

# ENGINEERING STUDENTS INTENTION TO USE DUOLINGO FOR MOBILE ASSISTED LANGUAGE LEARNING (MALL) FOR SPANISH AS FOREIGN LANGUAGE: APPLYING THE TECHNOLOGY ACCEPTANCE MODEL

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## ***Abstract***

*Mobile phones are considered an essential tool for language learning, and various research conducted in this regard has reflected the benefits of mobile-assisted language learning (MALL). Nevertheless, few studies on Mobile Assisted Language Learning through Duolingo have been conducted on Indian learners. Therefore, this study is an attempt to examine whether the usage of MALL through Duolingo in Spanish as a foreign language among private engineering institute students helped them. To do this research, a survey questionnaire based on the Technology Acceptance Model (TAM) is conducted for collecting data. One hundred fifty students of Vellore Institute of Technology were involved in this survey, and all the respondents were pursuing Bachelor in Technology (BTech).*

*For this research, a quantitative approach is adopted, and through the survey, we are going to see the perception among the respondents on the utilization of Duolingo for MALL. Moreover, further analysis of the perception of usage will be done based on perceived usefulness (PU) and perceived ease of use (PEoU). The study based on the above two criteria is pertinent because it is an essential aspect of the Technology Acceptance Model (TAM). In the end, the motive of this research is to find out whether the usage of Duolingo for MALL will ameliorate the Spanish teaching and learning process.*

***Keywords:*** Duolingo, MALL, Technology Acceptance Model, Spanish, Engineering Students, VIT

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## **I. Introduction**

The application of Mobile Assisted Language Learning (MALL) currently increases with the use of the mobile device, especially in the Indian context. In 2015 Vserv (Ghosh 2015), a smart data platform for mobile marketing and e-commerce, has conducted a survey. The findings indicate that about 63 percent of smartphone users in India were found to be under 25 years of age.

On the other hand, in the present world scenario, according to Vesselinov and Grego (2012), foreign language learning has become a very appealing and essential skill. In many cases, it involves using language learning software, mobile apps or computer-assisted self-study. Many language learning software tools are available in this area. Some software is more popular than others.

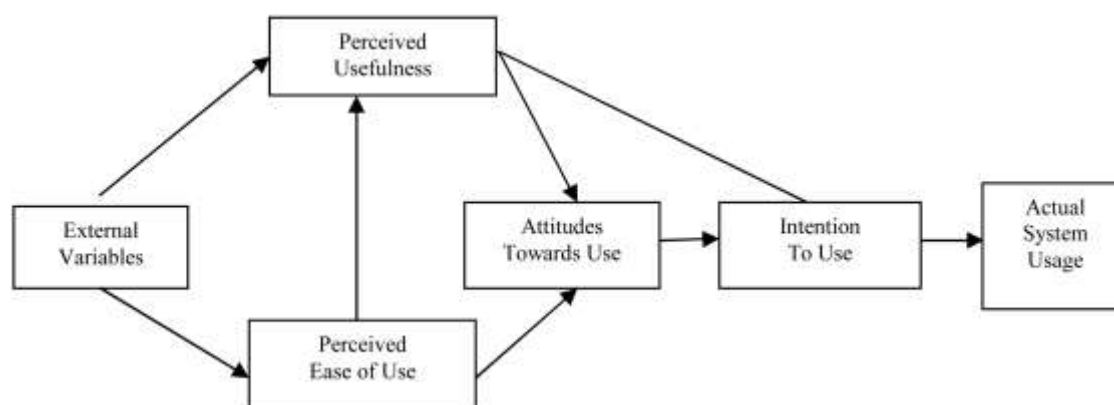
In this regard, Duolingo has got some definite benefits from the research point of view if it is compared to other language learning software packages available in the market. In order to use Duolingo, users have to first register online and provide an e-mail address. Vesselinov and Grego (2012) further explains that some of the features which Duolingo has it allows extracting the exact time of use/study by date and time, and by different activities: time used for lessons, time used for other activities.

