

Students' Engagement with Duolingo-based Language Learning

Abstract

- A large amount of research exists about the mixed benefits of Duolingo and other similar language-learning apps. However, there is little understanding of how students engage with the apps. This research project aims to explore students' initial conditions, components of their app engagement, and their perceived benefits of app-based learning.
- We recruited college students who are regular Duolingo users and are simultaneously taking a basic language course for the same language. We planned to conduct semi-structured interviews with selected participants 3 times over the course of a semester. Using a grounded theory method, we coded and analyzed several interviews to capture students' feelings, thoughts, and actions when engaging with the Duolingo app.
- Our preliminary analyses suggest that students begin to engage with the app based on prior multidimensional needs: social (e.g., friends), emotional (e.g., boredom), or cognitive (e.g., language interest). Using the app appears to be an expression of student agency that further sustains behavioral, emotional, and cognitive engagement. While learning the language with Duolingo often feels inconsistent, the game-like experience offsets the app's shortcomings and keeps the students engaged. Finally, students reported app engagement benefits that they expected to further support their classroom learning.
- This study's final findings will provide Duolingo user and learner insight into app-based learning processes which, in turn, might show how apps can contribute to learning and instruction.

Introduction

- Duolingo and similar language apps use various gamified elements for language learning, such as experience points, rewards, streaks, and more. How these elements relate to the user's engagement with language learning requires further research.
- This study views language learning as a complex dynamic system, meaning that multiple components interact at a lower level to shape a higher-level result. These components include initial conditions, dimensions of engagement, and objects of engagement, which work together to shape dynamic processes.
 - Initial conditions are learner-related or context-based variables.
 - The learner engages with the app through several dimensions: behavioral, cognitive, affective, and agentic.
 - The objects of engagement consist of input, interaction, information, and feedback.
 - The dynamic processes formed by these lower-level components interacting with one another include adaptation and self-organization.
- The framework for this study (Figure 1) was carefully designed using all of this information to attempt to answer the following research questions:
 - What are the initial conditions of Duolingo user participants, and do they change across the interviews?
 - What are the components of the user participants' engagement with the Duolingo app?
 - What are the benefits user participants think they gain from using the Duolingo app

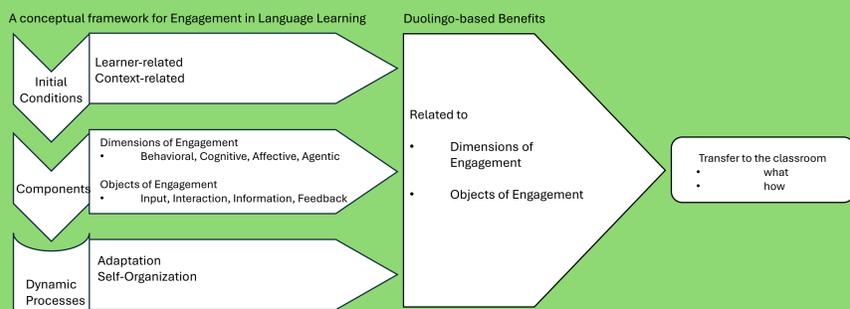


Figure 1

Theoretical Framework

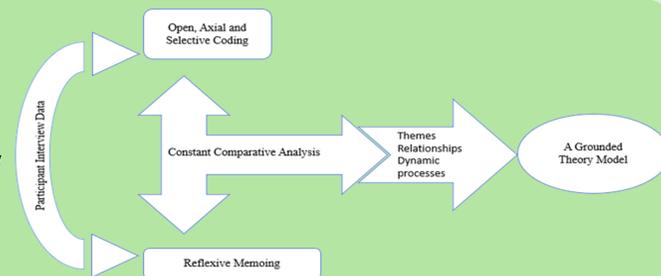
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Methods

- We first gathered participants by sending out surveys that looked for volunteers who were taking a language course at FSU and used Duolingo to learn that same language.
- The selected participants were then interviewed 3 times over the course of the Spring 2025, with 5 weeks in between each interview.
- We used a semi-structured interview style that follows a general guideline but is open to change based on the conversation. The interview structure and its questions were carefully designed to capture the various parts of the student's engagement with the app.
- Because there is a lack of existing research on this topic, and because the research is qualitative in nature, we used a grounded theory analysis approach for this study (Figure 2). The grounded theory method involves repeatedly analyzing the data as we collect it and continuously comparing it to previous data to find larger themes and relationships.
- Following grounded theory methods, we implemented a 3-stage coding process.
 - The first stage of the data coding process is the open coding stage, which involves tediously analyzing the interviews and coding parts relevant to the research questions.
 - The second stage is axial coding, which specializes in finding relationships between the existing codes.
 - The third and final stage is the selective coding stage, which focuses on bettering our understanding of Duolingo engagement and transfer processes.

