



Scaling inclusive learning design  
with FeedbackFruits

ISE Education Technology summit  
Barcelona, Spain | 1 February 2022

# Who are we?

2



Ziwei **Jo** Huang

Product Manager, R&D

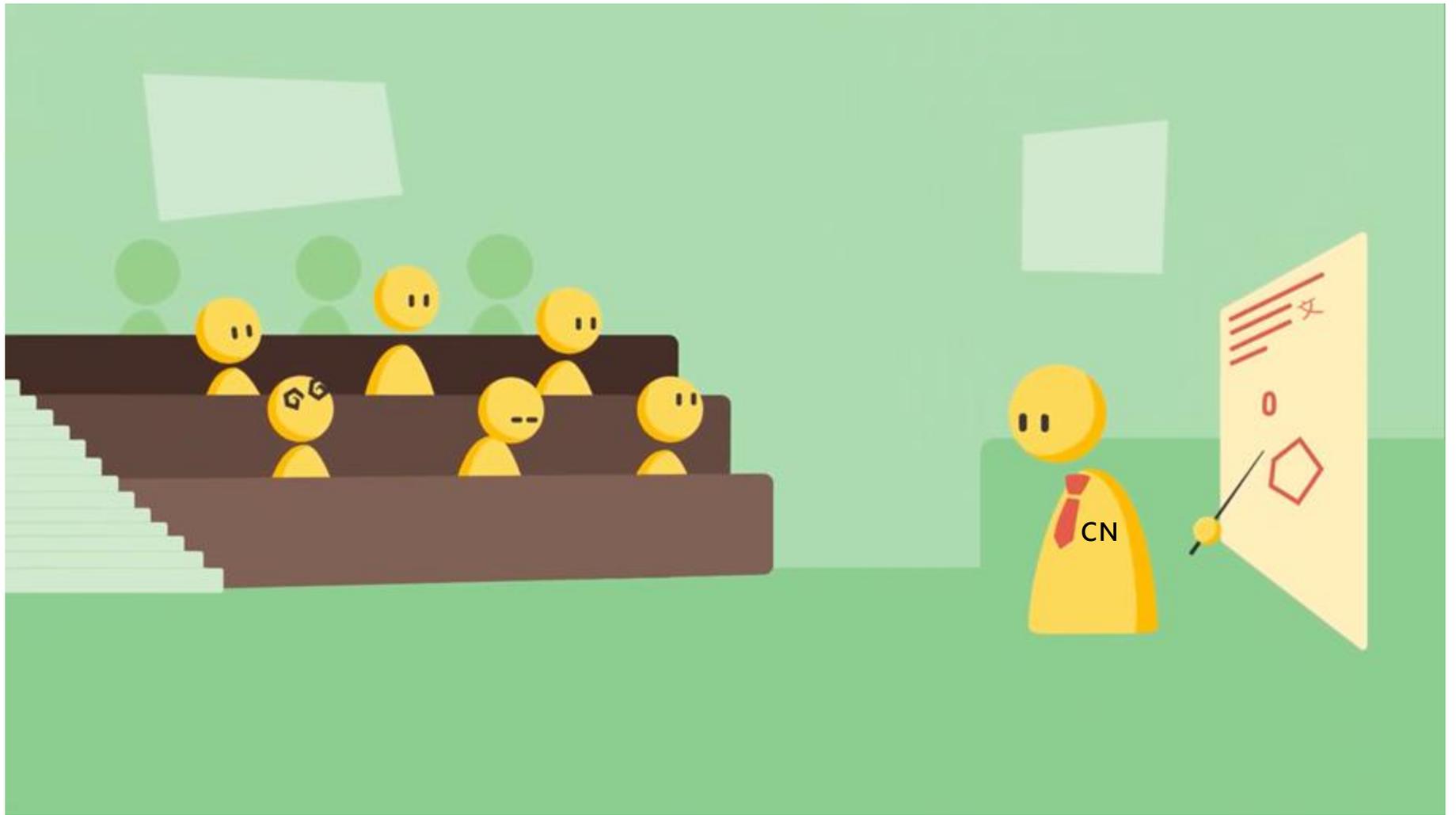
MSc Applied Linguistics  
University of Oxford

