Learning, Education, and Families

Discussion

Sarah Nassery, Jamie Lee, Seungmin Jeong

When Gamification Spoils Your Learning:

A Qualitative Case Study of Gamification Misuse in a Language-Learning App

Reza et al. L@S (2022).

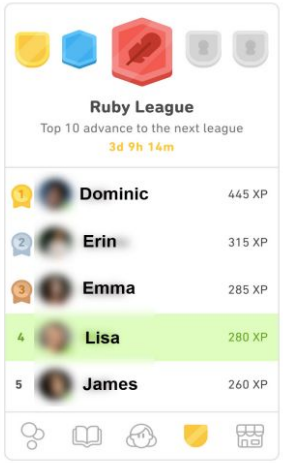
Overview

Gamification misuse in learning applications, such as Duolingo

(a) A sample question

(b) The learning tree

(c) Crowns



(d) A Leaderboard in Ruby

Why study + Research Gap

"However, the phenomenon of gamification misuse is still relatively an underexplored research topic in the literature of HCI and L@S."

1 INTRODUCTION

In recent years, the use of gamification for educational purposes has raised in popularity [34, 42, 78, 106]. Simply put, gamification is a motivational technique that uses game design elements (such as badges, points, and leaderboards) in non-game contexts to trigger positive user behaviors [28, 42]. The main objective of using gamification in education is to increase student motivation [43, 125], engagement [102], and learning performance [26]. However, some scholars have cautioned that using gamification is not devoid of potential side effects [5, 11, 14, 112]. One of the overarching concerns is that the **gamification itself might become a new source of distraction to learning** [6, 64, 112].

Gamification misuse occurs when students fixate too much on gamification and get distracted from learning [6, 11, 92]. Understanding this phenomenon assumes importance for the Human-Computer Interaction (HCI) and Learning at Scale (L@S) research communities because such misusing behavior wastes students' valuable time and negatively affects their learning efficiency [112]. However, the phenomenon of gamification misuse is still relatively an underexplored research topic in the literature of HCI and L@S. Most of the prior research has only investigated the positive aspects of gamification or whether students have been laboring under gamification or not (i.e., behavioral engagement) [26, 47, 67]. Consequently, not much attention is paid to the quality of students' interactions with gamification and their actual learning experience.

This paper aims to fill this knowledge gap about gamification misuse by taking the first steps to study the phenomenon in a large-scale gamified learning app. More specifically, our study is guided by the following three research questions:

Contributions

1. First qualitative research on gamification misuse in learning
2. In-depth analysis into dark side of gamification in learning
3. New design and research opportunities for future use of gamification in learning

Related Work

1

Gamification, Motivation, and Learning

BLAP system, extrinsic motivation

2

Gamification Misuses

cheating, addiction, obsession with competition

3

Other Theories

Self-Determination Theory, Rational Choice Theory

games, learning, education, psychology

Research Questions

- **RQ1:** How do learners perceive and experience the ramifications of gamification misuse?
- **RQ2:** What factors lead learners to misuse gamification in a learning app?
- **RQ3:** How can gamification designers and practitioners deal with the problem of gamification misuse?

Methods

1. Content analysis on data from Duolingo’s discussion forums

2. Semi-structured interviews with 15 international users

Findings

- **RQ1:** How do learners perceive and experience the ramifications of gamification misuse?
- **RQ2:** What factors lead learners to misuse gamification in a learning app?
- **RQ3:** How can gamification designers and practitioners deal with the problem of gamification misuse?

4.1 User Experience and Perceptions (RQ1)

The summary of our main findings from RQ1 is as follows.

✓ 1) The misuse of gamification can negatively impact users' learning aptitude and capacity by weakening their confidence in learning. It can also affect users' interest in learning and cause them to give up learning itself or even abandon the learning app.

✓ 2) According to our findings, gamification can sometimes be worrisome concerning users' well-being. The gamification misuse can lead to well-being complications such as disappointment, apprehension, self-recrimination, physical health problems, and disruption of daily life routines.

✓ 3) Furthermore, the misuse of gamification can deprive users of the right to learn in a fair learning environment. In addition, users believe that the misuse of gamification (if not addressed) can set a bad example for how success is defined in learning communities, allowing this unproductive behavior to become widespread among more users.

