

# Mobile, Low-Bandwidth and Low-Tech.

## The Story of Chi-Square Mobile

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2022-07-27

## About us

- ▶ Aleksander Dietrichson
- ▶ John Whitmer
- ▶ Chi Square Labs

## Context

- ▶ Argentina goes into lockdown in March 2020
- ▶ Instruction is emergency online
- ▶ Typically defaulting to video-conferencing
- ▶ Only 41.4% of students have access to a computer
- ▶ 84% access the internet primarily through a mobile device
- ▶ Prior experience found that teachers hesitant to use dashboards disconnected from instruction

Any solution we propose must be mobile first.

# The Feedback Loop

- ▶ Instructor teaches an online session
- ▶ Feedback is immediately requested from students
- ▶ Reported in realtime
- ▶ Recommendations made by AI

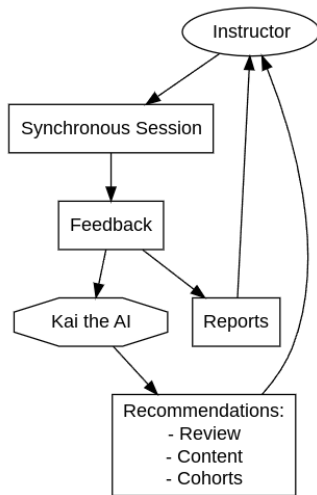


Figure 1: The Feedback Loop

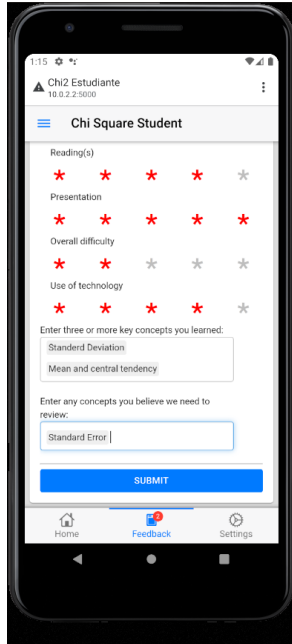
# Summary of Approaches

- ▶ Emergency alpha (March 2020)
- ▶ Alpha 2.0 (April 2020)
- ▶ Beta 1.0 (August 2021)

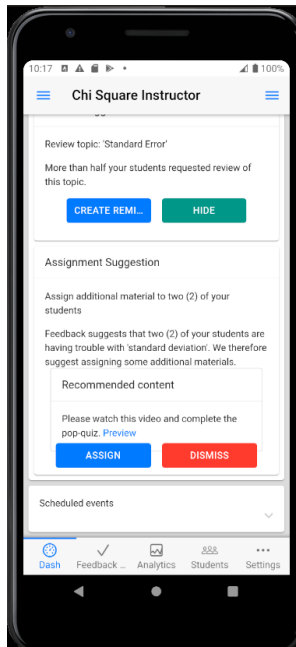
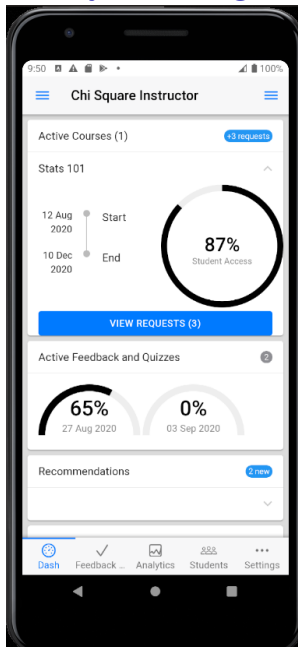
## First try: “Emergency alpha”

- ▶ Shiny + {shinyMobile}
- ▶ Backend in mariaDB (AWS)
- ▶ Authentication with {cognitoR}
- ▶ Distributed as a PWA