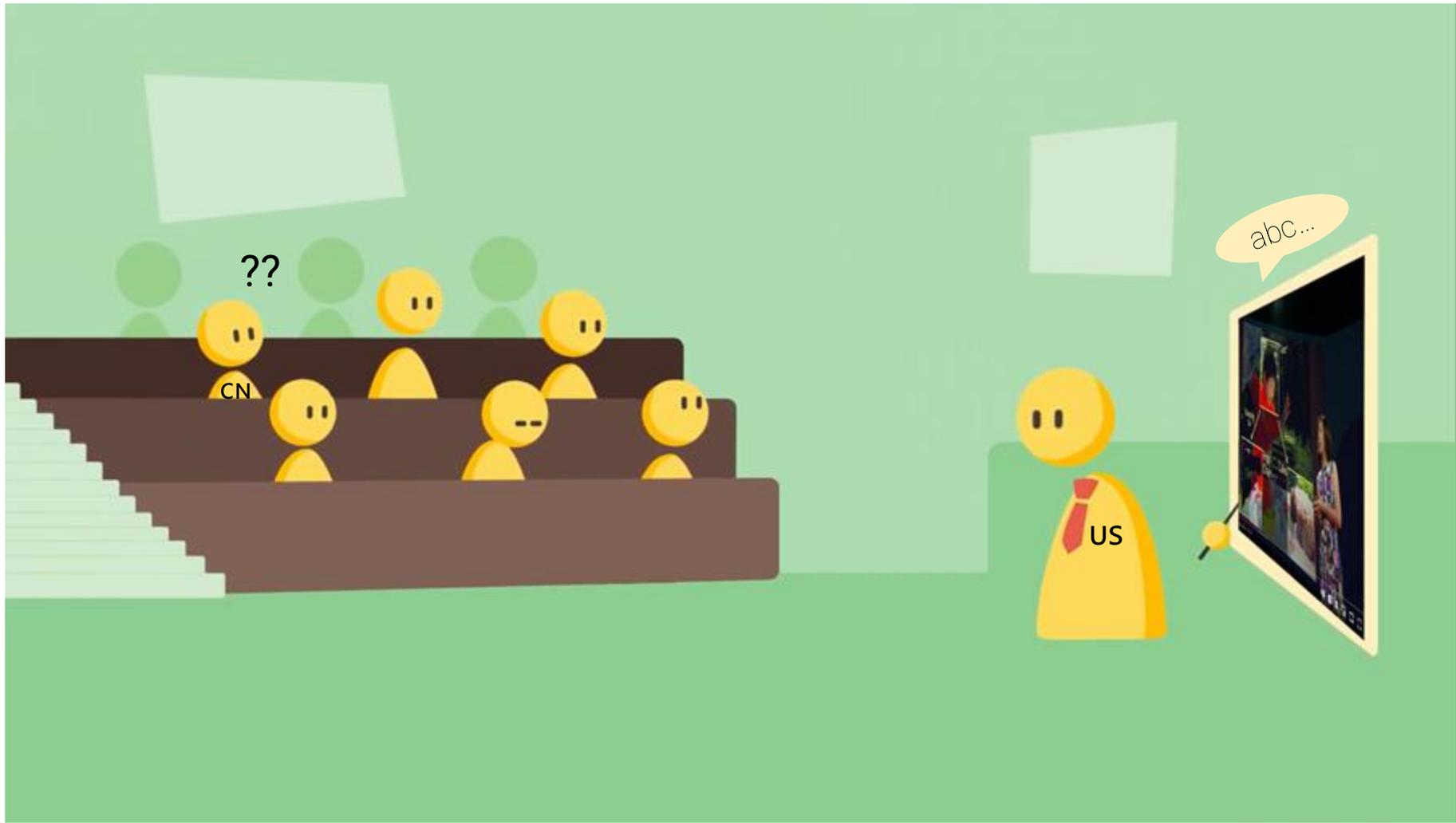


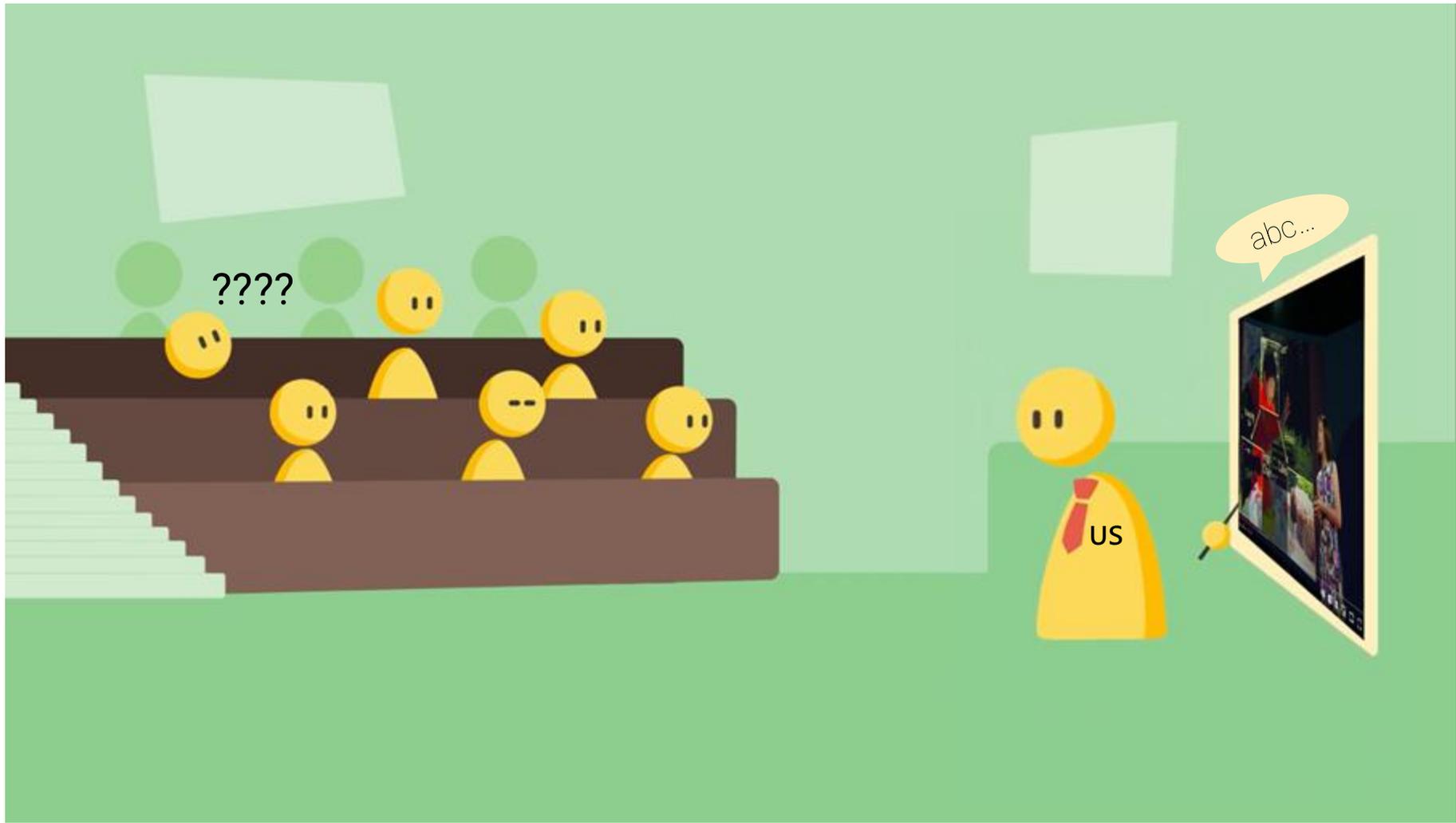
**Maria** Uglvig

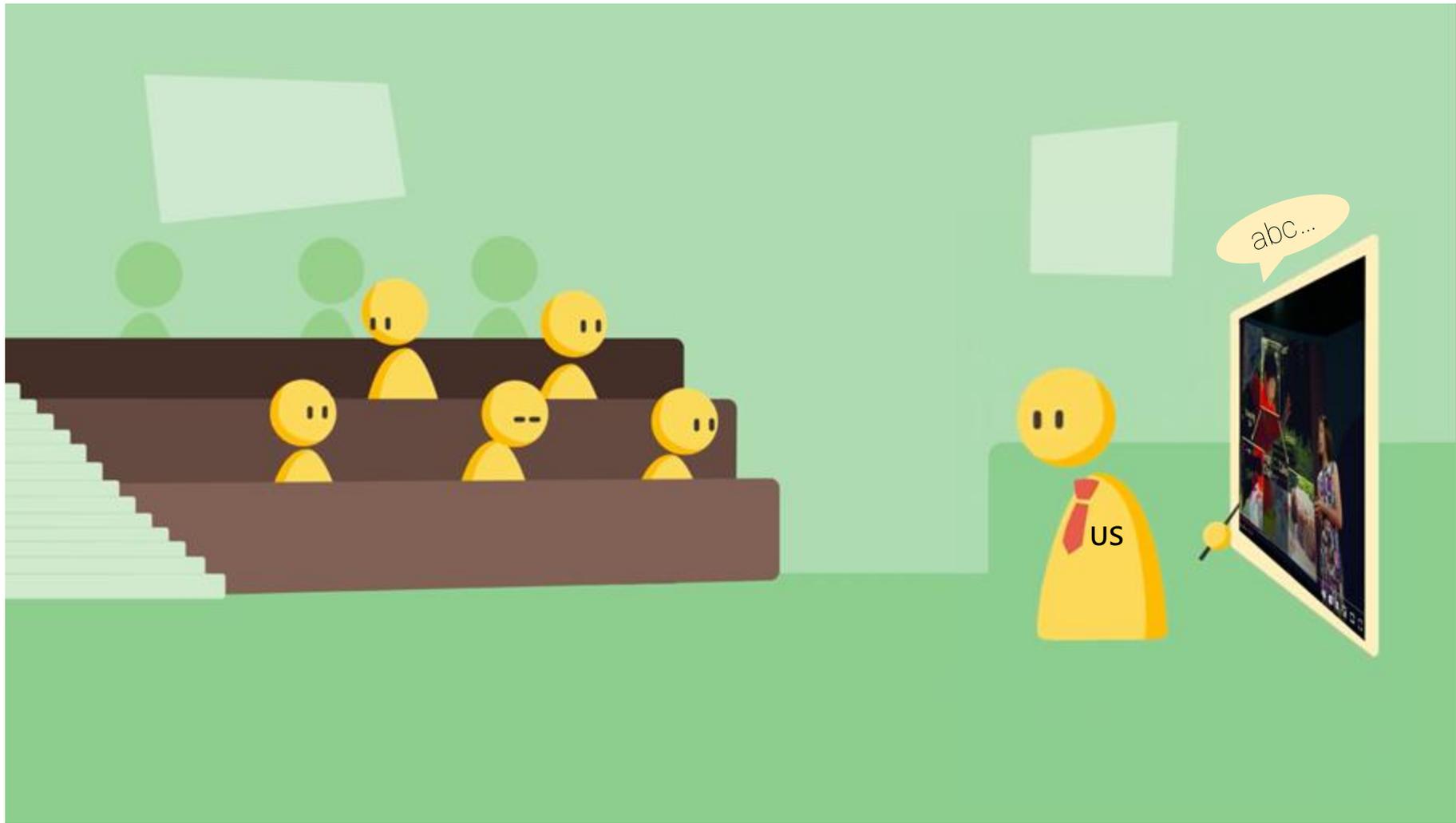
Product Manager, Platform

MSc Organizational Psychology  
University of Groningen

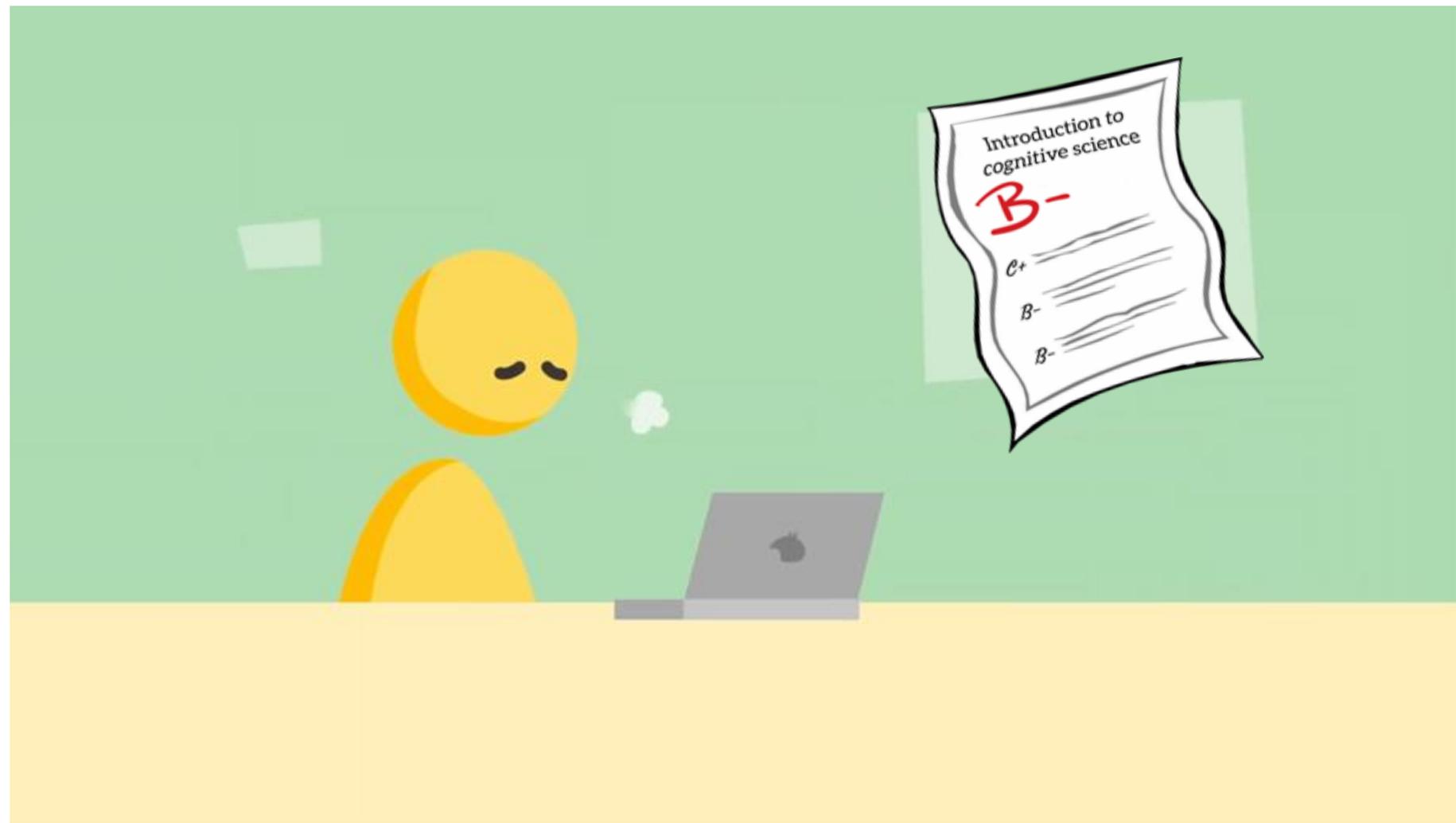












Introduction to  
cognitive science

**B-**

C+

B-

B-

# FeedbackFruits Integrated Teaching and Learning System

## Feedback & Assessment

-  Group Member Evaluation
-  Peer Review
-  Skill Review
-  Assignment Review
-  Automated Feedback
-  Self-Assessment

## Collaborative learning and student discussion

-  Interactive Study Material
-  Comprehension
-  Discussion on work
-  Discussion on Topic

## Synchronous learning

-  Interactive Presentation
-  Quiz
-  Team Based Learning