Figure 2
Grounded Theory Analysis



Preliminary Findings

- Early analyses grounded in interview data suggested several overarching themes: initial needs, personal agency, adaptive engagement, and perceived benefits for classroom learning.
- Students reported several multidimensional needs that drove their initial engagement with the Duolingo app: social, emotional, and cognitive.
 - Social needs involved keeping up with friends' Duolingo streaks: "I need to keep my streak because my friends also do it."
 - App use was often associated with emotional needs including boredom ("I was just bored") and curiosity ("I've heard from everybody [and] seen ads").
 - Along with emotional and social needs, cognitive needs involving language or learning interest were also an initial trigger to engage with the Duolingo app: "I've always wanted to learn a language."
- Based on initial needs, participants displayed personal agency and behavioral engagement as they signed up to use the app. They also engaged with the app emotionally and cognitively.
 - Their emotional engagement included enjoyment of certain game features ("I really like the way that it rewards you") as well as annoyance for other features ("The amount of ads... that's definitely annoying").
 - Students' cognitive engagement involved a range of contrasting experiences. Language challenges included lack of consistency in content presentation: "...one thing that's hard is like, Duolingo goes all over the place." As a result, adaptive responses included trial and error ("I'll just give the wrong answer to see like what mistake I made") and using graphic clues ("...look at a picture and kind of figure out what they're talking about").
- Some app-based benefits students reported were provision of vocabulary practice as complementing classroom learning: "In my French class, we focus a lot on grammar, but if you don't know the vocabulary of the sentence, you don't know what they're saying. Duolingo going over that is very helpful." Beyond learning specific things, the app provided a constant opportunity for brain activation: "...it's like making my brain work every day". Using the app regularly was perceived as important to recall prior knowledge ("It's a good practice just to keep my knowledge up").

Preliminary Findings Continued

- The following diagram models the relationships between the overarching themes discovered in our preliminary analyses.

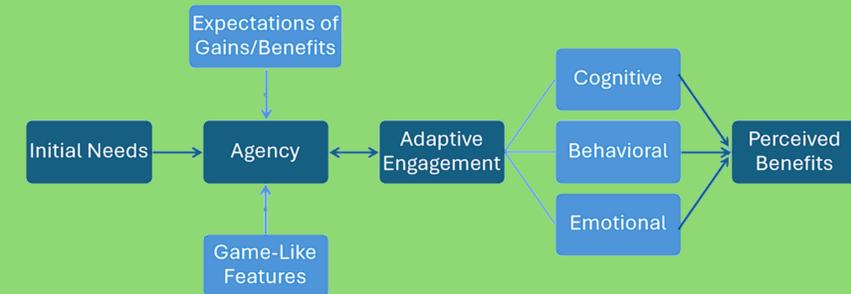


Figure 3

Preliminary Grounded Theory Model

- Students' initial needs led to agency as they began using the app. Students' agency unfolded across several engagement dimensions: behavioral, cognitive, and emotional. While engaging with the app, students continuously adapted to its challenges and reported several benefits.
- In conclusion, we found that students' agency was sustained by expectations for gains and benefits related to their initial needs. For example, "learning different cultures" through the app could help meet social needs. In addition, having something to do by using the app helps meet emotional needs ("...it is just something I like to do to occupy myself"). Finally, progressing towards learning a language by using the app helps meet cognitive needs ("I learned a lot of vocabulary").
- App design also plays an important role in supporting students' agency. Even though students reported that Duolingo learning can be fluid or inconsistent, the app's game-like elements and features help keep the students engaged despite the language-instruction flaws.

Discussion and Limitations

- Our preliminary findings are based on the grounded analysis of the first round of interviews of only three participants of a total of eight.
- While we have gathered some descriptive and informative insight into our three research questions, our grounded theory model is a very early representation of our findings.
- We are in the process of collecting and analyzing round two of interviews of our eight participants.
- We expect our final findings to provide much-needed insight that contributes to our understanding of app-based learning processes. By better understanding these processes, app-based instruction in general could be improved.

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