Limited studies have been conducted on the use of Duolingo for Mobile Assisted Language Learning (MALL) in Engineering colleges. Therefore, this study is aimed to investigate the perception of the usage of Duolingo for Mobile Assisted Language Learning (MALL) in Spanish as a foreign language learning among engineering students. Thus, the research questions driving this study are as follows: 1) What is the Engineering students' perception of the perceived usefulness (PU) of Duolingo for mobile-assisted language learning (MALL)? 2) What are the Engineering students' perceptions of the perceived ease of use (PEoU) of Duolingo for Mobile assisted language learning (MALL)?

## **II. Literature Review**

### **2.1 The Technology Acceptance Model (TAM)**

According to Fishbein & Ajzen (1977) this model was derived from the Theory of Reasoned Action (TRA). According to Davis (1985 and 1989), it offers a convincing explanation for user acceptance and usage behaviour of information technology. The Technology Acceptance Model (TAM) was designed to aid in the prediction of technology acceptance based on the constructs of perceived usefulness, perceived ease of use, attitudes, and behavioural intention.



Based on the TAM model, an individual's behavioural intention to adopt a system is determined by two beliefs, perceived usefulness and perceived ease of use. Davis (1989) further defined perceived usefulness as "the degree to which an individual believes that using a particular system would enhance his or her productivity" while perceived ease of use is defined as "the degree an individual believes that using a particular system would be free of effort." According to both definitions, Adams (1992) believed that perceived ease of use has a direct effect on both perceived usefulness and technology usage.

Davis (1985) stated that the user would put less effort into a tool that is easy to use. Thus, they will be able to spare efforts to accomplish other tasks. Perceived ease of use could help improve one's performance. In this study, perceived usefulness and perceived ease of use are used to analyse students' perceptions on the usage of Duolingo as MALL in Spanish as a Foreign Language Learning (FSL).

## 2.2 Past Studies Adopting TAM Model

Kim and Lee (2016) in their study examined how Korean students accept and use mobile -assisted language learning (MALL) and investigate related factors that potentially affect MALL usage. The analysis of the results of this research showed that TAM was a useful theoretical model to predict students' behavioural intention to use.

Tsai (2015) in her research also used Technology Acceptance Model (TAM) to evaluate blended English research paper writing course. In the given course, Course Management System (CMS) was used as a tool for e-learning. The result of this study showed that most students displayed positive learning outcomes, thereby indicating that the instruction model could contribute to the effectiveness of learning English writing.

Another study done by Tan (2019) to explore the learning attitudes of college students for English e-tutoring websites through Technology Acceptance Model (TAM) has shown that majority of English e-tutoring users felt that online courses for learning English offer greater convenience and are more effective than non-internet resources.

## 2.3 Mobile-Assisted Language Learning (MALL)

By using MALL, Klopfer et al (2002) believes that learners can control the learning process, thereby progressing in his/her own pace based on his/her cognitive condition. Some of the properties which give an edge to MALL over computer or e-learning are portability, social interactivity, context sensitivity, individuality, and connectivity.

Likewise, the study done by Thornton and Houser (2005) on the use of mobile phones in English education in Japan has shown that seventy-one percent of students prefer receiving study material on mobile phones rather than PCs. Also, ninety-three percent of students felt sharing study material on mobile phones a valuable teaching method.

The research done by Hashim et al. (2017) on the use of MALL for the learners of English as the Second language has shown more affordances than constraints. The study suggests that the use of MALL was helping in overcoming the difficulties faced by academicians in motivating students as well as enhancing their learning experience.