# FeedbackFruits Integrated Teaching and Learning System

## Feedback & Assessment

-  Group Member Evaluation
-  Peer Review
-  Skill Review
-  Assignment Review
-  Automated Feedback
-  Self-Assessment

## Collaborative learning and student discussion

-  Interactive Study Material
-  Comprehension
-  Discussion on work
-  Discussion on Topic

## Synchronous learning

-  Interactive Presentation
-  Quiz
-  Team Based Learning



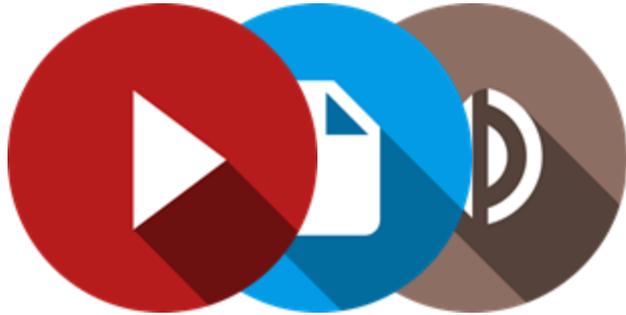
NO CLUE GETS IT

??



NO CLUE | GETS IT





# Interactive Study Material

Interactive Document, Video, Audio

Engage students by letting them interact with the study material, for example, by answering questions or discussing with each other.

**Pedagogical challenge:**

Passive consumption of study material

# Interactive Study Material

## Students read the instructions and open the video

1

### Instructions



Dear Students,

Please place comments on a fragment of the video that you find interesting and/or difficult to comprehend. We will discuss the comments with most upvotes during the following class session. By commenting and reflecting on the Ted talk video clip, you will deepen your understanding on the topic (learning objective) central in this course. I have already added an example discussion comment. Remember there are no such things as

bad discussion points or questions... Enjoy!

2

### Video

100% of your grade



Now open

#### In-video activities



Answer 8 question cards

Your progress 63%

41.2% grade (out of 45%)



Join discussion (currently 13 threads)

Your progress 75%

35% grade (out of 55%)

