Improving Classroom Language Learning with Personalized Instruction

Bozena Pajak
Learning Scientist
Duolingo

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Why learn another language?

Source: https://maudlintales.files.wordpress.com/2015/02/bilingual.jpg
Why learn another language?

- Communication
- Cultural enrichment
- Job opportunities
- Linguistic interest
- Intellectual challenge
Why learn another language?

• Cognitive advantages
  • improved attention
  • enhanced task switching
  • reduced age-related cognitive decline

• This applies to both early and late bilinguals

Bak, Nissan, Allerhand, & Deary, 2014, Annals of Neurology
Bak, Vega-Mendoza, & Sorace, 2014, Frontiers in Psychology

How to get cognitive benefits?

Use both languages frequently

Using two languages helps bilinguals develop better executive control

Better executive control leads to cognitive benefits

Source: http://humaan.com/humaans-and-the-web-1-cognition/

Marian & Shook, 2012, Cerebrum
Sandoval, Gollan, Ferreira, & Salmon, 2010, Bilingualism: Language and Cognition
Executive control in bilinguals

- All languages of a bilingual get co-activated during language use
- This co-activation leads to between-language interference
  - cross-language intrusion errors
  - frequent tip-of-the-tongue states
  - reduced verbal fluency


Marian & Shook, 2012, Cerebrum
Sandoval, Gollan, Ferreira, & Salmon, 2010, Bilingualism: Language and Cognition
Executive control in bilinguals

• To reduce interference, bilinguals develop **efficient inhibitory and cognitive control mechanisms**
  
• ability to inhibit the non-target language(s)

• ability to quickly switch between languages

• This is what **boosts cognitive functioning**


Marian & Shook, 2012, Cerebrum
Sandoval, Gollan, Ferreira, & Salmon, 2010, Bilingualism: Language and Cognition
How to motivate students?

• We know bilingualism has many advantages…

… but how do we motivate students to study another language?
How to motivate students?

• List all the reasons

• Provide an **enjoyable and effective learning experience**

• Duolingo can help!
1. Overview of Duolingo

- Duolingo courses & Incubator
- data- & research-driven personalized approach
- fun learning experience

2. Classroom implementations
Language learning platform

More than 150 million students worldwide

Currently offering 21 distinct languages (for different language backgrounds)

Available on Android, iOS, Windows Phone & Web

100% FREE
Video Time!
Google Play

iOS App Store

GOOGLE Best of the Best
APPLE App of the Year
TECHCRUNCH Education Startup of the Year
34 hours of Duolingo is as effective as one university semester

[Vesselinov & Grego, 2012]
Demo Time!
Talk outline

1. Overview of Duolingo
   - Duolingo courses & Incubator
     - data- & research-driven personalized approach
     - fun learning experience

2. Classroom implementations
Catalan, Danish, Dutch, English, Esperanto, French, German, Hebrew, Hungarian, Irish, Italian, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish, Ukrainian, Vietnamese, and Welsh
Catalan, Danish, Dutch, English, Esperanto, French, German, Hebrew, Hungarian, Irish, Italian, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish, Ukrainian, Vietnamese, and Welsh

for speakers of:

Arabic
Chinese
Czech
Dutch
French
German
Greek
Hindi
Hungarian
Indonesian
Italian
Japanese
Korean
Polish
Portuguese
Romanian
Russian
Spanish
Turkish
Ukrainian
Vietnamese
#1 course by country

English  French  Spanish  German  Swedish

making.duolingo.com
duolingo #2 course by country

- French
- Spanish
- German
- English
- Portuguese
- Italian
- Swedish
- Norwegian
- Dutch

making.duolingo.com
Catalan, Danish, Dutch, English, Esperanto, French, German, Hebrew, Hungarian, Irish, Italian, Norwegian, Portuguese, Russian, Spanish, Swedish, Turkish, Ukrainian, Vietnamese, and Welsh.

Duolingo is helping preserve languages whose speakers are in decline.
Catalan, Danish, Dutch, English, **Esperanto**, French, German, Hebrew, Hungarian, Irish, Italian, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish, **Ukrainian**, Vietnamese, and **Welsh** teaching languages that aren’t commonly taught
Upcoming courses for English speakers:

Greek (100% done)
Romanian (98% done)
Czech (97% done)
Swahili (96% done)
Hindi (59% done)
Klingon (29% done)
Indonesian (28% done)
Korean (21% done)
The Incubator

“crowdsourcing” new language courses since 2013

hatching  beta  stable
The Incubator

- Duolingo empowers the global community to **create language courses collaboratively**

- Thousands of volunteers worldwide have already applied to contribute
  - There’s a **strict vetting process**
  - We select 3-5 contributors for each new course
Talk outline

1. Overview of Duolingo
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2. Classroom implementations
Our Approach

• We take a **scientific** and **data-driven approach** to designing and improving Duolingo
  