### **III. Research Methodology**

#### **3.1 Research Setting and Respondents**

This study adopted a quantitative approach. The purpose of this study was to investigate the perception of the usage of Duolingo for Mobile Assisted Language Learning (MALL) in Spanish as a foreign language learning among engineering students. One hundred fifty students of Vellore Institute of Technology were involved. The respondents were completing Bachelor of Technology with different specializations. The main criterion for the sampling is that the participants must have almost the same level of Spanish proficiency. So, the selection was made from the same level of Spanish courses.

#### **3.2 Research Instruments**

A survey questionnaire employed in this study was adapted from Davis (1993) in his study titled "User acceptance of information technology: systems characteristics, user perceptions, and behavioral impacts." The questionnaire contained 20 items and was divided into two sections.

Section A contains ten items to find out information regarding perceived usefulness (PU) about Duolingo in mobile-assisted learning. The other section B contains ten items aimed at extracting students' perceived ease of use (PEoU) about mobile-assisted learning. The questionnaire was designed by using a 5 Likert scale wherein it indicated 5 "strongly agree," 4 "agree," 3 "neutral," 2 "disagree," and 1 "strongly disagree."

#### **3.3 Data Collection and Analysis**

In order to collect data, the questionnaire was shared with the respondents through Google form. The respondents were explained in detail about the questionnaire by the researcher. The respondents were given one day to complete the questionnaire.

All the quantitative data collected from the questionnaire was analyzed by google forms response analysis and SPSS. The data was presented in percentage and frequency form. Subsequently, the data from Section A and Section B was analyzed and converted to mean scores in order to obtain perception on the usage of Duolingo (MALL) in Spanish as a foreign Language learning among engineering students.

## IV. Findings

### 4.1 Background of Respondents

All the respondents belonged to the same course of study, i.e. Bachelor of Technology (BTech) program. They were all part of the course Español Fundamental (ESP1001), which is one of the compulsory foreign language courses in the curriculum of the BTech program. The given questionnaire was shared with the respondents

Since all the respondents were enrolled in the Español Fundamental (ESP1001) course, Duolingo was made part of this language course. With Duolingo, all the students were assigned ten topics, and under each topic, students had to complete one level. All the students had to complete the above task before a given deadline. The questionnaire was shared with the students only after completing the given task.

### 4.2 Perceived Usefulness

In this study, the respondents' perceptions of the perceived usefulness (PU) of Duolingo for mobile-assisted language learning (MALL) for ten items were analyzed. Their perceptions on (PU) were obtained using five-point Likert-scale with 1 "strongly disagree," 2 "disagree," 3 "neutral," 4 "agree," and 5 "strongly agree."

Table 1 shows the frequency distribution of perceived usefulness items. Firstly, for Item 1, the majority of the respondents (52%) strongly agreed that using Duolingo for MALL improves the quality of Spanish learning. However, only (1%) strongly disagreed that "using Duolingo for MALL improves the quality of the task." Similarly, for Item 2, around 48.7 percent of respondents agreed that "using Duolingo for MALL gives greater control over the Spanish learning." One respondent each disagreed and strongly disagreed that "using Duolingo for MALL gives greater control over the Spanish learning."

Table 1  
 Frequency Distribution of Perceived Usefulness (PU)

Items	SD	D	N	A	SA	Total
1. Using DUOLINGO improves the quality of learning Spanish I do	1 0.7%	1 0.7%	8 5.3%	62 41.3%	78 52.0%	150 100%
2. Using DUOLINGO gives me greater control over my Spanish learning	1 0.7%	1 0.7%	13 8.7%	73 48.7%	62 41.3%	150 100%
3. DUOLINGO enables me to accomplish Spanish learning more quickly	1 0.7%	2 1.3%	8 5.3%	70 46.7%	69 46%	150 100%
	3	7	22	69	49	150