#### Student contributions



11 discussion threads

# Interactive Study Material

## Students watch

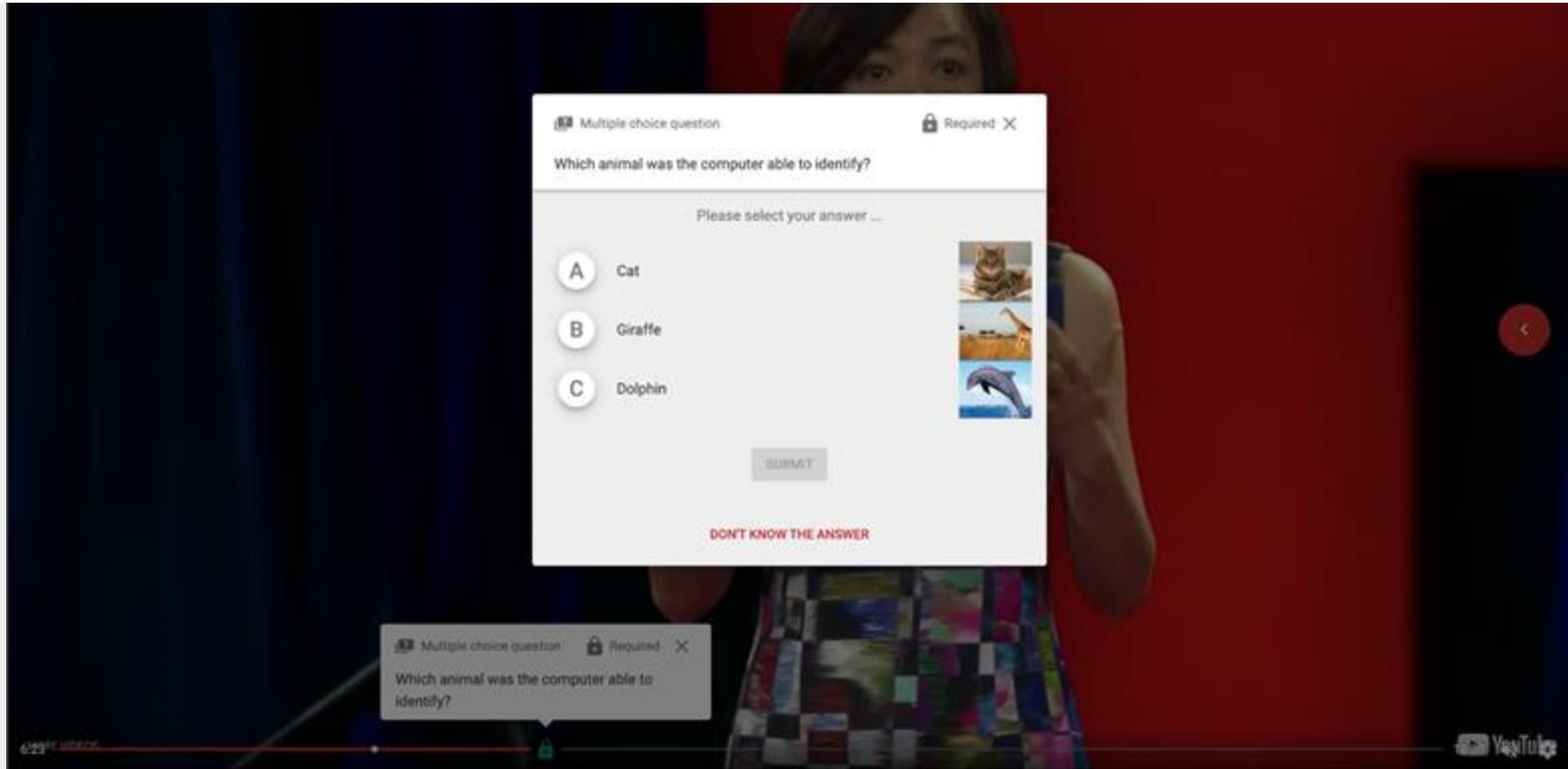
The image shows a video player interface. The main video area displays the text: "Vision begins with the eyes, but truly takes place in the brain." with a play button icon in the center. Below the video, there is a list of contributions from students. The contributions are as follows:

- Contributions**
  - Sorted on location
  - Liz Bennett** (a year ago)
    - min 0:13
    - This is a controversial topic
    - 1 like
    - REPLY
    - 2 replies
  - Multiple choice question** (Answered)
    - min 0:21
    - How does this relate to X?
  - Multiple choice question** (Incorrect)
    - min 1:11
    - What is she talking about?
  - Emily Collins** (2 months ago)
    - min 1:11
    - Please note this...
    - REPLY
  - Open question** (Incorrect)
    - min 1:43
    - What example does the presenter use here?
  - Olivia Johnson** (2 years ago)

The video player controls at the bottom include a progress bar, volume icon, and the YouTube logo.

# Interactive Study Material

## They answer practice questions



A woman is holding a tablet that displays a multiple-choice question. The question asks, "Which animal was the computer able to identify?" and provides three options: A Cat, B Giraffe, and C Dolphin. There are small images of a cat, a giraffe, and a dolphin next to the options. The tablet also has a "SUBMIT" button and a "DON'T KNOW THE ANSWER" link. A smaller, semi-transparent version of the question is visible in the bottom left corner of the tablet screen.

Multiple choice question Required X

Which animal was the computer able to identify?

Please select your answer ...

A Cat 

B Giraffe 

C Dolphin 

SUBMIT

[DON'T KNOW THE ANSWER](#)

Multiple choice question Required X

Which animal was the computer able to identify?

6:29 AM 10/26/2016

YouTube

# Interactive Study Material

## Which helps to get insight into students' understanding

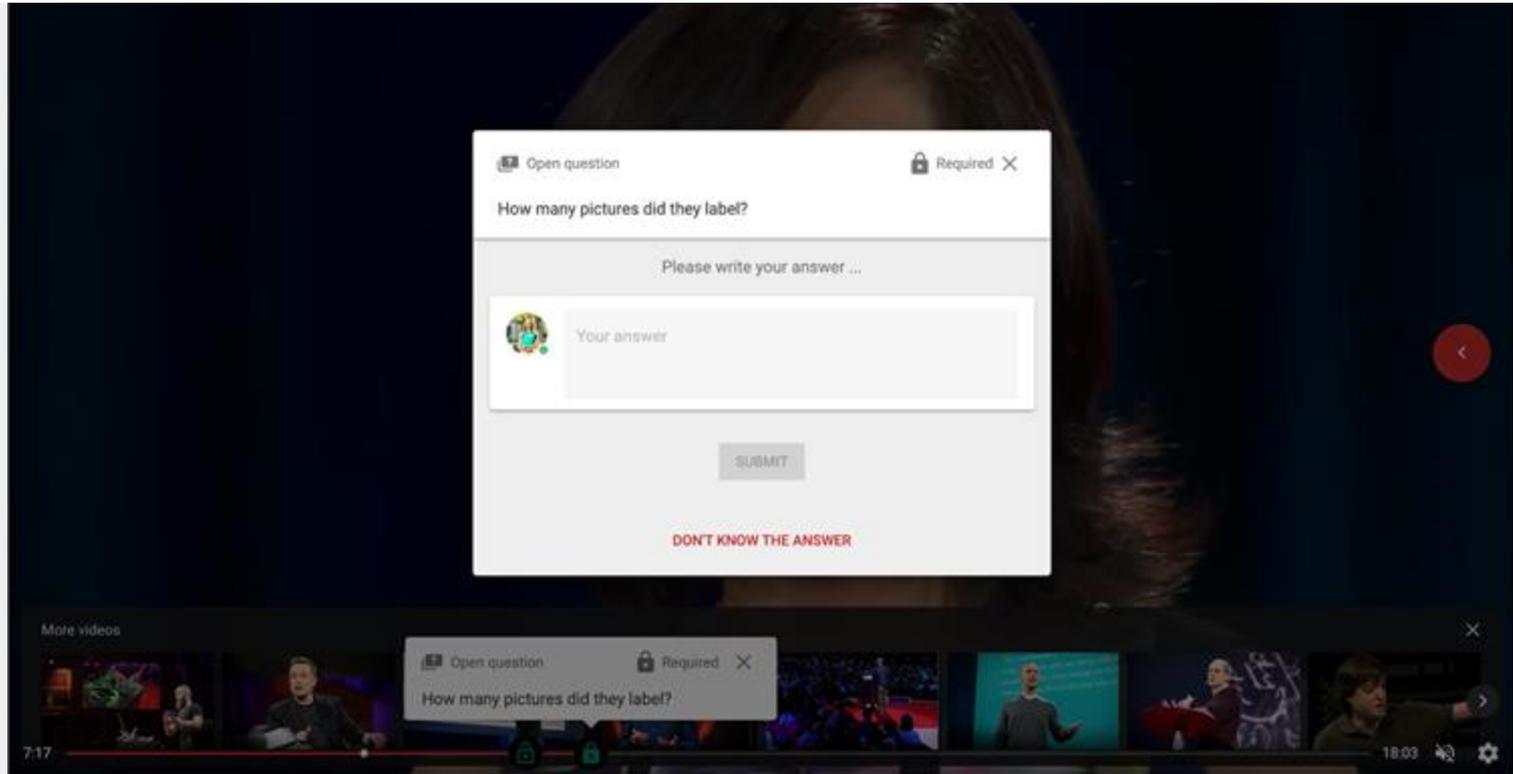
The image shows a video player interface for a TED talk. The main video area displays a woman on a stage with a large screen behind her showing a cat and a child. A white overlay box in the bottom center of the video contains a multiple-choice question: "Which animal was the computer able to identify?" with 5 answers out of 18. Below the question, it shows "60% answered correct" and "40% answered incorrect". A "DETAILS" link is also present.