# First try: “Emergency alpha”



# First try: “Emergency alpha”





## First try: “Emergency alpha”

- ▶ works
- ▶ updates quickly
- ▶ lightweight on devices
- ▶ cross-platform
- ▶ bandwidth issues detected
- ▶ not a native app
- ▶ not scalable

## Alpha 2.0

- ▶ Used template from Android community.
  - ▶ e.g.: <https://github.com/chi2labs/androidApps>
- ▶ Quick updates since we're still showing a shiny app
- ▶ Playstore distribution
- ▶ Requires *some* knowledge of java
- ▶ still not scalable
- ▶ Android only

# In the wild

## ¿Qué aprendimos? La herramienta de “feedback”



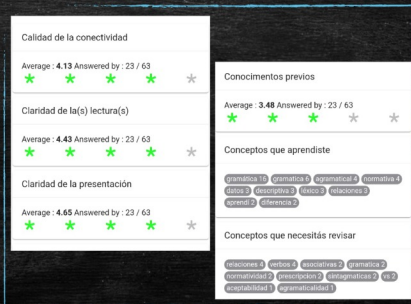
I FEEDBACK!

$\chi^2$

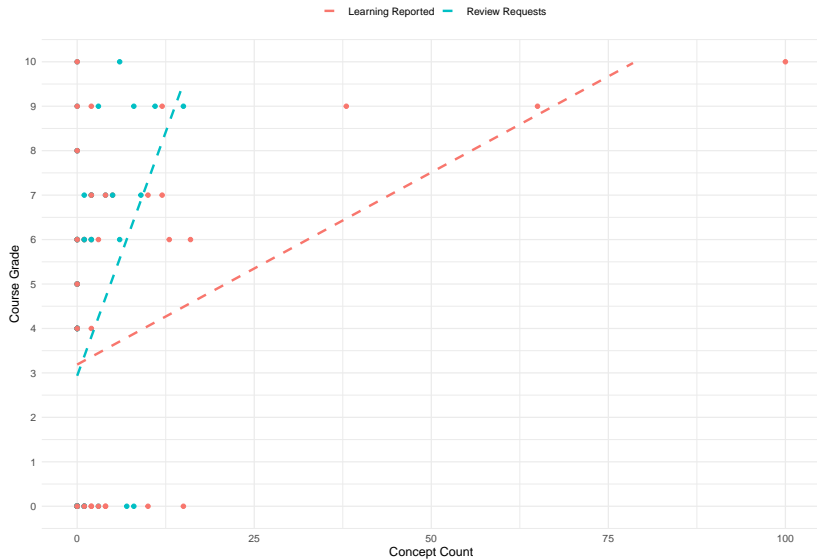
<https://chi2.shinyapps.io/chi2mobile/>

<https://play.google.com/store/apps/details?id=chi2labs.chi2mobile>

Código del curso:  
WHNfw38KsJWOjraiYSUa



# The research track



# The research track

- ▶ Most distributions are non-normal and some important outliers found in the data. Furthermore grades are on an ordinal scale, therefore:
  - ▶ Kendall's Tau (rank correlation)
  - ▶ Ordinal regression
- ▶ Encouraging results
  - ▶ Strong correlation ( $\text{Tau} > .3$ ) found
  - ▶ Predictive after three weeks use
  - ▶ Good feedback from instructors