4. DUOLINGO supports critical aspects of my Spanish learning	2%	4.7%	14.7%	46%	32.7%	100%
	2	4	19	66	59	150
5. Using DUOLINGO increases my productivity	1.3%	2.7%	12.7%	44.0%	39.3%	100%
	1	1	10	76	62	150
6. Using DUOLINGO improves my Spanish learning performance	0.7%	0.7%	6.7%	50.7%	41.3%	100%
	2	3	26	64	55	150
7. Using DUOLINGO allows me to accomplish more in Spanish learning than would otherwise be possible	1.3%	2.0%	17.3%	42.7%	36.7%	100%
	1	1	19	75	54	150
8. Using DUOLINGO enhances my effectiveness on the completion of task related to Spanish learning	0.7%	0.7%	12.7%	50.0%	36.0%	100%
	1	0	17	75	57	150
9. Using DUOLINGO makes it easier to do Spanish learning	0.7%	0.0%	11.3%	50.0%	38.0%	100%
	1	0	9	71	69	150
10. Overall, I find DUOLINGO useful in my Spanish learning	0.7%	0.0%	6.0%	47.3%	46.0%	100%

Note. SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, and SA: Strongly Agree.

On the other hand, other responses for Item 3 shows that (46.7%) agreed “Duolingo for MALL enables them to accomplish the task quickly.” Additionally, for Item 4 (46%) agreed that “Duolingo for MALL supports critical aspects of their Spanish learning.” Apart from that, item 5, which was related to productivity, (44%) of the respondents “strongly agreed” that using Duolingo increases their productivity. Similarly, for Item 6, respondents agreed (50.7) that Duolingo improves Spanish learning performance.

Moreover, for Item 7, the majority (42.7%) agree that “Duolingo for MALL allows them to accomplish more tasks.” In Item 8 (50%) agree that “using Duolingo enhances the effectiveness on the completion of task related to Spanish learning.” Proceeding further, for Item 9 (50%), agree that “using Duolingo makes it easier to do Spanish learning.” Likewise, for Item 10, a large part of respondents (47.3%) strongly agreed that Using Duolingo for MALL is useful in the respondents’ task.

In the next table (Table 2), the mean scores for each aspect of the perceived usefulness (PU) are shown. From the table, we can see that the respondents perceived using Duolingo for MALL as useful for learning Spanish. This was visible with their quality of Spanish learning. The highest mean score ( $M = 4.43$ ) was using Duolingo improves the quality of Spanish learning. The second highest score was ( $M = 4.38$ ), wherein overall, the respondents find Duolingo for MALL enable useful in Spanish learning.

Table 2  
 Descriptive Statistical Analysis of Perceived Usefulness (PU)

	Mean	Std. Deviation	N
1. Using DUOLINGO improves the quality of learning Spanish I do	4.43	0.69	150
2. Using DUOLINGO gives me greater control over my Spanish learning	4.29	0.71	150
3. DUOLINGO enables me to accomplish Spanish learning more quickly	4.36	0.71	150
4. DUOLINGO supports critical aspects of my Spanish learning	4.03	0.92	150
5. Using DUOLINGO increases my productivity	4.17	0.85	150
6. Using DUOLINGO improves my performance in Spanish learning	4.31	0.69	150
7. Using DUOLINGO allows me to accomplish more in Spanish learning than would otherwise be possible	4.11	0.86	150
8. Using DUOLINGO enhances my effectiveness on the completion of task related to Spanish learning	4.20	0.73	150
9. Using DUOLINGO makes it easier to do Spanish learning	4.25	0.70	150
10. Overall, I find DUOLINGO useful in my Spanish learning	4.38	0.66	150

Similarly, the respondents strongly agreed with the next three items with mean scores ( $M = 4.36$ ), ( $M = 4.31$ ), and ( $M = 4.29$ ). In the given items, they believed that Duolingo enables them to accomplish Spanish learning, then Duolingo improves their Spanish learning performance, and finally, DUOLINGO gives me greater control over my Spanish learning. In the meantime, the respondents reported that they were agreed ( $M = 4.25$ )

that Duolingo makes it easier to do Spanish Learning and (M = 4.20) Duolingo enhances the effectiveness on the completion of tasks related to Spanish learning. The mean score (M = 4.17) that comes subsequently shows that the Duolingo increases productivity. The last two mean scores (M = 4.11) and (M = 4.03) show that the respondents somewhat agreed that Duolingo allows accomplishing more in Spanish learning than would otherwise be possible, and Duolingo supports critical aspects of Spanish learning.

The above discussion clearly shows that the majority of the respondents have an affirmative perception of the usefulness of Duolingo for MALL. They agreed that the “integration of Duolingo for MALL shows many benefits for them while doing Spanish learning.”

### 4.3 Perceived Ease of Use (PEoU)

In this part, ten items related to perceived ease of usefulness (PEoU) of Duolingo for mobile-assisted language learning is going to be analyzed based on respondents’ perception. For this analysis, the perceptions were obtained by using five-point Likert-scale with 1 “strongly disagree,” 2 “disagree,” 3 “neutral,” 4 “agree,” and 5 “strongly agree.” The statements used in the survey questionnaire were positive, as well as negative. For example, the statements for items number 11, 13, 15, 17, and 19 were negative whereas statements for items number 12, 14, 16, 18, and 20 were positive.

In the table 3, the frequency distribution of perceived ease of use (PEoU) for the different frequency of each item has been shown. Within that, we can see that more than half of the respondents almost disagree with item 11. Around (26%) disagree and (25.3%) strongly disagree that they find Duolingo cumbersome to use. However, a good percentage of respondents agreed (18.7%) and strongly agreed (12.7%) with the statement that Duolingo is cumbersome to use. Subsequently, for Item 12, the majority of the respondents either agreed (50%) or strongly agreed (42.7%) that learning to operate Duolingo is easy for them while, on the other hand, only (1.3%) of the respondents disagreed with this item.

Table 3  
 Frequency Distribution of Perceived Ease of Use (PEoU)

Items	SD	D	N	A	SA	Total
11. I find the DUOLINGO cumbersome to use	38 (25.3%)	39 (26.0%)	26 (17.3%)	28 (18.7%)	19 (12.7%)	150 100%
12. Learning to operate DUOLINGO is easy for me	0 (0.0%)	2 (1.3%)	9 (6.0%)	75 (50.0%)	64 (42.7%)	150 100%
13. Interacting via DUOLINGO is often frustrating	42 (28.0%)	53 (35.3%)	21 (14.0%)	23 (15.3%)	11 (7.3%)	150 100%



14. I find it is easy to get DUOLINGO do what I want it to do	0 (0.0%)	1 (0.7%)	39 (26.0%)	73 (48.7%)	37 (24.7%)	150 100%
15. DUOLINGO is rigid and inflexible to interact with	41 (27.3%)	51 (34.0%)	21 (14.0%)	25 (16.7%)	12 (8.0%)	150 100%
16. It is easy for me to remember how to learn Spanish using DUOLINGO	1 (0.7%)	3 (2.0%)	13 (8.7%)	78 (52.0%)	55 (36.7%)	150 100%
17. Interacting via DUOLINGO requires a lot of mental effort	34 (22.7%)	52 (34.7%)	27 (18.0%)	23 (15.3%)	14 (9.3%)	150 100%
18. My interaction via DUOLINGO is clear and understandable	1 (0.7%)	3 (2.0%)	15 (10.0%)	79 (52.7%)	52 (34.7%)	150 100%
19. I find it takes a lot of effort to become skillful at using DUOLINGO	39 (26.0%)	53 (35.3%)	20 (13.3%)	24 (16.0%)	14 (9.3%)	150 100%
20. Overall, I find DUOLINGO is easy to use	0 (0.0%)	1 (0.7%)	11 (7.3%)	72 (48.0%)	66 (44.0%)	150 100%

Note. SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, and SA: Strongly Agree.