On the right side, a detailed view of the question is shown. It is titled "Multiple choice question" and is marked as "Required". It has a duration of "min 6:21". The question text is "Which animal was the computer able to identify?" with "5 answered out of 18". The options are:

- Cat 60% 
- Giraffe 20% 
- Dolphin 20% 

# Interactive Study Material

## These can be multiple choice or open questions



The image shows a video player interface with a white question overlay. The overlay is titled "Open question" and includes a "Required" indicator. The question text is "How many pictures did they label?". Below the question is a text input field with the placeholder "Please write your answer ...". The input field contains a small profile picture and the text "Your answer". At the bottom of the overlay are two buttons: "SUBMIT" and "DONT KNOW THE ANSWER". The video player background is dark, and a red circular navigation button is visible on the right. At the bottom of the video player, there is a "More videos" section with a row of video thumbnails. A smaller version of the question overlay is also visible over the middle thumbnail. The video player controls at the bottom show a progress bar at 7:17, a volume icon, and a settings icon.

# Interactive Study Material

Students indicate whether their answer is correct on open questions

The image shows a video player interface with a central overlay for an interactive question. The overlay is titled "Open question" and contains the following text:

How many pictures did they label?

Answer submitted  
Answering locked. Your answer is received

**Correct answer**

 Annika Borgstede  
1 billion

 Emily Collins  
a few seconds ago  
1 million  


Rate your answer to finish

CORRECT  
 ALMOST  
 WRONG

The background of the video player shows a lecture slide with the same question: "How many pictures did they label?". The video player includes a progress bar at the bottom with a timestamp of 7:17 and a "More videos" section on the left.

# Interactive Study Material

## Stimulate interaction between students

 Olivia Johnson  
2 years ago

 min 2:08

I dont understand this piece of the video. Can someone help me out? pls

 2    REPLY

^ 1 reply

---

 Liz Bennett  
a year ago

In this part of the video they discuss the affects of global warming to the increasing water levels globally. Please have a look at the article we discussed during last week's lecture on [www.edu.com](http://www.edu.com)

 1    REPLY

---

 Write a reply      

 Liz Bennett  
10 days ago

@min 4:43

Who can help me understand the black box of a cat further?

    REPLY

---

 What helped me to understand it was to ... 

# Interactive Study Material

## Grouping to increase interaction

✕ Contributions

All 2 groups

Group A 8 contributions  
Ash Fisher, Emily Collins, Karey Star, Liz Bennett

Group B 4 contributions  
Connor Murphy, Donald Cook, Olivia Johnson

✕ Contributions

 Liz Bennett (Group A)  
a year ago

 min 1:16

Sorry guys, I still find this part difficult. Can someone help me explain perhaps?

 REPLY

 Connor Murphy (Group B)  
a year ago

 min 11:15

When input (data) gets taken from one note and it gets used in another note does this mean a new category gets created?

 1 REPLY

# Interactive Study Material

## Afterwards, students reflect on the activity (optional)

3

### Reflect on the video



What did you think of this video? How does it relate to the topics discussed in class?

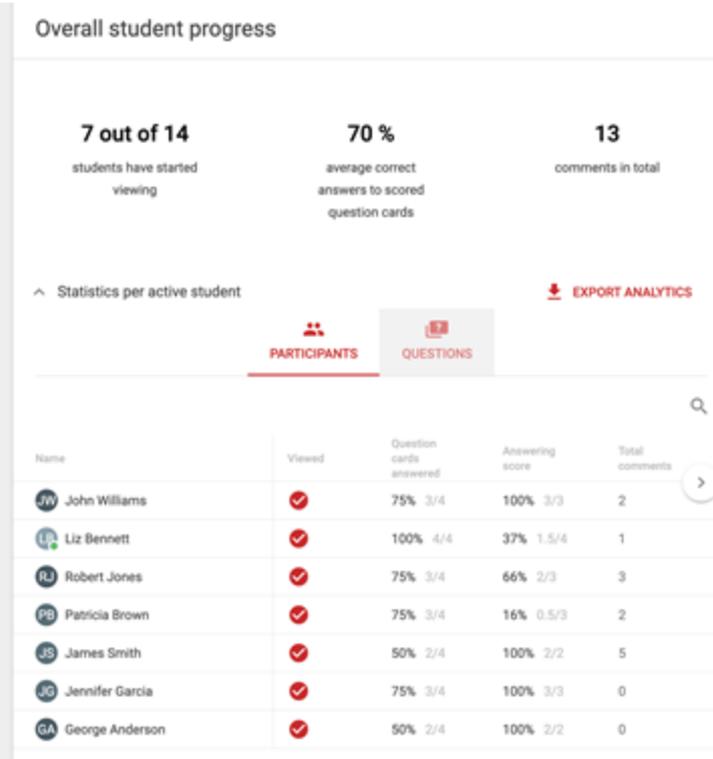
#### What I learned \*

I really liked the video, because it offered an alternative perspective on the topic discussed in class. Before watching, I disagreed with the topic but now I understand why some people think it is a good idea.

