engagement. Numerous empirical studies have revealed that Duolingo's gamification enhances motivation, enjoyment, and willingness to engage with English language learning (Almufareh, 2021; Li & O'Rourke, 2022; Skuta & Kostolanyova, 2016; Sri Redjeki & Muhajir, 2021). However, there is evidence suggesting that while Duolingo's gamification can promote learner autonomy and motivation, self-directed students may exhibit superficial levels of engagement (Hidayati & Diana, 2019), use the application minimally if not mandated for formal learning (García Botero, Questier, & Zhu, 2018), or even discontinue usage altogether (Bende, 2017; Krashen, 2014). Overall, despite the consensus on Duolingo's gamified approach as a useful application and a positive motivational tool in language learning, this may not always translate into consistent and sustained platform usage (Inayah, Yusuf, & Fibula, 2020). This seems to suggest a need for a guided approach that integrates classroom teaching with autonomous study (Bende, 2017).

For what concerns EFL learning for older adults and seniors, research has shown that learning a foreign language, or otherwise engaging in mentally stimulating activities, may reduce cognitive decline (Kroll & Dussias, 2017; Yates, Ziser, Spector, & Orrell, 2016). Furthermore, it can prove highly beneficial from a cultural point of view as it can promote cross-cultural communication and interaction, as well as increase the opportunities to socialize (Klimova, 2018; Klimova & Pickhart, 2020). Despite the naturally-occurring physical and cognitive decline experienced with age, which can hinder the effectiveness of the learning effort (Burke & Shafto, 2004; Hakuta, Bialystok, & Wiley, 2003), research has shown that there is no definite age at which people stop being able to learn (Marinova-Todd, Marshall, & Snow, 2000). As such, it has been concluded that healthy adults remain capable of learning, and, more specifically in this case, acquire an L2 (Kuklewicz & King, 2018; Marinova-Todd et al., 2000; White & Genesee, 1996).

While several studies have examined Duolingo's application in classroom settings, research regarding its use among mature EFL students, particularly seniors, is limited. In fact, the author was unable to find any relevant studies specifically focusing on the use of Duolingo to teach classes of mature and senior learners. Therefore, this paper aims to provide a case

study that sheds additional light on the specific topic of the use of Duolingo among mature EFL students, particularly for basic English levels.

### **Prior Considerations**

The 40-hour English course that is the object of this case study was conducted within the framework of the UnigeSenior program at the University of Genoa. This program offers courses tailored to mature learners aged 45 and above, and does not impose any formal academic prerequisites.

The composition of this English language course, which commenced in November 2022, was based on students' self-assessment, where they categorized themselves as 'Beginners' on a 3-point scale (Beginner, Intermediate, Advanced). No further assessment or analysis of the participants was conducted before their placement in the class, and no CEFR scale assessment or information was provided to the students upon enrollment.

In deciding the appropriate methodology for the course, the researcher based her decision on several assumptions and considerations:

- It was recognized that many students may not have prior experience with university-level classes. Therefore, there was a possibility that some learners might feel intimidated by the new academic environment.
- Some students might experience nervousness and apprehension at the prospect of being placed in a class alongside more proficient peers. This apprehension could potentially hinder their participation and interaction during classes or even lead them to consider dropping out of the course.
- Mature learners typically enroll in this category of courses at the University of Genoa with specific goals in mind, such as traveling, visiting family abroad, or gaining practical and immediately applicable knowledge in real-life situations.
- Considering their age and life stage, mature learners often have various responsibilities such as children, grandchildren, elderly parents, other family

commitments, jobs, and household chores. These responsibilities require flexible, adaptable and customizable study arrangements.

- Considering the age of the students and their background in Italian society and education, it was reasonable to assume that many had never studied a foreign language before. This implied the likelihood of the presence of significant learning challenges and mental barriers that extended beyond the English language itself.
- The class was expected to be, to some degree, rather heterogeneous in terms of language proficiency. As suggested above, the self-assessed ‘Elementary’ level, given its inherent vagueness and subjectivity, could potentially encompass a wide range of skills, from A0 to A2 on the CEFR scale.