Findings

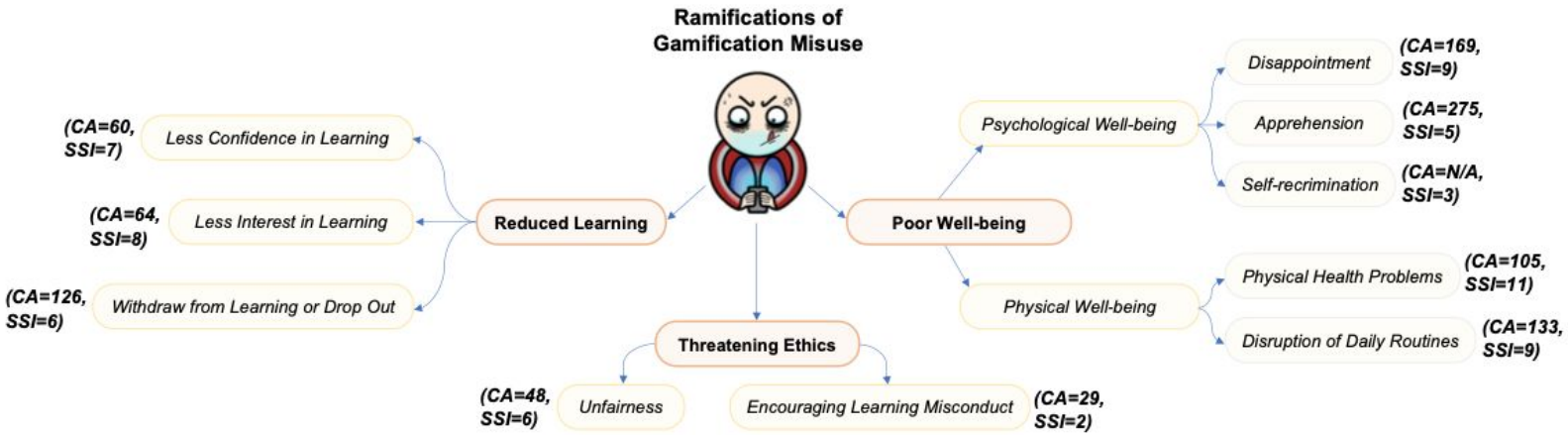


Figure 2: The thematic network for RQ1. We find that gamification misuse can be a threat to user *learning*, *well-being*, and *ethics*. The values of CA and SSI show the number of times each theme has appeared in our content analysis and semi-structured interviews, respectively.

Findings

- **RQ1:** How do learners perceive and experience the ramifications of gamification misuse?
- **RQ2:** What factors lead learners to misuse gamification in a learning app?
- **RQ3:** How can gamification designers and practitioners deal with the problem of gamification misuse?

4.2 Reasons Behind Gamification Misuse (RQ2)

We find and classify the main reasons for the misuse of gamification into two categories: *active* and *passive*. The summary of the main findings from RQ2 is as follows.

✓ We define the *active reasons* for gamification misuse as those reasons for which users acknowledge their own agency, control, or direct responsibility. We identify three active reasons for the misuse of gamification: *competitiveness*, *overindulgence in playfulness*, and *challenging the system*.

✓ We define the *passive reasons* as those reasons that indirectly manipulate the user's behavior to misuse gamification. In some cases, users are not even aware of their misusing behavior until they notice it later. We identify three passive reasons for the misuse of gamification: *dark nudges of gamification*, *compulsion*, and *herding*.

Findings

Figure 3: The thematic network for RQ2 provides the detailed reasons users misuse gamification in learning. The values of CA and SSI show the number of times each theme has appeared in our content analysis and semi-structured interviews, respectively.

Findings

- **RQ1:** How do learners perceive and experience the ramifications of gamification misuse?
- **RQ2:** What factors lead learners to misuse gamification in a learning app?
- **RQ3:** How can gamification designers and practitioners deal with the problem of gamification misuse?

4.3 Design Suggestions for Gamification (RQ3)

This subsection provides some design suggestions for gamification designers and practitioners working on learning applications to help them overcome or mitigate the problem of gamification misuse. The suggestions extracted here are divided into four distinct themes: (1) personalization and customization, (2) revision of gamification mechanics and dynamics, (3) intelligent detection of gamification misuse, and (4) informing and guiding users.

Main takeaways

5 LIMITATIONS AND FUTURE WORK

In this work, we took the first steps to fill the knowledge gap about gamification misuse in learning apps. Our work contains **three important take-home messages** that might be insightful for practitioners working in this field: 1) This paper makes clear why gamification misuse and its negative consequences for learning, well-being, and ethics should not be ignored. 2) Our work reveals that all instances of gamification misuse are not intentional. 3) Finally, most user suggestions in our work show that gamification misuse becomes more likely when (gamification) designers do not know their target users very well or have incorrect assumptions about them.

Although our study provides a thorough exploration of users' views on the misuse of gamification, it also poses some drawbacks.

Discussion

If this paper was submitted to CHI, which subcommittee would it best belong?

“When Gamification Spoils Your Learning: A Qualitative Case Study of Gamification Misuse in a Language-Learning App”

Games and Play

This subcommittee is suitable for papers across all areas of playful interaction, player experience, and games. Examples of topics include: game interaction and interfaces, playful systems (e.g., toys, books, leisure), the design and development of games (including serious games and gamification), player experience evaluation (player psychology, games user research, and game analytics), the study of player and developer communities, and understanding play.

Learning, Education, and Families

The “Learning and Education” component of this subcommittee is suitable for contributions that deepen our understanding of how to design, build, deploy, and/or study technologies for learning processes and in educational settings. Topics may include (but are not limited to): intelligent tutoring systems; multimedia interfaces for learning; learning analytics; systems for collaborative learning and social discussion; technology-supported learning; teacher/educator-facing designs; and tangible learning interfaces. These may be suitable for a variety of settings: online learning, learning at scale; primary, secondary, and higher education; informal learning in museums, libraries, homes, and after-school settings.

Discussion

What do you think about dark nudges in these learning games? Have you experienced it? Do you think it’s ethical?


DUOLINGO
Yesterday, 7:11 PM
Hi! It's Duo.
These reminders don't seem to be working.
We'll stop sending them for now.
DUOLINGO
Yesterday, 7:07 PM
Hi! It's Duo.
It's time for your daily French lesson. Take 5 minutes now to complete it.


COMING SO
leja
@afterlaughter16
Follow
Replying to @duolingo
Is this Duo coming to my door in the midd
of the night to kill me because I haven't ta
my German lessons since Thursday?
9:18 AM · 26 Mar 2019
101 Likes


Duolingo · Mar 26, 2019
@duolingo · Follow
COMING SOON
Elbardo
@Elbardo_ts · Follow
The duolingo bird when you haven't practiced in 2 days
Beg for your life in Spanish
8:20 AM · Mar 26, 2019
16.2K
Reply
Copy link
Read 26 replies

"Rosita Reads With My Family":
Developing A Bilingual Conversational Agent to Support Parent-Child Shared Reading

Ying et al. IDC (2023)

Background

Best Paper in IDC 23
Written by UCI School of Education

“Rosita Reads With My Family”: Developing A Bilingual Conversational Agent to Support Parent-Child Shared Reading