  • second language acquisition
  
  • cognitive psychology
  
  • corpus and computational linguistics
  
  • “big data” and machine learning
Contributor Guidelines

We want our courses to align with the Common European Framework of Reference for Languages (CEFR). CEFR is a guideline created by the Council of Europe to unify language learning, teaching, and assessment. Within this framework, language competence is defined at six levels:

- A1: Breakthrough / Beginner
- A2: Waystage / Pre-intermediate
- B1: Threshold / Intermediate
- B2: Vantage / Upper intermediate
- C1: Advanced
- C2: Proficient

### A1 level

<table>
<thead>
<tr>
<th>Communicative Function</th>
<th>Example sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greetings and goodbyes</td>
<td><em>Hello</em></td>
</tr>
<tr>
<td></td>
<td><em>Nice to meet you</em></td>
</tr>
<tr>
<td></td>
<td><em>Good morning</em></td>
</tr>
</tbody>
</table>

- Simple past vs. present perfect
- Present progressive as future
- Future progressive
- Past progressive
- Future in the past with "going to"

<table>
<thead>
<tr>
<th>Component</th>
<th>CEFR level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definite and indefinite articles, zero article with uncountable and plural nouns</td>
<td>A1</td>
</tr>
<tr>
<td>Negation</td>
<td>A1</td>
</tr>
<tr>
<td>Yes/no questions (with be, can/could, do)</td>
<td>A1</td>
</tr>
<tr>
<td>Wh-questions in present (when, where, how, why, who, what, which + one/NP)</td>
<td>A1</td>
</tr>
<tr>
<td>Comparative and superlative (inflectional and periphrastic)</td>
<td>A1</td>
</tr>
<tr>
<td>Possessive pronouns</td>
<td>A1</td>
</tr>
<tr>
<td>Possessive 's</td>
<td>A1</td>
</tr>
<tr>
<td>Causative verbs (make, let, have, get)</td>
<td>B1</td>
</tr>
<tr>
<td>Wh-questions (with &quot;whose&quot;)</td>
<td>B1</td>
</tr>
<tr>
<td>Relative clauses (with &quot;whenever&quot;)</td>
<td>B1</td>
</tr>
<tr>
<td>&quot;Used to&quot;</td>
<td>B1</td>
</tr>
<tr>
<td>Imperative (with &quot;let me&quot;, etc.)</td>
<td>B1</td>
</tr>
<tr>
<td>Modal verbs (ought)</td>
<td>B1</td>
</tr>
<tr>
<td>Present perfect vs. simple past</td>
<td>B1</td>
</tr>
</tbody>
</table>
Contributor Guidelines

**Introducing grammar**
How do you introduce grammar rules without explaining them explicitly? The trick is to use carefully chosen example sentences, which contrast the words that demonstrate a particular grammatical rule.

**Good example:** The Family skill teaches the rule for forming plural nouns with the following sentences:

- "I have one brother."
- "I know your sister."
- "My dad has a nice car."
- "John has two brothers."
- "My three sisters live in Chicago."
- "Do you have brothers or sisters?"
- "I have two cars."

**Word variety**
Mix different parts of speech (nouns, verbs, adjectives, etc.) in every lessons. This will let you create more varied and interesting sentences, and will make the lessons more engaging.

**Good example:** A lesson teaches the words "eating", "drinking", "chicken", "rice", "hot", "cold".

**Bad example:** A lesson teaches the words "eating", "drinking", "ordering", "asking", "paying", "leaving".

**Other tips**
Avoid teaching words that look or sound the same (e.g., "shirt" & "skirt", "ekmek" & "erkek") in the same lesson. These words are easy to confuse and will make learning less effective. Pay particular attention to the first sound and first syllable, because those are the most salient parts of a word. Make sure all new words in a lesson begin with a different sound.

**Good example:** The words "shirt" and "skirt" are taught in two different lessons that are separated by at least one other lesson.

**Bad example:** The words "shirt" and "skirt" are taught in the same lesson.
Methodology

- Providing context: Teaching through whole sentences / pictures
Methodology

- Teaching through conversation
Methodology

- Teaching through action
Methodology

• Teaching through conversation: chatbot
Methodology

• Listening and speaking
Methodology

- Implicit learning / Rule discovery

- **el** = masculine definite singular determiner
- **la** = feminine definite singular determiner

- el niño
- la niña
- el hombre
- la mujer
- el padre
- la madre
- el hermano
- la hermana

[Zimmerman, 2005]
Methodology

• Drawing attention to language properties that learners need to “notice”

[Ellis, 1994]
Methodology

- Immediate feedback

[Bloom, 1984; Ericsson et al., 1993; Locke, & Latham, 2002]
Personalized Learning