37 words (between 25 and 250 words required)

# Interactive Study Material

## You can get insight into students' progress



# FeedbackFruits Integrated Teaching and Learning System

## Feedback & Assessment

-  Group Member Evaluation
-  Peer Review
-  Skill Review
-  Assignment Review
-  Automated Feedback
-  Self-Assessment

## Collaborative learning and student discussion

-  Interactive Study Material
-  Comprehension
-  Discussion on work
-  Discussion on Topic

## Synchronous learning

-  Interactive Presentation
-  Quiz
-  Team Based Learning





Interactive Study Material

Engage students with material  
prior to class



Finished



Interactive Study Material

Engage students with material  
prior to class



Automated Feedback

Students receive automated  
feedback on writing assignments



Finished



Interactive Study Material

Engage students with material  
prior to class



Automated Feedback

Students receive automated  
feedback on writing assignments



Peer Review

Students give each other feedback  
on deliverables based on criteria



Finished



Interactive Study Material

Engage students with material prior to class



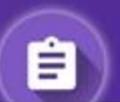
Automated Feedback

Students receive automated feedback on writing assignments



Peer Review

Students give each other feedback on deliverables based on criteria



Assignment Review

Teachers give in-line feedback on students' deliverables



Finished



Interactive Study Material

Engage students with material prior to class



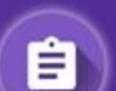
Automated Feedback

Students receive automated feedback on writing assignments



Peer Review

Students give each other feedback on deliverables based on criteria



Assignment Review

Teachers give in-line feedback on students' deliverables



Group Member Evaluation

Students evaluate their team members' collaboration skills



Finished



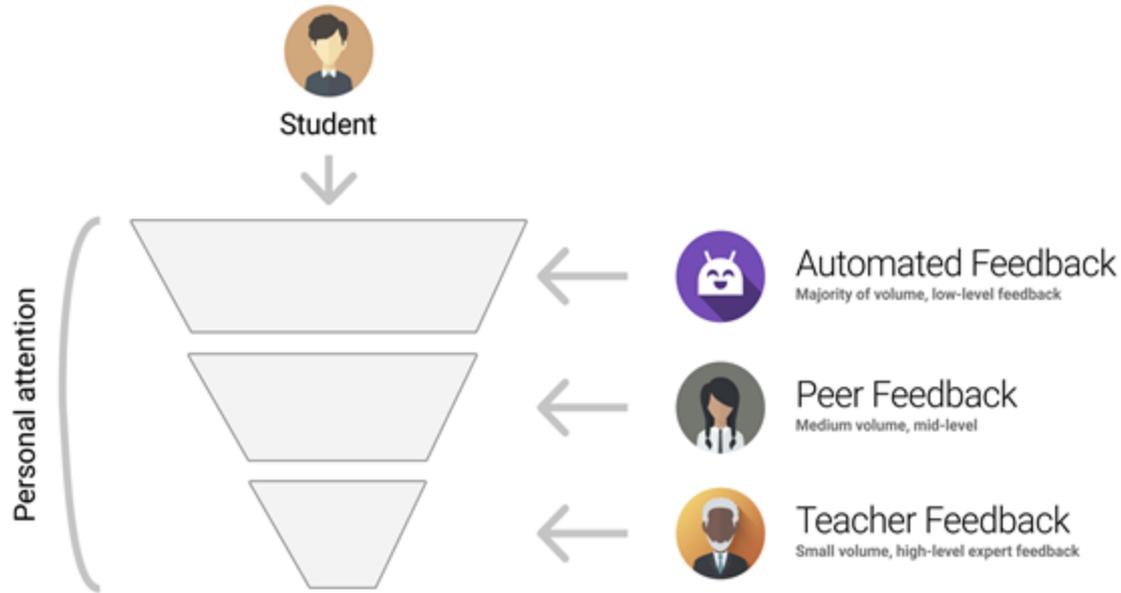
# Automated Feedback

Instant automated feedback, powered by Artificial Intelligence, on writing assignments to increase the quality of student's work and reduce teacher workload

## Pedagogical challenge

Focus on *higher-order* feedback from peers and teachers

# Increase feedback amount and quality



- Allow students to get more quality feedback
- Empower teachers to focus on complex skills such as **critical thinking, problem solving, domain-specific knowledge**
- Increase amount of personalized, contextualised feedback

Choose from over 30 criteria

The screenshot displays the 'Feedback criteria configuration' interface in a web browser. The browser's address bar shows the URL 'feedbackfruits.instructure.com/courses/280/assignments/new'. The interface is titled 'Link Resource from External Tool' and 'Feedback criteria configuration'. A 'DONE' button is visible in the top right corner of the configuration area.

The main configuration area is divided into two columns. The left column lists various criteria with their descriptions and configuration options:

- Academic Language**
- Active voice** (Beta, EN): Passive voice should be avoided and replaced with active voice.
- Grammar** (EN): Document should be written with correct grammar.
- Personal pronouns** (EN): Certain personal pronouns should be avoided. (CONFIGURE)
- Punctuation** (Beta): Document should be written with correct punctuation. (CONFIGURE)
- Spelling** (Beta, EN): Document should be written with correct spelling.
- Verb tense** (Beta, EN): Document should be written in the present tense. (CONFIGURE)
- Vocabulary** (EN): (CONFIGURE)

The right column is titled 'Add feedback criterion' and shows a list of criteria with their descriptions and configuration options:

- Academic Language**
- Abbreviation introduction**: Abbreviations that are not commonly known should be introduced. (→)
- Formal writing style** (Beta, EN): Formal writing conventions should be followed, avoiding contractions (it's, they're), and starting sentences with a coordinating conjunction. (→)
- Citing and Referencing**
- Citation count of references**: Referenced articles should be cited a certain number of times by other publications. (→)
- Direct quotation usage** (Experimental): Direct quotations should be avoided in favor of paraphrasing.
- Peer-reviewed references** (Experimental): Referenced articles should be peer reviewed.
- Reference content** (Beta): References should contain certain information, where...