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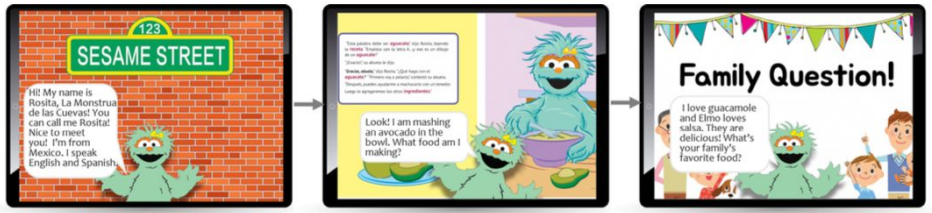


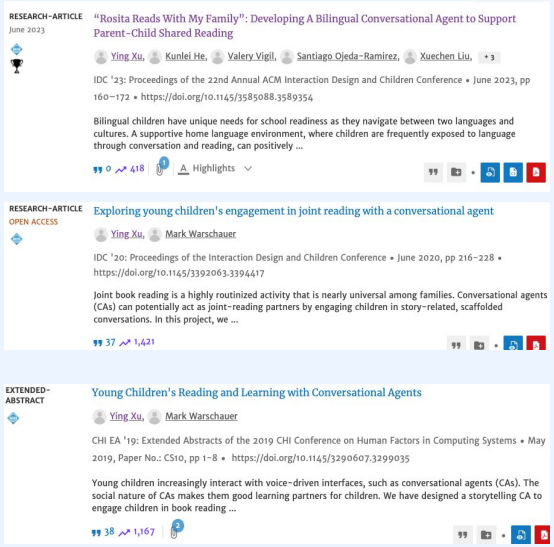
Rosita introducing herself, building rapport with families.

Rosita engaging children in **story-oriented** conversation by raising “child questions” and providing feedback or scaffolding that aims to facilitate comprehension.

Rosita encouraging **social-oriented** conversation by suggested a family question for parents and children to discuss.

About Author: Ying Xu

Conversational Agent for reading education



RESEARCH-ARTICLE
June 2023

"Rosita Reads With My Family": Developing A Bilingual Conversational Agent to Support Parent-Child Shared Reading

Ying Xu, Kunlei He, Valery Vigil, Santiago Ojeda-Ramirez, Xuechen Liu, +3

IDC '23: Proceedings of the 22nd Annual ACM Interaction Design and Children Conference • June 2023, pp 160–172 • https://doi.org/10.1145/3585088.3589354

Bilingual children have unique needs for school readiness as they navigate between two languages and cultures. A supportive home language environment, where children are frequently exposed to language through conversation and reading, can positively ...

0 418 | Highlights

RESEARCH-ARTICLE
OPEN ACCESS

Exploring young children's engagement in joint reading with a conversational agent

Ying Xu, Mark Warschauer

IDC '20: Proceedings of the Interaction Design and Children Conference • June 2020, pp 216–228 • https://doi.org/10.1145/3392063.3394417

Joint book reading is a highly routinized activity that is nearly universal among families. Conversational agents (CAs) can potentially act as joint-reading partners by engaging children in story-related, scaffolded conversations. In this project, we ...

37 1,421

EXTENDED-ABSTRACT

Young Children's Reading and Learning with Conversational Agents

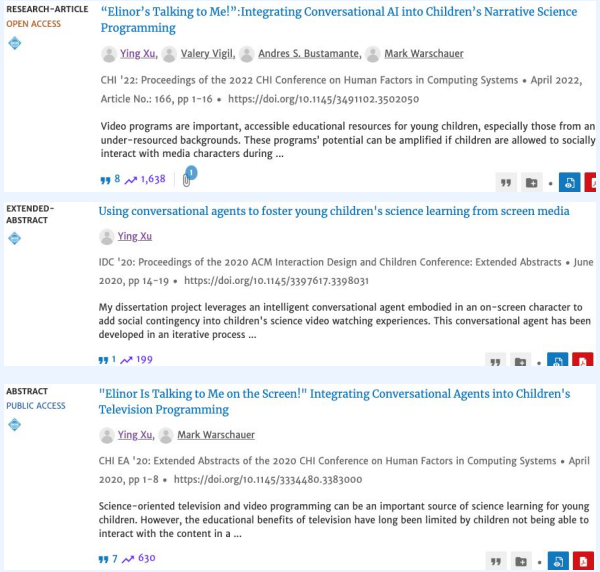
Ying Xu, Mark Warschauer

CHI EA '19: Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems • May 2019, Paper No.: CS10, pp 1–8 • https://doi.org/10.1145/3290607.3299035

Young children increasingly interact with voice-driven interfaces, such as conversational agents (CAs). The social nature of CAs makes them good learning partners for children. We have designed a storytelling CA to engage children in book reading ...

38 1,167

Conversational Agent for programming education



RESEARCH-ARTICLE
OPEN ACCESS

"Elinor's Talking to Me!":Integrating Conversational AI into Children's Narrative Science Programming

Ying Xu, Valery Vigil, Andres S. Bustamante, Mark Warschauer

CHI '22: Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems • April 2022, Article No.: 166, pp 1–16 • https://doi.org/10.1145/3491102.3502050

Video programs are important, accessible educational resources for young children, especially those from an under-resourced backgrounds. These programs' potential can be amplified if children are allowed to socially interact with media characters during ...

8 1,638

EXTENDED-ABSTRACT

Using conversational agents to foster young children's science learning from screen media

Ying Xu

IDC '20: Proceedings of the 2020 ACM Interaction Design and Children Conference: Extended Abstracts • June 2020, pp 14–19 • https://doi.org/10.1145/3397617.3398031

My dissertation project leverages an intelligent conversational agent embodied in an on-screen character to add social contingency into children's science video watching experiences. This conversational agent has been developed in an iterative process ...