In light of these assumptions and considerations, the researcher opted for a flexible and non-threatening approach that prioritized the practical application of knowledge and celebrated individual progress. Building upon these considerations, the researcher chose to incorporate Duolingo as the primary instructional tool in the course.

## **Methodology**

### **Initial assessment through standardized testing**

During the first lesson of the course, a standardized test was administered to the students. This assessment comprised a total of 50 questions and aligned with the A1-A2 proficiency levels. The rationale behind conducting this assessment stemmed from the absence of CEFR-level rankings for the students, prompting the researcher’s need to gain a clear understanding of their starting point. However, as it was later evinced, most students had never studied English before; only two students, one of whom had participated in another English course at the University of Genoa the preceding year, had a slightly higher proficiency level, approximately at the A1 range as determined by the researcher. Upon receiving the test papers, all students, with the exception of one, promptly returned them blank almost immediately after looking at the first few questions. The lone student who completed the test achieved a score of 35 out of 50. The test papers were then collected by the researcher and never mentioned again until the end of the course.

### **In-class teaching and approach**

Throughout the course, a consistent teaching approach was maintained. After introducing Duolingo (which a few students already knew about and had used before), the English-from-Italian course tree was started from zero. In each session, the researcher would start a lesson using her own Duolingo account, projecting it for the entire class to follow. The class collectively engaged in the exercises, and frequently, when encountering significant points meriting attention, the Duolingo lesson would be paused for in-depth explanation with the aid of the classroom whiteboard. The sentences and words encountered in Duolingo lessons often served as catalysts for exploring various aspects, including grammar issues, extended word usage, word collocations, etymology, and trivia.

As part of their weekly homework, students were initially tasked with independently completing the Duolingo unit that had been introduced during the class. However, during the latter half of the course, this approach was slightly modified by the researcher based on positive student feedback. In this revised approach, homework assignments required students to initiate and complete the next unit themselves, even if it had not been explained by the researcher yet. Subsequently, during the following class, the researcher would address the issues and challenges that students encountered with the new unit. Similar to earlier lessons, this served as a platform for explaining associated grammar concepts and branching into various additional teaching points.

The 40-hour course was structured into weekly 2-hour lessons over 20 weeks. From the start of the course, a total of 17 Duolingo units were completed. The class maintained a consistent pace, progressing through one unit each week. Toward the end of the course, as the lesson content began to appear more intricate, the pace experienced a slight deceleration due to some students finding the material more challenging.

### **Attitude and mindset**

As previously emphasized, the researcher believed that one of the biggest challenges in the course would not be the English language per se, but rather the attitude to the language learning process, as this could occasionally be frustrating, intricate, and disheartening. Consequently, a paramount objective of the course was to cultivate a non-judgmental environment where students would feel comfortable expressing their frustrations with the learning journey while also sharing and celebrating their achievements. The researcher endeavored to empathize with the students' struggles arising from the differences between their

native language, Italian, and the English language. Simultaneously, the researcher also sought to demonstrate how English, despite its complexities, possessed its own inherent logic and structure. This approach aimed to bridge the gap between the students' perspectives and the peculiarities of the English language.

Strong emphasis was placed on the importance of consistent, daily effort, leading to constant and gradual improvement, as opposed to overwhelming and sporadic exertions that were likely to lead to burnout. Similarly, the course emphasized the value of active learning from the students' daily surroundings outside the classroom, including exposure to advertising, social media, and television, where many English words and concepts were already familiar due to their assimilation and integration into the Italian language. Students were encouraged to look at daily life contexts with a curious eye, exploring the use of English words in Italian and sharing their findings with the rest of the class. Throughout the course, the researcher aimed to establish the groundwork for self-directed and sustained progress, extending beyond the confines of the two weekly hours of class, as well as, ideally, beyond the course itself, thereby fostering autonomous and individual growth.