# Students hand in works

## Automated Feedback

feedback you receive and don't assume it picks up everything. See if it applies to you! To help other students worldwide learn, feel free to give your feedback directly within the tool.

Good luck and have fun!

**2** **Hand in**  
1 submission required

Your submission

 DEMO\_Maxwell\_Turner\_sector\_research  
6 pages ✓ Submission received

[ADD MORE FILES](#)

**3** **Automated feedback**

Meet the robot readers that are here to provide suggestions to improve your work. They won't grade your work. These AI-driven readers are still pretty new and will make mistakes sometimes. Please let them know so they can learn and improve.

[SHOW CRITERIA](#)

 **Automated feedback**  
Results: 9 compliments, 10 suggestions, 2 skipped

 DEMO\_Maxwell\_Turner\_sector\_research [VIEW FEEDBACK](#)

# Receive inline feedback as suggestions

The screenshot displays a document editor interface. On the left, a document titled "Higher Education in the Kingdom of Saudi Arabia" is open, showing an introduction paragraph. On the right, a sidebar titled "Automated feedback" provides a summary of suggestions: 9 compliments, 10 suggestions, and 2 skipped. The feedback is categorized into four sections: "Active voice" (3 suggestions), "Grammar" (2 suggestions), "Personal pronouns" (2 suggestions), and "Punctuation" (No suggestions). Each section includes a "SHOW COMMENTS" button. At the bottom of the sidebar, there is a feedback prompt: "Was this useful?" with a star rating system.

← DEMO\_Maxwell\_Turner\_sector\_research

Maxwell Turner  
AP 625: Global Higher Education  
August 9, 2018

Higher Education in the Kingdom of Saudi Arabia

**Introduction**

Many young countries around the world have undergone different levels of economic development as well as development in their society and culture. Among these countries, Saudi Arabia is one that's garnered a significant amount of attention from the outside world for its drastic change in the oil-based economy and its rise in the political arena. The Kingdom of Saudi Arabia (KSA) was founded in 1932. Started as an impoverished country, its economy saw a dramatic boost since the discovery of oil in 1958. Now the world's largest oil producer/exporter and a middle power country, KSA is one of the most controversial nations in the world for its status in economics, politics, and culture. It is a high-income country belonging to the G-20 while having the least diversified economy. It is a monarchical autocracy, controlled by the royal family and a fiercely Islamic country. Often seen as one of the most conservative countries in the world, it is often criticized (at least by Western countries) for lack of human rights, especially in the topics of women's rights and capital punishment. However, in recent years, thanks to the new Crown Prince Muhammad bin Salman, there has been drastic development in women's rights as well as in its overall socio-cultural environment. The country is also working towards more political, religious and economic reforms following the Saudi Vision 2030 (O Al-Youbi, 2017).

Like its economy, KSA's education sector developed in a rapid fashion. A few features of Saudi's education are gender-segregation (by institution or by class), religious studies focus, and

**Automated feedback**

Automated feedback  
Results: 9 compliments, 10 suggestions, 2 skipped

**Active voice** Beta  
Passive voice should be avoided and replaced with active voice  
3 suggestions  
SHOW COMMENTS

**Grammar**  
Document should be written with correct grammar  
2 suggestions  
SHOW COMMENTS

**Personal pronouns**  
Certain personal pronouns should be avoided  
2 suggestions  
SHOW COMMENTS

**Punctuation** Beta  
Document should be written with correct punctuation  
No suggestions

Was this useful? ☆☆☆☆☆

# Even on reference formatting

← DEMO\_Maxwell\_Turner\_sector\_research

Alamri, M. (2011). *Higher education in Saudi Arabia*. Majmaah University.

Alharbi, E. A. (2016). Higher Education in Saudi Arabia: Challenges to Achieving World-Class Recognition. *International Journal of Culture and History*, 2(4), 169-172.

The Economist. (2018, July 10). *Women and the Saudi revolution* [Video file]. Retrieved from <https://www.youtube.com/watch?v=xuaR6zQauE>

Hassan, S. (2018, February 7). Saudi women join the workforce as country reforms. *CNN*.

ICEF Monitor. (2016, January 4). Fastest growth in 35 years for international enrolment in US.

Institute of International Education. (2017). *Open Doors*.

Kingdom of Saudi Arabia General Authority for Statistics. (2017). *Annual yearbook 2017*.

Kingdom of Saudi Arabia General Authority for Statistics. (2016). *Annual yearbook 2016*.

Miller, D. E. (2011, May 17). Saudi Arabia opens world's largest women's university. *The Jerusalem Post*.

O Al-Youbi, A. (2017, December 1). The development and advancement of higher education in Kingdom of Saudi Arabia. *QS Wow News*.

UNESCO Institute of Statistics. (2017, April 12). Saudi Arabia | UNESCO UIS. Retrieved August 5, 2018, from <http://uis.unesco.org/country/SA>

UNESCO Institute of Statistics. (2018). *UIS.stat*. Retrieved August 5, 2018, World Bank. (2017).

Comments

MARK AS INCORRECT

Was this useful? ☆☆☆☆☆

Citation style - Suggestion

Reference is not formatted correctly

@page 6

This reference seems to be formatted incorrectly.

Expected formatting

O Al-Youbi, A. (2017-December-1). The development and advancement of higher education in Kingdom of Saudi Arabia. *QS Wow News*

More info on this criterion

MARK AS INCORRECT

Was this useful? ☆☆☆☆☆

Citation style - Suggestion

Reference is not formatted correctly

@page 6

This reference seems to be formatted incorrectly.

Expected formatting

UNESCO Institute of Statistics. (2017-April-12). Saudi Arabia | UNESCO UIS. