LONDON JOURNAL ᴏꜰ SOCIAL SCIENCES

Effectiveness of motivational agents on reducing foreign language anxiety

Dhir Parekh
dhirp007@gmail.com
Harmony School of Innovation - Sugar Land

Lama Elsayed
lamaelsayedd@gmail.com
Harmony School of Innovation - Sugar Land

Nathan Fernandes
nafe5975@student.harmonytx.org
Harmony School of Innovation - Sugar Land

Abstract

Utilizing resources focused on artificial intelligence (A.I.) and its influence on education, this paper analyzes the impact of "animated agents" to aid students in learning and understanding a new language. We used these articles to understand the effect that A.I. has on the anxiety levels of students and how these learners respond to differing motivational agents. Foreign Language Anxiety (FLA) is a term used to describe the stress exhibited by learners of a new language, specifically when being negatively evaluated by others or when perceiving an inability in themselves. FLA is a major barrier when it comes to the overall growth of a student and his/her proficiency in the new language, as it increases stress and decreases motivation to learn by making students think that they are not good enough. Because this has led to a notable decline in learners' performance in that subject, pedagogical methods have been developed and examined to provide emotional support. With a group of 56 students and an e-learning system, researchers utilized either motivational or explanatory feedback through the use of text, voice, or animated agents (characters that can engage students and present information), and measured anxiety levels across the different combinations. While the motivational support of an agent was most sufficient, gender played a big role in the efficacy of different pedagogical methods; therefore, incorporating the gender of the learner into artificial intelligence systems and animated agents in the future would personalize feedback in forms that males and females can better take in and implement. To provide more equity in education, these results can be applied to other anxiety barriers that actively prevent students from developing the skills essential for their learning. With the proper assistance from A.I., FLA can become a thing of the past, and language learners can no longer suffer from the stress of learning something entirely new.

Keywords: Foreign Language Anxiety, Motivation, Language Barrier, Education, Stress, Artificial Intelligence.

Dhir Parekh
Lama Elsayed
Nathan Fernandes

Introduction

Foreign Language Anxiety (FLA) is the negative feeling– namely worry or stress– that can come with learning a new language. While studying a foreign language, students are required to practice reading, writing, speaking, and listening; however, some can grasp this information easier while others take longer and struggle more, which only increases their anxiety (Genc, p. 135). Learners exhibiting this Foreign Language Anxiety do not view their mistakes as natural and essential to the learning process, but rather as damaging to their image and a source of negative evaluations from mentors and peers (Ansari, p. 39). FLA has become a growing problem throughout the world, especially within the United States. Research conveys that FLA has a specific negative impact on one's performance in learning English as a second language, which lengthens the educational process (Fariadian et al., p. 21). Foreign Language Anxiety has even been observed in the classroom environment, where non-native students are often hesitant to speak up and contribute to the discussion (Ansari, p. 38). Unfortunately, some teachers do not note this as anxiety, but rather as low ability or low motivation to learn, which prevents them from finding proper solutions to this issue (Ansari, p. 38). However, because of the large population of non-English speakers in the country, it is becoming increasingly important to create an anxiety-free environment in which people can learn the new language without thinking negatively of themselves. A major setback is that non-native speakers do not get the chance to practice conversing in the learned language in real life, and thus their language anxiety persists; however, several studies suggest that computer-based discussions can pose the same benefits to their skills (Ayedoun, p. 1434). Thanks to advances in technology, researchers have begun to study the use of artificial intelligence and supportive feedback to efficiently combat this phenomenon. This was accomplished through "animated agents," which can be voice assistants or life-like characters that can assess learners in a way that motivates them to embrace the language and persevere further. Previously, studies on the interaction of humans with these pedagogical agents have shown an increase in learners' confidence and desire and a decrease in nervousness (Ayedoun, p. 1441). So for the sake of this experimentation, researchers first studied some of the feedback methods that these agents could be programmed to use, including sandwich feedback, explanatory feedback, and corrective feedback. Sandwich feedback gives a positive comment about the learners' efforts, followed by an explanation, and then another positive comment; explanatory feedback only explains the reasoning behind the correct answer; and corrective feedback, simply states if the given answer was right or wrong (Ismail, p. 202). Depending on gender and achievement level, the effects of these practices varied in use. However, to accommodate for the differences between students, it has become essential to study the solutions to Foreign Language Anxiety and ensure that everyone can receive an education that suits them and enables their success.