### **Repeated standardized testing**

During the last lesson of the course, the researcher decided to administer the same standardized test, which had previously only been completed by one student during the first lesson of the course, and which had been returned blank by the rest of the class. The standardized test had not been mentioned throughout the course after the initial lesson, and the student who had filled it in reported not remembering doing so.

Before distributing the tests, the researcher clarified the following points to the class:

- The standardized test was designed for A1-A2 levels, which meant that, given the researcher's belief that the average classroom level was now A1, there would be many words and grammar points that had never been encountered before, so the students need not panic.

- The test was simply a standardized assessment and its contents were not aligned with the Duolingo course curriculum that had been followed during the course.
- Test results would remain private and personal, and students could choose to anonymously share them with the researcher if they wished.
- All 8 students present on that day took the test, and 7 out of the 8 students shared their results with the course researcher through the anonymous online platform 'Strawpoll'.

## **Results**

### **Standardized Test Results**

Out of the 7 students who took the test and shared their results with the researcher, the average score was 29.3 out of 50, with scores ranging from a minimum of 19 out of 50 to a maximum of 43 out of 50. The median score was 25 out of 50. The student who had initially taken the test at the beginning of the course shared that her score had improved from 35 out of 50 to 43 out of 50.

### **Attitude and Mindset**

As previously mentioned, the researcher held the belief that attitude and mindset would play a significant role in the outcome of the course. This assumption was validated by several instances throughout the course. For example, when encountering particularly challenging concepts, some students displayed signs of frustration and unease, often expressing sentiments like 'no way', 'that is impossible', or 'that doesn't make sense' - reflecting the initial stage of the learning process often characterized by resistance and discomfort.

One student, in particular, stood out for vocalizing her struggles during class, consistently proclaiming in Italian, 'I can't do this' ('non ce la posso fare') in response to new concepts or words. The researcher believed that these exclamations were more than mere comments; they represented tangible manifestations of the very challenge that the researcher had anticipated prior to the start of the course.

However, by the end of the course, this student's exclamation had evolved into a light-hearted classroom joke, and she, along with the other students, had transformed it into a positive affirmation: 'I can do this' ('ce la posso fare').



Moreover, students frequently shared pictures of themselves on vacation in the WhatsApp class chat, humorously indicating that Duolingo was their travel companion. They made jokes and comments about how Duolingo had become a part of their daily lives.

Lastly, all the students expressed their intention to continue studying English at the University of Genoa in the following academic year. They actively contacted the relevant University offices to request placement in the same group.

### **Individual Study**

Student progress was tracked and monitored with Duolingo for Schools, which enabled the researcher to create a virtual classroom for all the students and monitor their progress and various statistics and indicators.

Duolingo for Schools also sent weekly reports to the researcher, highlighting the number of experience points (XP) gained and the amount of time the students spent using Duolingo each week. On average, throughout the course, each student earned a mean score of 542 XP or a median score of 547 XP, and spent 2.5 hours per week using Duolingo outside of the classroom. Therefore, the amount of time that students dedicated to individual English learning was greater than the time spent in the classroom. In total, including the 2 weekly hours of classroom teaching, students spent an average of 4.5 hours per week learning English throughout the course.

During the final lesson of the course, the researcher suggested that, in order to maintain the achieved proficiency level and the positive learning routine established, students could choose to obtain a token amount of 100 XP (significantly less than the average XP they had been earning) each week from the end of the course until the beginning of September 2023. The researcher recommended that students achieve this amount of XP by reviewing previous lessons without attempting newer, more complex ones, and encouraged them to stop if they felt overwhelmed. The goal was to sustain the positive learning routine and English proficiency while enjoying the summer months and preventing burnout.

Over the 16 weeks from the end of the course in May 2023 until the start of September 2023, the students maintained an average weekly XP score of 184, surpassing the goal that had

been set. There were no significant fluctuations, and the weekly XP gained remained relatively consistent throughout the summer months.

### **Limitations of This Study**

This case study presents several challenges and limitations. Firstly, the sample size is very small, with only 9 students, allowing for a high level of individual fluctuations. As such, while this study may offer qualitative insights, its quantitative findings can be subject to scrutiny. Secondly, the reliability of the standardized test results may also be questioned, due to the fact that, albeit for a very limited amount of time, the question papers were provided to the students at the beginning of the course, potentially affecting the results obtained at the end of the course when the same question papers were used. The author believes that the relevance of this paper lies in its qualitative analysis in terms of attitude towards EFL learning among older adults, as opposed to its quantitative findings which were not the focus of the course.

### **Conclusion**

The existing literature on using Duolingo to teach English as a foreign language demonstrates its potential as an effective tool, offering benefits such as improved language skills, increased motivation, and learner autonomy. Furthermore, it promotes an approach that diverges from traditional grammar-focused methods while still indirectly imparting grammar rules. This case study aims to shed light on two distinct sub-categories within the broader topic of using Duolingo for EFL teaching: using Duolingo to teach English to mature and senior learners and integrating Duolingo into a university context. Overall, the 40-hour course has yielded highly positive results, successfully elevating students from an average A0 to an average A1 English proficiency level.

It is important to note that, in this case study, the adoption of Duolingo as a teaching method has gone hand in hand with the establishment of a robust learning framework that promotes resilience and consistency. There is evidence highlighting the risk of students discontinuing their use of Duolingo when they learn independently. However, the presence of a framework that supports students throughout their English language journey can reduce the likelihood of them abandoning the language learning process altogether.

From the author's perspective, the most significant result that can be evinced from this case study is the creation of a safe and positive learning environment, fostering a flexible,

curious, and resilient attitude among learners, and encouraging proactive individual learning within the structured classroom environment, laying solid foundations for sustained and enduring language improvement. In this specific context, Duolingo has proven more than capable of providing this essential framework. Further research should continue to explore the best practices and effectiveness of Duolingo as an EFL teaching tool for adults and seniors in university settings.

## References

- Ajisoko, P. (2022). Using Duolingo apps to improve English reading comprehension of engineering students in Universitas Borneo Tarakan. *Exposure: Jurnal Pendidikan Bahasa Inggris*, 11(1), 1-6. <https://doi.org/10.26618/exposure.v11i1.6452>
- Alfuhaid, S.R. (2021). The utilisation of Duolingo to enhance the speaking proficiency of EFL secondary school students in Saudi Arabia. *English Language Teaching*, 14(11), 9-15. <https://doi.org/10.5539/elt.v14n11p9>
- Almufareh, M. (2021). The impact of gamification and individual differences on second language learning among first-year female university students in Saudi Arabia. *Simulation & Gaming*, 52(6), 715-734. <https://doi.org/10.1177/10468781211056511>
- Aulia, H.R., Wahjuningsih, E., & Andayani, R. (2020). The effect of Duolingo application on students' English vocabulary mastery. *English Language Teaching and Research Journal*, 4(2), 29-37. <https://doi.org/10.37147/eltr.v4i2.71>
- Bende, L. (2017). Encouraging high school students to become autonomous EFL learners: exploring the possibilities of Duolingo. *EduLingua*, 3(1), 53-65. <https://doi.org/10.14232/edulingua.2017.1.4>
- Burke, D. M., & Shafto, M. A. (2004). Aging and Language Production. *Current Directions in Psychological Science*, 13(1), 21-24. <https://doi.org/10.1111/j.0963-7214.2004.01301000.x>
- Cesarini, A., Sulaeman, N.P., Mulyana, S.S., & Yolandri, V. (2021). Utilizing Duolingo in learning vocabulary. Paper presented at the International Conference on Education of Suryakencana (2021). Retrieved from [https://www.researchgate.net/publication/353514447\\_PUBLIKASI\\_PROCEEDING\\_iCONNECT2021\\_rev\\_27\\_Feb\\_21\\_1](https://www.researchgate.net/publication/353514447_PUBLIKASI_PROCEEDING_iCONNECT2021_rev_27_Feb_21_1)