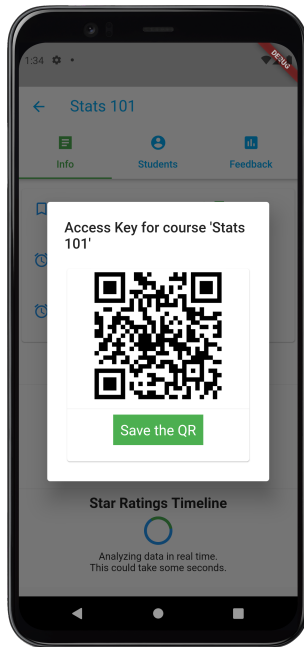
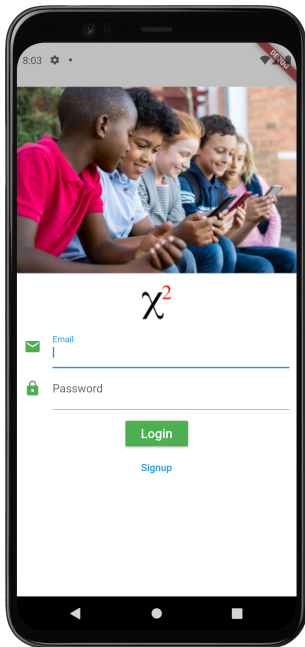
# NLP issues

- ▶ Plenty of pretrained models for general and specific purposes (e.g. medical/legal)
- ▶ Context of course becomes very specific (invalidating general models)
- ▶ Input issues
- ▶ Spanish v. English

## Beta 1.0

- ▶ True native app with **Flutter**
- ▶ Backend moved to Firebase (Google Cloud)
- ▶ Authentication by Google
- ▶ Analysis in R with plumber API for JIT calculations
- ▶ Content recommendations
- ▶ Email interface

# Beta 1.0





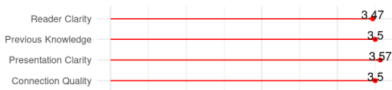
## Email integrated {blastula}

Dear Professor Whitmer.

Here are the results from the latest feedback request for your course *Stats1*. The feedback was in relation to the class *Centralization and dispersion* and expired on December 16, 2021

### Star Ratings

Summary of responses to the star-ratings questions:



### Concepts Learned and Review Requests

Concepts by Category

#### Concepts Learned Review Requests

range	mean
deviation	range
mean	variance
standard	median
median	deviation

## Feedback from instuctors

“It would be nice to have a unified dashboard online with all the information.”

— Prof. Cecilia Magadán

# Instructor dashboard

My Courses Gramática 2021 Unsam

## Gramática 2021 Unsam

### Summary ⓘ

33

Students

10

Requests Made

84

Submissions

25.45 %

Submissions Completed

### Feedbacks ⓘ

Click on a feedback title for details.

Show 10 entries

Search:

name ⓘ	type ⓘ	perc_completed ⓘ	startDate ⓘ	endDate ⓘ
Clase 2	feedback1	36.36	2021-08-13 14:10:00	2021-08-19 02:30:00
Clase 3	feedback1	36.36	2021-08-20 00:05:00	2021-08-26 00:06:00
Clase 4	feedback1	36.36	2021-08-27	2021-09-02 02:30:00

### Students ⓘ

Click on a student for details.

Show 10 entries

Search:

lastname ⓘ	firstname ⓘ	email ⓘ	firstLogin ⓘ	lastLogin ⓘ
Alderete	Sofia	sofiaalderete558@gmail.com	2021-08-19T22:17:48Z	2021-09-17T13:47:15Z
Arce	Florencia	fiore86@gmail.com	2021-08-20T00:08:49Z	2021-09-17T00:12:59Z

# Instructor dashboard

## Content Recommendations

### funcional

Topic: funcional

Type:

Reference: es.linkedin.com

Applies to: 1 students

Preview: [View](#)

### clases de palabras

Topic: clases de palabras

Type:

Reference: openbooks.library.umass.edu

Applies to: 1 students

Preview: [View](#)

### ambigüedad categorial

Topic: ambigüedad categorial

Type: PDF/Adobe Acrobat

Reference: www.infoamerica.org

Applies to: 1 students

Preview: [View](#)

### adjetivos

Topic: adjetivos

Type:

Reference: www.significados.com

Applies to: 1 students

Preview: [View](#)

# Contact Info

Website:

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Repos:

- ▶ <https://github.com/chi2labs>
- ▶ <https://github.com/dietrichson>