1 199

ABSTRACT
PUBLIC ACCESS

"Elinor Is Talking to Me on the Screen!" Integrating Conversational Agents into Children's Television Programming

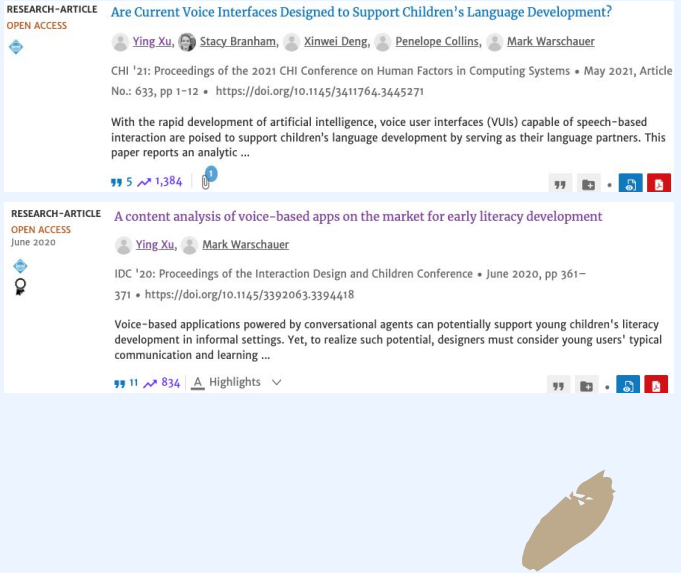
Ying Xu, Mark Warschauer

CHI EA '20: Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems • April 2020, pp 1–8 • https://doi.org/10.1145/3334480.3383000

Science-oriented television and video programming can be an important source of science learning for young children. However, the educational benefits of television have long been limited by children not being able to interact with the content in a ...

7 630

Conversational Agent for language/literacy development



RESEARCH-ARTICLE
OPEN ACCESS

Are Current Voice Interfaces Designed to Support Children's Language Development?

Ying Xu, Stacy Branham, Xinwei Deng, Penelope Collins, Mark Warschauer

CHI '21: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems • May 2021, Article No.: 633, pp 1–12 • https://doi.org/10.1145/3411764.3445271

With the rapid development of artificial intelligence, voice user interfaces (VUIs) capable of speech-based interaction are poised to support children's language development by serving as their language partners. This paper reports an analytic ...

5 1,384

RESEARCH-ARTICLE
OPEN ACCESS
June 2020

A content analysis of voice-based apps on the market for early literacy development

Ying Xu, Mark Warschauer

IDC '20: Proceedings of the Interaction Design and Children Conference • June 2020, pp 361–371 • https://doi.org/10.1145/3392063.3394418

Voice-based applications powered by conversational agents can potentially support young children's literacy development in informal settings. Yet, to realize such potential, designers must consider young users' typical communication and learning ...

11 834 | Highlights

About Author: IDC vs. CHI


RESEARCH-ARTICLE
June 2023

"Rosita Reads With My Family": Developing A Bilingual Conversational Agent to Support Parent-Child Shared Reading

Ying Xu, Kunlei He, Valery Vigil, Santiago Ojeda-Ramirez, Xuechen Liu, +3

IDC '23: Proceedings of the 22nd Annual ACM Interaction Design and Children Conference • June 2023, pp 160–172 • https://doi.org/10.1145/3585088.3589354

1. Introduction
2. Related Work
3. The design of "Rosita reads with my family"
4. Usability study
5. **Result**
6. Discussion
    - Using AI to support shared storybook reading
    - Designing for linguistic **minority communities**
    - Future directions


RESEARCH-ARTICLE
OPEN ACCESS

"Elinor's Talking to Me!":Integrating Conversational AI into Children's Narrative Science Programming

Ying Xu, Valery Vigil, Andres S. Bustamante, Mark Warschauer

CHI '22: Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems • April 2022, Article No.: 166, pp 1–16 • https://doi.org/10.1145/3491102.3502050

1. Introduction
2. Related Work
3. Design of the conversational videos
4. Usability study
5. **Randomized study to assess effectiveness**
6. Discussion
    - The Promise of Conversational Narrative Programming
    - **Some Design Considerations**
    - **Current Limitations** and Agenda for Future Research
    - A Note on Ethical Considerations

Who is Rosita?

- **Conversational Agent (CA)**
- **Understanding and processing both Spanish and English**
- **Providing responsive feedback based on the child's answer (fallback intent)**

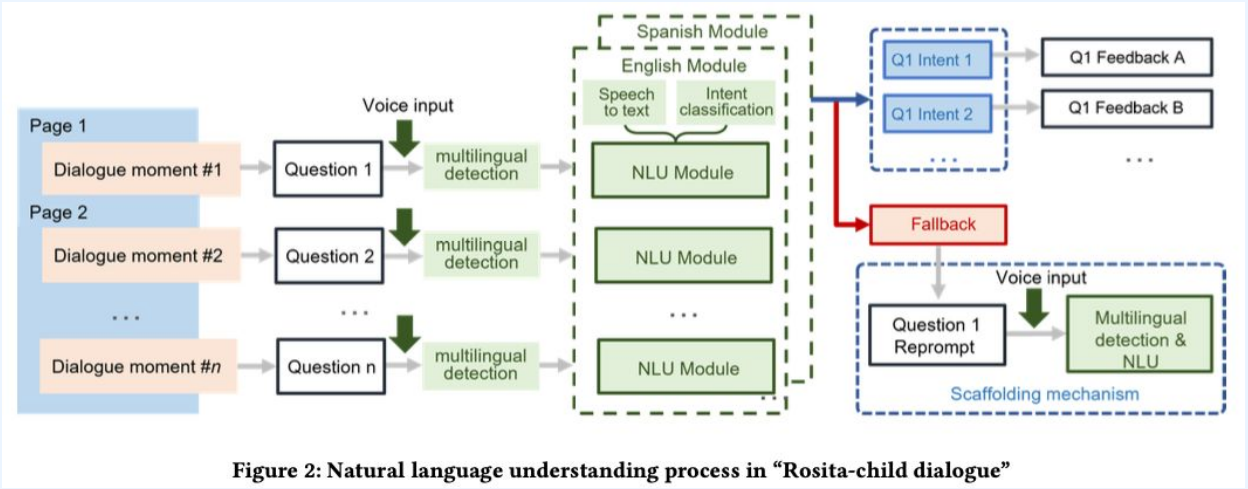


Figure 2: Natural language understanding process in "Rosita-child dialogue"

***NLU:** Natural Language Understanding. Complex processes like determining the intended meaning behind words, understanding context, discerning sentiment, and recognizing the various structures and nuances of language.

***Scaffolding:** instructional techniques used to move students progressively toward stronger understanding and, ultimately, greater independence in the learning process (e.g., hints, prompts, or a sequence of steps to follow)

What is Rosita?

Question for Children

Rosita engaging children in **story-oriented** conversation by raising "child questions" and providing feedback or scaffolding that aims to facilitate comprehension.

Subsequent Question for family

Rosita encouraging **social-oriented** conversation by suggested a family question for parents and children to discuss.

Dialogic Reading
Open-Ended Questions

- Support dialogue in two language and accommodate the unique linguistic flexibility of bilingual children.
- Encourage parents from co-reading with their child.

Research Questions?

Question for Children

Rosita engaging children in **story-oriented** conversation by raising "child questions" and providing feedback or scaffolding that aims to facilitate comprehension.

Subsequent Question for family

Rosita encouraging **social-oriented** conversation by suggested a family question for parents and children to discuss.

Dialogic Reading
Open-Ended Questions

- What types of parent-child interactions and language usage patterns emerge during families' reading sessions?
- How do parents and children perceive co-reading with Rosita?

User study & Data Analysis

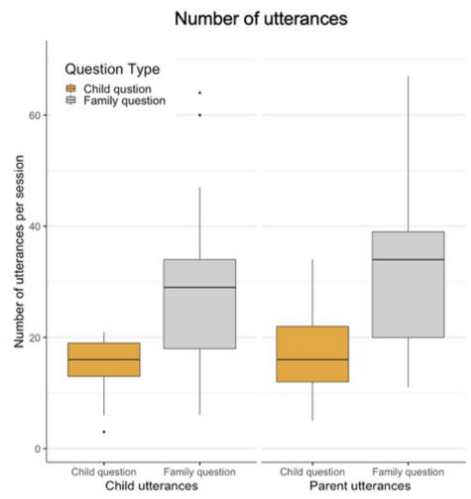
- Each of questions marked the beginning of a coding unit
- Each unit included all parent or child utterances made in response to the question but prior to Rosita's subsequent question.

- Coded all video recordings and transcriptions
- Utterance: a complete thought or idea contained within a word, phrase, or sentence.
- Criteria to capture conversation productivity
  (1) whether a child/parent verbally engaged in each unit,
  (2) the number of utterances,
  (3) the word length of each utterance.
- For bilingual choice, classified each utterance
  (1) English, (2) Spanish
  (3) code-switching between English and Spanish in one utterance.
- For interaction style, a four-category framework
  - Parent-Driven
  - Rosita-Driven
  - Parent-Rosita-Co-Driven
  - Children-Driven

Findings

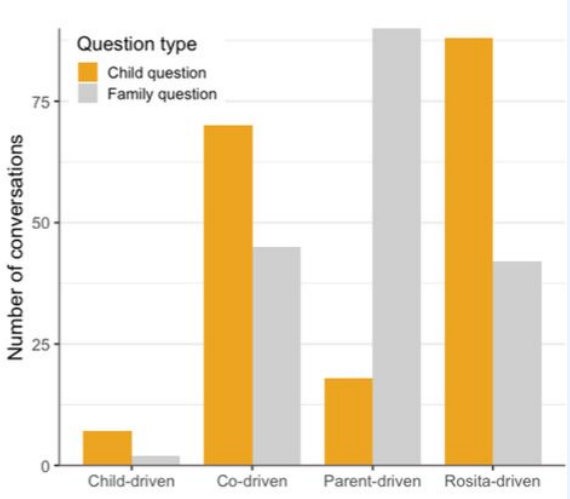
What types of parent-child interactions and language usage patterns emerge?

Conversation productivity



- Both parents and children use more utterance when they got family questions.

Interaction Style

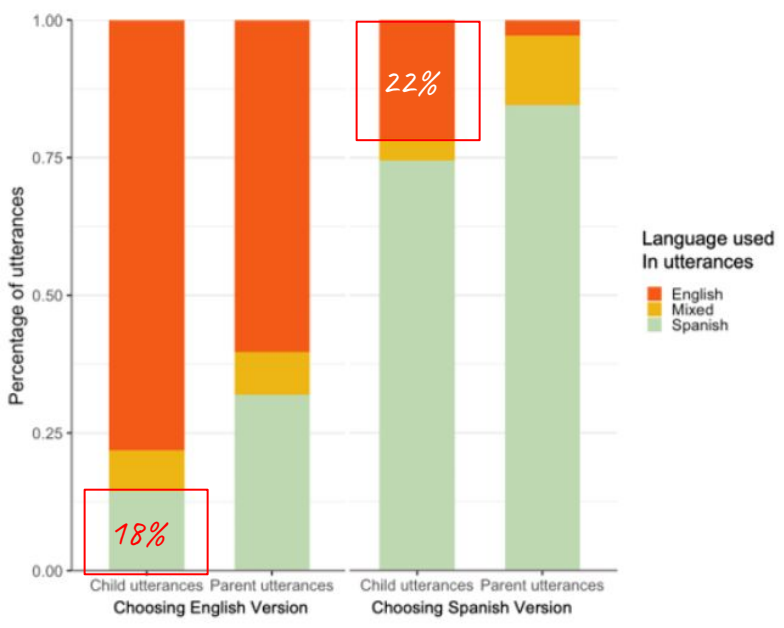


- Parent-driven conversation generates more conversation when they got family questions.

Q. What can we take away from these findings?

Findings

What types of parent-child interactions and language usage patterns emerge?



Percentage of code (language) switching

Q. Are these figures meaningful to show the effectiveness of CA in bilingual education?

Other children/siblings in the home were reported as speaking to the child in Only Spanish (22%), Spanish and English (31%), or Mostly English (47%) (Collins, 2014).

Collins, B. A. (2014). Dual language development of Latino children: Effect of instructional program type and the home and school language environment. Early Childhood Research Quarterly, 29(3), 389–397. https://doi.org/10.1016/j.ecresq.2014.04.009

Findings

How do parents and children perceive co-reading with Rosita?

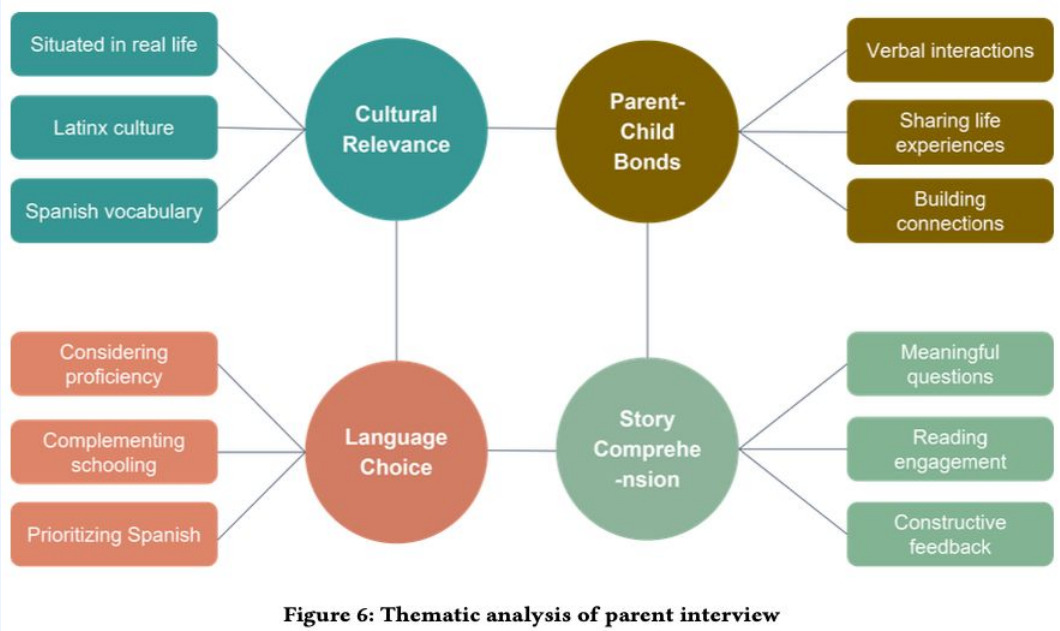


Figure 6: Thematic analysis of parent interview

Q. What could be the unique findings related to CA?

Findings

How do parents and children perceive co-reading with Rosita?

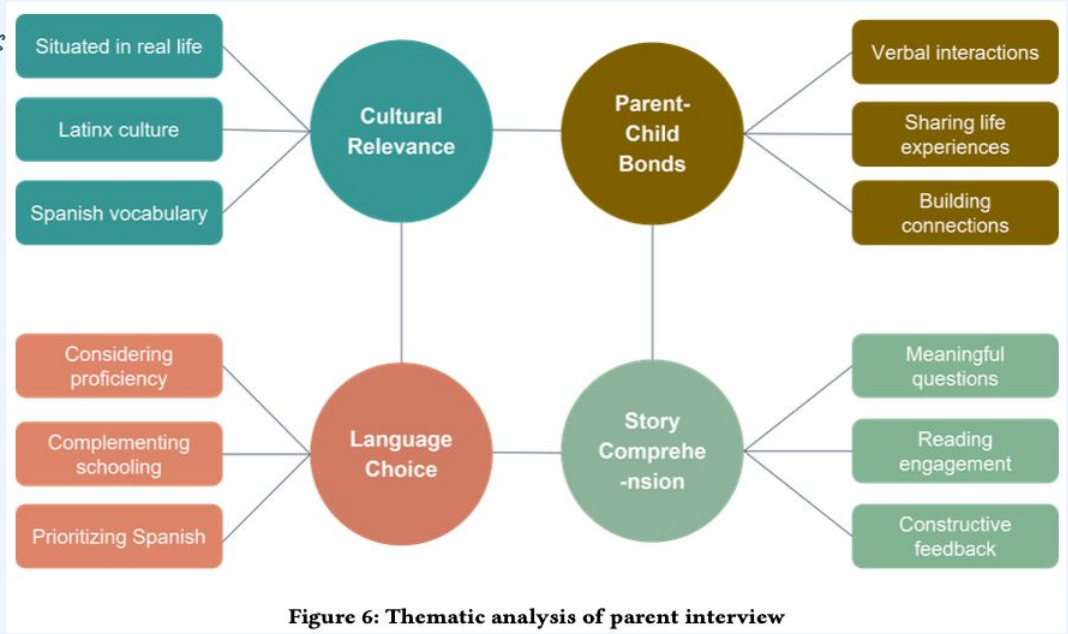


Figure 6: Thematic analysis of parent interview

Story including cultural factors

Bilingual Reading

Bilingual Reading

CA (Responsive Fallback)

Bilingual Reading

Bilingual Reading

Co-Reading

Story including cultural factors

Co-Reading

CA (Open-Ended)

CA (Open-Ended)

CA (Responsive Fallback)

What makes this paper the best paper?

Welcome to IDC'23

We are pleased to announce the 22nd annual **ACM Interaction Design and Children (IDC) Conference** to be held on **June 19-23, 2023** at Northwestern University in Chicago, Illinois. IDC is the premier international conference for researchers, educators and practitioners to share the latest research findings, innovative methodologies and new technologies in the areas of inclusive child-centered design, learning and interaction. IDC'23 is hosted by the Center for Computer Science and Learning Sciences at Northwestern University.

Implementation of bilingual CA,
Implementation of e-book
with co-reading feature,

The latest findings of
how multicultural family
use CA in reading education

Bilingual Children-centered

CA, NLU

What parts would be good to add/edit if authors want to submit this paper to other technical/educational venues?

What could be a limitation or negative impact of conversational AI for children?

Showing face in video instruction:

effects on information retention, visual attention, and affect.

René et al. CHI (2014).

Showing face in video instruction:

effects on information retention, visual attention, and affect.

René et al. CHI (2014).

Showing face in video instruction:

effects on information retention, visual attention, and affect.

René et al. CHI (2014).

Overview - Quote from Abstract

“We conducted an experiment with eye-tracking and recall tests to investigate how adding the instructor’s face to video instruction affects information retention, visual attention, and affect.”

Overview - Quote from Abstract

“We conducted an experiment with eye-tracking and recall tests to investigate how adding the *instructor’s face to video instruction* affects information retention, visual attention, and affect.”

Overview - Quote from Abstract

“We conducted an experiment with eye-tracking and recall tests to investigate how adding the *instructor’s face to video instruction* affects information retention, visual attention, and affect.”

Overview - Quote from Abstract

CHI 2014
One of a CHInd
chi.acm.org/chi-series/

"We conducted an experiment with eye-tracking and recall tests to investigate how adding the *instructor's face to video instruction* affects information retention, visual attention, and affect."

chi.acm.org/chi-series/

What is “affect?”

“In education, affect is broadly defined as the attitudes, emotions, and values present in an educational environment”

(en.wikipedia.org/wiki/Affect_(education)).

Overview - Contributions

“We conducted an experiment with eye-tracking and recall tests to investigate how adding the *instructor’s face to video instruction* affects information retention, visual attention, and affect.”

Overview

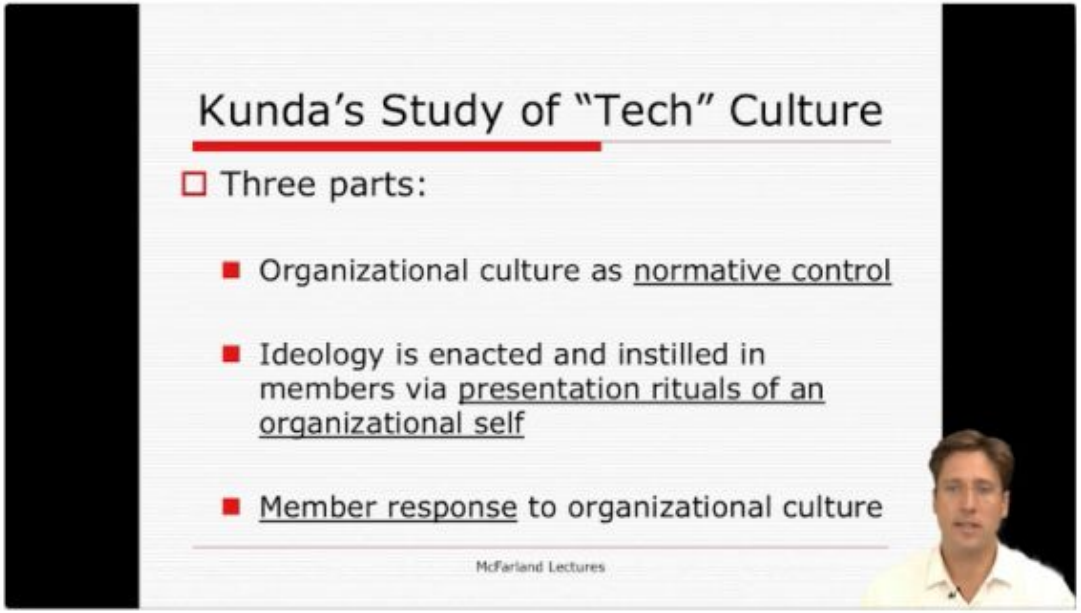


Figure 1. Example of video instruction with lecture slides in the background and a picture-in-picture of the instructor's face. Screenshot courtesy of D. A. McFarland.

Importance

- “In 2012, **32% of higher education** students took at least one course online [1].”
- “One of the largest providers of massive open online courses (MOOCs), Coursera, went from **zero to 2.9 million** registered users from more than **220 countries** in their first year of operation [38].”

Related Work

- “Recent **ethnographic findings** suggest that **video-based courses facilitate a richer interaction between learners and the instructor**, who reportedly seems more present and real to learners; moreover, learners in such courses find the **learning experience similar to face-to-face instruction** [4].“

- **Baddeley’s Theory of Working Memory**: “…separate processing units are employed for different input modalities: one area of working memory, called the visual-spatial ‘sketchpad’, **stores visual input** while another area, the phonological loop, **stores auditory information**.”

Research Questions

- **RQ1: “**Are recall scores higher, lower, or equal if the instructor’s face is present in the lecture video than when it is absent?”
  - **RG:** “...**conflicting** views on the effect of the instructor’s face on learning outcomes.”

- **RQ2: “**Do learners prefer audiovisual instruction with or without the instructor’s face? How do learners rate the experience with and without the instructor’s image on a set of descriptive adjectives?”
  - **RG:** “...**conflicting** evidence on learner’s affective response to the face.”

Research Questions

- **RQ1: “**Are recall scores higher, lower, or equal if the instructor’s face is present in the lecture video than when it is absent?”
- **RQ2: “**Do learners prefer audiovisual instruction with or without the instructor’s face? How do learners rate the experience with and without the instructor’s image on a set of descriptive adjectives?”

Hypotheses

- **H1: “**Preferences for information presentation moderates the effect of the presence of the face on recall ability.”
- **H2: “**The transition rate is higher for learners who prefer visual than verbal information.”

Methods

“We conducted an experiment with eye-tracking and recall tests to investigate how adding the instructor’s face to video instruction affects information retention, visual attention, and affect.”

- Eye-Tracking
- Questionnaire
  - pre-stimulus questionnaire
  - post-stimulus questionnaire
- Recall Tests
  - short-term recall test (~3 minutes after lecture)
  - medium-term recall test (5 days after lecture)

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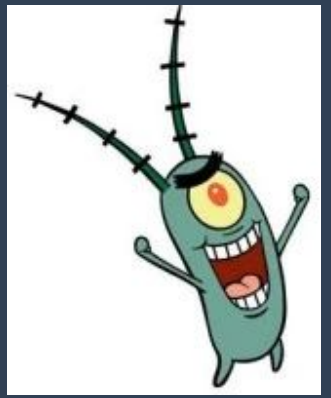
Findings



https://nicktoonsheroes.fandom.com/wiki/Sheldon_J._Plankton

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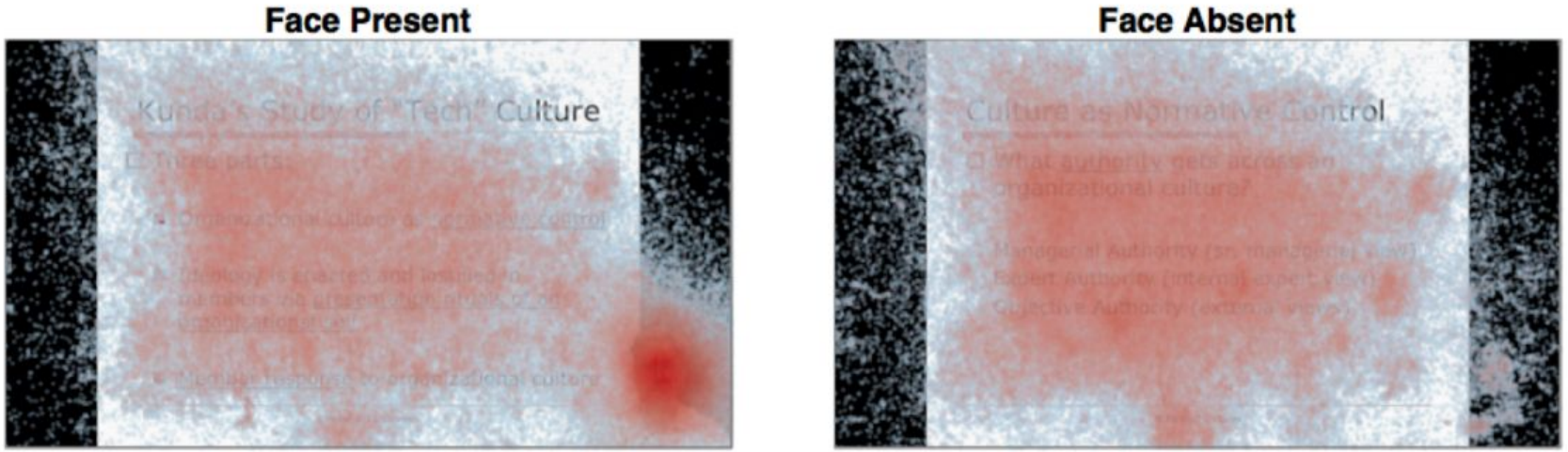

Figure 2. Heatmap of visual attention aggregated for all segments where the face was present or absent with exemplary screenshot in the background. Screenshot courtesy of D. A. McFarland.

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- **RQ1: "**Are recall scores higher, lower, or equal if the instructor's face is present in the lecture video than when it is absent?"
  - "All participants' ratings of which video segments they preferred **were strongly in favor** of showing the face, with 15 out of 22 participants extremely preferring segments with the face."
  - "...participants indicated that the sections of the lecture video where the face was present were **more helpful and useful**... while the sections without the face were more **frustrating, annoying, and confusing**"
  - "...participants who self-reported to **prefer learning from verbal** rather than visual information more strongly indicated that sections with the face were **more helpful and useful**."

Research Questions

- **RQ2: "**Do learners prefer audiovisual instruction with or without the instructor's face? How do learners rate the experience with and without the instructor's image on a set of descriptive adjectives?"
  - "...strong evidence that whether or not the face is present has **no effect on recall ability**, neither immediately after the lecture, nor five days later (medium-term recall)."
  - "...present study suggests that although **learners strongly prefer video instruction with the instructor's face** and their watching behavior is profoundly changed by including the face, they do not perform significantly better or worse on knowledge recall tests compared to without the face."
  - "...participants indicated that the sections of the lecture video where the face was present were **more helpful and useful**... while the sections without the face were more **frustrating, annoying, and confusing**"

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Main Takeaway

"More **fine-grained analytics** combining eye-tracking with **detailed learning assessment** could shed light on the mechanisms by which the face aids or hinders learning."

Thanks!