- Duolingo (2023). Q2FY23 Press Release. Retrieved from <https://investors.duolingo.com/financials#Quarterly-Results>
- Faradisa, L.H., Afrila, I.Y., Faroh, I.N., & Choirunnisa, G. (2022). The use of Duolingo to assist EFL students of Prof. KH. Saifuddin Zuhri State Islamic University in learning vocabulary. Paper presented at the Conference on English Language Teaching (CELTl 2022). <https://doi.org/10.24090/celti.v2.29>
- García Botero, G., Questier, F., & Zhu, C. (2018). Self-directed language learning in a mobile-assisted, out-of-class context: Do students walk the talk?. *Computer Assisted Language Learning*, 32, 71-97. <https://doi.org/10.1080/09588221.2018.1485707>
- Hakuta, K., Bialystok, E., & Wiley, E. (2003). Critical evidence: A test of the critical-period hypothesis for second-language acquisition. *Psychological Science*, 14(1), 31-38. <https://doi.org/10.1111/1467-9280.01415>
- Hidayati, T., & Diana, S. (2019). Students' motivation to learn English using mobile applications: The case of Duolingo and Hello English. *JEELS (Journal of English Education and Linguistic Studies)*, 6(2), 189-213. <https://doi.org/10.30762/jeels.v6i2.1233>
- Inayah, L., Yusuf, Q., & Fibula, N. (2020). Exploring undergraduate students' perception toward the use of Duolingo in learning English. *Humanities & Social Sciences Reviews*, 8(3), 76-85. <https://doi.org/10.18510/hssr.2020.839>
- Jiang, X., & Pajak, B. (2022). Reading and listening outcomes of learners in the Duolingo English course for Spanish speakers. *Duolingo Research Report DRR-22-08*. Retrieved from <https://duolingo-papers.s3.amazonaws.com/reports/duolingo-english-efficacy-whitepaper.pdf>
- Jiang, X., Portnoff, L., Plonsky, L., & Pajak, B. (2022). Developing reading and listening proficiency with Duolingo: A cross-sectional analysis. *Duolingo Research Report DRR-22-11*. Retrieved from [https://duolingo-papers.s3.amazonaws.com/reports/Duolingo whitepaper language read listen A2 to B1 2022.pdf](https://duolingo-papers.s3.amazonaws.com/reports/Duolingo%20whitepaper%20language%20read%20listen%20A2%20to%20B1%202022.pdf)

- Jiang, X., Rollinson, J., Chen, H., Reuveni, B., Gustafson, E., Plonsky, L., & Pajak, B. (2021a). How well does Duolingo teach speaking skills?. *Duolingo Research Report DRR-21-02*. Retrieved from <https://duolingo-papers.s3.amazonaws.com/reports/duolingo-speaking-whitepaper.pdf>
- Jiang, X., Rollinson, J., Plonsky, L., Gustafson, E., & Pajak, B. (2021b). Evaluating the reading and listening outcomes of beginning-level Duolingo courses. *Foreign Language Annals*, 54(4), 974-1002. <https://doi.org/10.1111/flan.12600>
- Klimova, B. (2018). Learning a Foreign Language: A Review on Recent Findings About Its Effect on the Enhancement of Cognitive Functions Among Healthy Older Individuals. *Frontiers in Human Neuroscience*, 12. <https://doi.org/10.3389/fnhum.2018.00305>
- Klimova, B., & Pikhart, M. (2020). Current Research on the Impact of Foreign Language Learning Among Healthy Seniors on Their Cognitive Functions From a Positive Psychology Perspective—A Systematic Review. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00765>
- Krashen, S. (2014). Does Duolingo “trump” university-level language learning? *International Journal of Foreign Language Teaching*, 9(1), 13-15. Retrieved from <https://www.sdkrashen.com/content/articles/krashen-does-duolingo-trump.pdf>
- Kroll, J.F., & Dussias, P.E. (2017). The benefits of multilingualism to the personal and professional development of residents of the US. *Foreign Language Annals*, 50, 248-259. <https://doi.org/10.1111/flan.12271>
- Kuklewicz, A., & King, J. (2018). "It's never too late": A narrative inquiry of older Polish adults' English language learning experiences. *TESL-EJ*, 22(3).
- Li, L., & O'Rourke, B. (2022). Chinese second language learners' perceptions of gamification in an informal learning environment: Duolingo as a case study. *Educational Communications and Technology Yearbook*, 183-201. [https://doi.org/10.1007/978-981-16-8329-9\\_10](https://doi.org/10.1007/978-981-16-8329-9_10)
- Marinova-Todd, S., Marshall, D., & Snow, C. (2000). Three misconceptions about age and L2 learning. *TESOL Quarterly*, 34, 9-34. <https://doi.org/10.2307/3588095>
- Nurhisyam, R., Usman, S., Agussatriana, A., & Rofiqoh, R. (2023). University students' perception in learning vocabulary through Duolingo. *E-Journal of ELTS (English Language Teaching Society)*, 10(3), 295-305.