Concerning item 13, (35.3%) of the respondents disagreed that interacting via Duolingo is often frustrating. For the same item, (15.3%) and (7.3%) respondents agreed and strongly agreed. Furthermore, for item 14, a high proportion of the respondents (48.7%) agreed that they find it is easy to get Duolingo to do what they want it to do. Only (0.7%) respondents disagreed with this statement.

In response to Item 15, which states that Duolingo is rigid and inflexible to interact with, (34%) disagreed and (27.3%) strongly disagreed. However, (16.7%) agreed, and (8%) strongly agreed that Duolingo is rigid and inflexible and that is why it is hard to handle. Moving further, for Item 16, more than half (52%) respondents agreed and that it is easy for them to remember how to learn Spanish using Duolingo. Only (2%) people disagreed with the statement given in Item 16.

Moreover, for Item 17, a decent percentage (34.7%) of respondents disagreed and strongly disagreed (22.7%) with the statement that Interacting via Duolingo requires much mental effort. On the other hand, (15.3%) respondents agreed and (9.3%) strongly agreed that Duolingo requires much mental effort. The findings for Item 18 show that the majority of respondents either agreed (52.7%) or strongly agreed (34.7%) with the statement that their interaction via Duolingo is clear and understandable. Only (2%) could disagree with this statement.

Moving further to the second last Item, i.e. Item 19, it is found that (35.3%) and (26%) respondents disagreed and strongly disagreed with the statement where they find it takes much effort to become skilful at using Duolingo. However, (16%) and (9.3%) agreed and strongly agreed with this statement. Lastly, for Item 20 (48%) and (44%) of the respondents agreed and strongly agreed that overall, they find Duolingo is easy to use.

Moving ahead, in table 4, the results show the mean scores for each aspect of perceived ease of use (PEoU). So, while discussing the above score, we have to keep in mind that the different mean score refers to the two types of statements, namely the positive one and the negative statements. In the table, we can see that the highest mean score obtained was ( $M = 4.35$ ), wherein the respondents believed that overall Duolingo is easy to use. Similarly, the respondents choose to agree and strongly agree with the statement that learning to operate Duolingo is easy for them. The mean score was 4.34 for this Item.

Besides that, the respondents show agreement with the other three items. The mean score for Item 16 was ( $M = 4.22$ ), in which the respondents find it easy to remember how to learn Spanish using Duolingo. It was then followed by the mean score ( $M = 4.19$ ) for Item 18, which states that their interaction via Duolingo is clear and understandable. Lastly, the respondents claimed that it is easy to get Duolingo to what they want to do.

Table 4  
 Descriptive statistical analysis of Perceived Ease of Use (PEoU)

	Mean	Std. Deviation	N
11. I find the DUOLINGO cumbersome to use	2.67	1.37	150
12. Learning to operate DUOLINGO is easy for me	4.34	0.65	150
13. Interacting via DUOLINGO is often frustrating	2.39	1.25	150
14. I find it is easy to get DUOLINGO to what I want it to do	3.97	0.73	150
15. DUOLINGO is rigid and inflexible to interact with	2.44	1.27	150
16. It is easy for me to remember how to learn Spanish using DUOLINGO	4.22	0.74	150
17. Interacting via DUOLINGO requires a lot of mental effort	2.54	1.26	150

18. My interaction via DUOLINGO is clear and understandable	4.19	0.75	150
19. I find it takes a lot of effort to become skillful at using DUOLINGO	2.47	1.29	150
20. Overall, I find DUOLINGO is easy to use	4.35	0.65	150

Moreover, the respondents' response that using Duolingo is cumbersome for Item 11, and the mean value was close to neutral option ( $M = 2.67$ ). It shows that respondents were not sure how cumbersome it is to use Duolingo. Similarly, for Item 17, the respondents were neither completely agreeing or disagreeing ( $M = 2.54$ ) with the statement that interacting via Duolingo requires much mental effort. The mean score shows that they were closer to neutral opinion.

On the other hand, the last three mean scores for the three items were low levels, which were closer to disagreement. Firstly, for the Item that it takes much effort to become skilful at using Duolingo ( $M = 2.47$ ) means that the respondents are finding it easy to become skilful at using Duolingo. Secondly, the respondents also apparently agreed with the statement of Item 15 that Duolingo is not rigid, and it is flexible to interact with. Likewise, for the last Item 13, the mean value result ( $M = 2.39$ ) shows that the majority of respondents do not agree that interacting via Duolingo is often frustrating. So, the above discussing on the mean score concerning the statements of each Item, we do not find any uniformity in the opinion of the respondents.

## V. Discussion

The findings and the above discussion of this study reveal that the majority of the respondents were having positive perceptions towards the usage of Duolingo for mobile-assisted language learning through Duolingo, which includes perceived usefulness (PU) and perceived ease of use (PEoU). These finding also supports the argument that there is general agreement on the potential of Duolingo for MALL as a convincing approach for Spanish as Foreign Language learning. These results are in line with the results of Tan's (2019) study, where the analysis indicated that the majority of English e-tutoring users felt that online sources for learning English offer greater convenience and are more effective than non-internet resources

Apart from that, based on the findings, it can be concluded that the respondents have shown a positive perception of the usefulness of Duolingo for them. The majority of the respondents have agreed with all the statement items of perceived usefulness. The results showed the highest percentage either for agree option or strongly agreed option for each item. This explains that the respondents believed that using Duolingo for MALL brings many benefits for them while doing Spanish learning. Apart from that, Azli et al (2018), in his study, had similar results wherein it was found that the majority of respondents have a positive perception towards the usage of MALL for English language learning. These results about positive perception provide a positive environment for the integration of Duolingo for MALL among educators for delivering Spanish courses to engineering students

Meanwhile, the findings for items related to perceived ease of use in the questionnaire showed that the respondents in this Study have positive perceptions of the usage of Duolingo for MALL. The number of respondents who showed some disagreements in each item was mostly less. One of the reasons for this could be respondents already having prior knowledge of how to use Duolingo. Similar views were expressed by Zhonggen and Xiaozhi (2019) in their study in which they found that the perceived ease of use of Rain Classroom for MALL was positive among respondents. One of the main reasons for this was that the respondents were already very familiar with the platform on which Rain Classroom was being used.

One of the critical findings in this study is the high percentage of respondents' agreement with the statement about the easiness of using Duolingo. This shows that the respondents are optimistic about the role of Duolingo in improving their Spanish.

## VI. Conclusion

After discussing the results of this study on the use of Duolingo for MALL for learning Spanish, it could be concluded that engineering students who are learning Spanish as a foreign language are finding that the Duolingo for MALL is enhancing their teaching and learning process. The incorporation of Duolingo for MALL in Spanish language classrooms helped the learners to practice different topics any time as well as to enhance their level of Spanish without taking the help of the instructor. More than that, it also helped them in improving their performance in exams.

Apart from that, the integration of Duolingo for MALL helps teachers and students to improve the learning environment by complementing the traditional way of Teaching. There are different types of activities to do in Duolingo applications like stories, podcasts, dictionaries, and words which makes the learning process more exciting and engaging. The other inference that comes out of the positive perceptions among respondents of Engineering college is the need to second thought on integrating Duolingo in the Spanish curriculum. The usage of Duolingo will let students practice and take part in learning activities regardless of time and place. This will make the learning process easier and enjoyable for teachers as well as learners.

Despite discussing all the above positive aspects of this study, there are some limitations to this study. Among them, one of the important ones is that the sample size of the study was only 150 students of the engineering branch from the Vellore Institute of Technology. This suggests that there should be a larger sample size in order to incorporate the suggestions and results in larger learners' groups.

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