- Learning is most efficient when practices are spaced over long intervals (reviewing when on the verge of forgetting)

- Duolingo uses strength bars to indicate when a skill needs practice

- The strength goes down with time, but it is personalized for each user based on their learning patterns

[Ebbinghaus, 1885; Pimsleur, 1967; Leitner, 1972]
Scientific Experimentation

A/B testing

OLD

NEW

A

B
Talk outline

1. Overview of Duolingo
   - Duolingo courses & Incubator
   - data- & research-driven **personalized** approach
   - **fun** learning experience

2. Classroom implementations
Make It Fun!

Set Goals

Practice Complete! +10 XP
Heart bonus! +2 XP

You’re on a 365 day streak.
Set a goal
Continue

Compete

Your Position this Week

Remy
107 XP

You strengthened the skill Abstract Objects 1!
You’ll now be able to recall this skill more quickly and accurately from your brain.

Strengthen Skills

Continue

Continue

Continue
Make It Fun!

POWER-UPS

Double or Nothing
Attempt to double your five lingot wager by maintaining a seven day streak.

5 LINGOTS

Streak Freeze
Streak Freeze allows your streak to remain in place for one full day of inactivity.

10 LINGOTS

OUTFITS

Formal Attire
Learn in style. Duo has always been a sharp guy, now he'll look sharp too.

WEAR

Champagne Tracksuit
Learn in luxury. Duo will love the feel of 24 carat gold silk on his feathers.

TAKE OFF
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Duolingo for Schools

The most popular language learning app, now for schools.

Teachers can create classrooms, distribute assignments, and track progress. It's completely free.

Get started
Duolingo for Schools

• We worked with high school teachers and college professors to gather information about how Duolingo is used in schools
  
  • teacher surveys
  
  • student surveys
  
  • class observation
How teachers use Duolingo

- Homework
- Extra credit

- In class
  - everyday warm-up or cool-down
  - one class period per week
High School Spanish

• Ms. Riley, Brashear High School (Pittsburgh, PA)

• “I was thrown. Once a week I was witnessing a classroom with at least **90% full engagement** where the primary words spoken were, ‘I just leveled up!’ or ‘It told me I am 10% fluent!’ ”

• “I couldn’t believe it. My students were interpreting conjugated verbs well before I even introduced the idea in class. This was a breakthrough.”

• “The overall **success** of the new software was overwhelming. These students could do things far better than my students the year prior.”

http://gettingsmart.com/2016/07/could-online-learning-tools-replace-the-traditional-teacher/
High School Spanish

• Ms. Riley, Brashear High School (Pittsburgh, PA)

• “The app served as the perfect supplementary tool.”

• “It gave my students much needed exposure to additional vocabulary and grammar structures in a different setting in an immediately rewarding environment.”

• “It’s potentially the much-needed tool to capture the interest of even the most jaded teenager—a challenge we all know is real.”

http://gettingsmart.com/2016/07/could-online-learning-tools-replace-the-traditional-teacher/
College Spanish

• Prof. Munday, Sacred Heart University (Fairfield, CT)

• Quotes from students:
  
  • “I felt like by doing Duolingo I was more prepared in class.”

  • “Duolingo was a great reinforcement for the material covered in class.”

  • “It wasn't boring to do and it was quick and helped me understand more.”
College Spanish

• Prof. Munday, Sacred Heart University (Fairfield, CT)

• Quotes from students:
  
  • “Duolingo has helped me realize foreign language is not that difficult to learn.”
  
  • “Because it isn't something you do just to get done it engages your thought and makes you learn.”
  
  • “Duolingo makes me more excited to learn languages.”
Student Surveys

- **286 high-school students** learning on Duolingo

How much do you like learning on Duolingo?

- **76%** positive
- **13%** negative

How likely are you to recommend Duolingo to a friend?

- **71%** positive
- **22%** negative
• Katie Fahrenkopf, Academic Coordinator & Instructor

• Program for students with intellectual disabilities

• Teaches students the life skills they will need to be independent on their own, employability skills, and functional academic skills.

• A wide variety of disabilities are represented in our program, including autism spectrum disorders, Down Syndrome, Cerebral Palsy, DiGeorge Syndrome, and PDD-NOS.
• Katie Fahrenkopf, Academic Coordinator & Instructor

• “This past summer, I offered foreign language to our students and for nearly every student, it was the first opportunity to learn a foreign language that they had encountered in their lives!”

• “My students absolutely loved using Duolingo”

• “All of the students felt good about what they were doing and they were proud of themselves. They never became frustrated or overwhelmed, which is so important in the field of special education and disability services!”

• “Duolingo helped them develop a general passion for learning about other languages and cultures. It really opened up their worlds for the first time - it was like turning on a light in a dark closet.”
Video Time!
We are hiring!

www.duolingo.com/jobs
Thank you!