Instrumentation

The first study aimed to measure FLA across various methods; researchers developed an e-learning system to teach English to 56 foreign students, altering feedback type and feedback modality across the sample. The experiment was a 2 x 3 factorial design, in which participants were randomly given the condition of explanatory or motivational support, and another condition of text, voice, or agent. For the explanatory feedback type, the reasoning was

provided for incorrect and partially correct answers given by students, and for correct answers, the system stated "yes" and then gave an explanation (Prochazka 2020). For the motivational feedback type, sandwich feedback was used as the basis, in which an explanation was put in between two positive comments, such as "Super Job!" or "You tried really hard!" This framework was applied to the group of students. Once students answered a given question, the system gave them an explanation based on their experimental group, and students then self-reported their levels of anxiety during the process. To analyze the results, the researchers did an Analysis of Variance or ANOVA to compare the means of multiple independent and dependent variables.
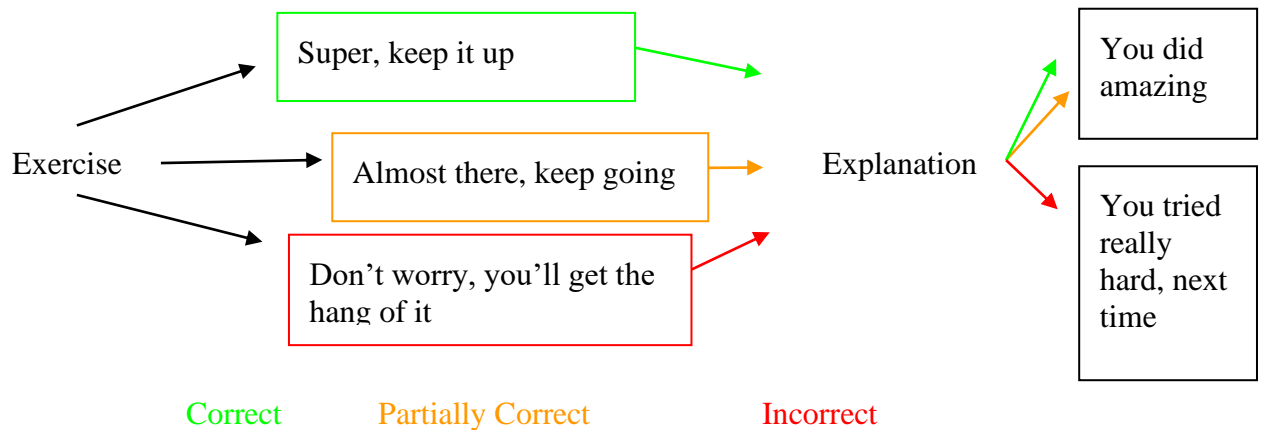

Figure 1. Shows a sandwich feedback model

The second study aimed to figure out the true effectiveness of the different types of animated agents– either text, voice, or agent– using a classroom setting of 61 students with 3 groups (animated agent, voice agent, and no voice or animated agent). In this design, students were split by gender, and then randomly assigned to one of the three groups as equally as possible. In the control group, there were 11 boys and 10 girls, while every other group consisted of 10 boys and girls. Over the course of 29 assignments, students in the three groups were tested on an increase or decrease in self-efficacy. After the completion of all the assignments, a post-test was given to see how much the students learned (Van Der Meij et. al 2015). At the end of the experiment, ANOVA tests– where the gender and group fixed agents were fixed condition– were done to compare how students fared on the assignments and tests as the course progressed to see how well animated agents improved scores.

Results

In the first experiment, four main evaluations were used. For the first evaluation, researchers measured mean anxiety across the different modalities and types of feedback, which showed no overall effect. For the second evaluation, they measured mean anxiety across the feedback types depending on the performance of the learner (correct, incorrect, partially correct), which showed a few results. For the third evaluation, they measured mean anxiety across gender,

Dhir Parekh
Lama Elsayed
Nathan Fernandes

feedback modality, and feedback type; the interactions among them were proven to be significant, conveying that gender had a main effect on the anxiety levels that are felt when learning a foreign language. To further examine this, the researchers had a fourth evaluation, in which they measured mean anxiety for males and females separately across the six conditions; they found significant effects.

For the second experiment, which revolved around the effectiveness of animated agents, it was seen that through the use of animated agents, students were reporting higher levels of confidence and knowledge while also reporting lower levels of anxiety associated with learning something new. There was statistical significance when referring to three main ideas: time, condition, and gender. Over time, for males, it was seen that in the control group, self-efficacy increased while in the experimental group, it decreased over time. On the other hand, it was the opposite for females, where experimental groups reported higher levels of self-efficacy, and lower levels were reported as time spent in the control group increased (Van Der Meij et. al 2015). However, the gender of motivational agents does influence the comfortability exerted by students, thus leading to better scores (Armando 2022).

Group	Boys Before Exp.	Boys After Exp.	Girls Before Exp.	Girls After Exp.
Agent	5.25	7.00	~4.20	~5.80
Voice	~5.30	~5.60	3.25	~5.10
Control	6.30	7.50	3.75	5.25

Figure 2. Shows the distribution of self-efficacy rating over the experiment

When asked to rate the model, in comparison to the midpoint, it was seen that there was a gap of one standard deviation between the rating of the animated agents. More specifically, the boys tended to rate 0.5 standard deviations below while girls tended to rate 0.5 standard deviations above.