- Putri, L. M. & Islamiati A. (2018). Teaching listening using Duolingo application. *Journal of English Education*, 1(4), 460-465. <https://doi.org/10.22460/project.v1i4.p460-465>
- Skuta, P., & Kostolanyova, K. (2016). The inclusion of gamification elements in the educational process. Paper presented at the Eleventh international scientific conference on Distance Learning in Applied Informatics (DIVAI 2016), 421-429. <https://doi.org/10.13140/RG.2.1.3026.7766>
- Sri Redjeki, I., & Muhajir, R. (2021). Gamification in EFL classroom to support teaching and learning in 21st century. *Journal of English Educators Society*, 6(1), 68-78. <https://doi.org/10.21070/jees.v6i1.882>
- Sukarya, D., Kamil, A.B., & Utami, P.P. (2022). The students' experiences in implementing Duolingo-assisted listening learning. *Jurnal Ilmiah Ilmu Pendidikan*, 5(10), 3941-3946. <https://doi.org/10.54371/jiip.v5i10.972>
- Syahputra, M. (2019). Duolingo gamification: Does it reduce students' grammatical errors in writing? *Getsempena English Education Journal*, 6(1), 1-12. <https://doi.org/10.46244/geej.v6i1.858>
- Vesselinov, R., & Grego, J. (2012). Duolingo effectiveness study. Retrieved from [https://theowlapp.health/wp-content/uploads/2022/04/DuolingoReport\\_Final-1.pdf](https://theowlapp.health/wp-content/uploads/2022/04/DuolingoReport_Final-1.pdf)
- Vinh, L.P. (2020). The effectiveness of using Duolingo for learning vocabulary of English-major students in HUFI. Paper presented at the Workshop on Innovation in Language Teaching and Learning (WILTAL), Ho Chi Minh City, Vietnam. <https://doi.org/10.5281/ZENODO.3947209>
- Warman, D.A.L. (2019). The effect of Duolingo on English as Foreign Language university students' vocabulary mastery. *Proceedings of the Second International Conference on Social, Economy, Education and Humanity (ICoSEEH 2019)*, 209-215. <https://doi.org/10.5220/0009104502090215>
- White, L., & Genesee, F. (1996). How native is near-native? The issue of ultimate attainment in adult second language acquisition. *Second Language Research*, 12(3), 233-265. <https://doi.org/10.1177/026765839601200301>

- Yates, L., Ziser, S., Spector, A., & Orrell, M. (2016). Cognitive leisure activities and future risk of cognitive impairment and dementia: Systematic review and meta-analysis. *International Psychogeriatrics*, 28(11), 1791-1806.  
<http://doi.org/10.1017/S1041610216001137>