Discussion and Conclusion

The researchers reached many conclusions from their examinations. For females, they found that while feedback modality and type did not have a significant relation, the mode of feedback alone had a notable impact: the highest levels of Foreign Language Anxiety came from text and then voice, with the lowest levels coming from animated agents (Ismail p. 205). Males, on the other hand, had more of a noticeable relationship with feedback type and mode's effects on anxiety levels. Furthermore, the researchers noted that the type of feedback (motivational or explanatory), did not have an overall impact on FLA. That's because both types only explained why the right answer was right, so people who chose the wrong options did not dwell on them or feel anxious about it. For feedback modality, there was no observable impact on the levels of FLA except in the presence of other factors (Ismail, p. 205). The highest levels of anxiety occurred in people who answered incorrectly and got explanatory feedback, while the lowest levels of anxiety occurred in people who answered correctly and got explanatory feedback; this was significantly less than the people who answered correctly and got supportive feedback (Ismail p. 205). This suggests that supportive feedback is effective if used fittingly; students answering correctly feel as if they are not performing well enough when they receive such feedback, increasing their anxiety levels. Biologically, males and females differ in their higher-order functions, and thus in their learning styles and cognitive ability (Taghinezhad p. 419). Therefore, researchers recommend studying the relationship between gender and FLA to create better-suited learning environments for all. For instance, females in this study became less stressed when working with an agent, and males required text-based explanatory feedback (as opposed to text-based supportive) to feel more at ease (Ismail p. 205). Applying these findings to classrooms and teaching practices would pose large-scale benefits,

The research in this article could have many potential implications. For example, it seems as if the use of pedagogical agents for motivation influences females more than it does males, providing them with a heavier boost in confidence regarding their skills. This advancement in the use of motivational agents could be extended to other areas of education, such as public speaking. Motivational agents aim to reduce students' lack of faith in their abilities, and in some cases improve the skill altogether. However, pedagogical artificial intelligence systems can always be improved to factor in the mindset of the student, and doing so can lead to the modification of school curriculums, creating a more proficient education for students. This will allow for the widespread use of motivational agents, which can help benefit the learning rates of all students. Due to the nature of these motivational agents, a few modifications– which regard special circumstances– can help increase the learning potential of special education students. Furthermore, other research done on motivational agents suggests that their overall benefit goes further than increasing scores, as they also influence behavior (Figen 2007). Based on the research presented in the article, the future looks promising for the development of AI to help bridge the language barrier and create a more adaptive and interactive system for all.

References

Ansari, M.S.: Speaking anxiety in ESL/EFL classrooms: a holistic approach and practical study. Int. J. Educ. Invest. 2(4), 38–46 (2015)

Armando, M., Ochs, M., & Régner, I. (2022, May 19). The impact of pedagogical agents' gender on academic learning: A systematic review. Frontiers. https://www.frontiersin.org/articles/10.3389/frai.2022.862997/full

Ayedoun, E., Hayashi, Y., Seta, K.: A conversational agent to encourage willingness to communicate in the context of English as a foreign language. Procedia Comput. Sci. 60, 1433–1442 (2015)

Fariadian, E., Azizifar, A., Gowhary, H.: Gender contribution in anxiety in speaking EFL among Iranian learners. Int. Res. J. Appl. Basic Sci. 8(11), 2095–2099 (2014)

Figen, Dr, & Olzem (2007). The Effects of Animated Agents on Students' Achievements and Attitudes. Turkish Online Journal of Distance Education, 13(2). https://files.eric.ed.gov/fulltext/EJ983643.pdf

Genc, G.: Can ambiguity tolerance, success in reading, and gender predict the foreign language reading anxiety? J. Lang. Linguist. Stud. 12(2), 135–151 (2016)

Hastings, P. & Ismail, D.(2021). Way to Go! Effects of Motivational Support and Agents on Reducing Foreign Language Anxiety. Lecture Notes in Computer Science, 202–207.

Prochazka, J., Ovcari, M., Durinik, M.: Sandwich feedback: The empirical evidence of its effectiveness. Learn. Motiv. 71, 101649 (2020)

Taghinezhad, A., Abdollahzadeh, P., Dastpak, M., Rezaei, Z.: Investigating the impact of gender on foreign language learning anxiety of Iranian EFL learners. Mod. J. Lang. Teach. Methods 6(5), 417–426 (2016)

Van Der Meij, H., van der Meij, J. & Harmsen, R. Animated pedagogical agents effects on enhancing student motivation and learning in a science inquiry learning environment. Education Tech Research Dev 63, 381–403 (2015). https://doi.org/10.1007/s11423-015-9378-5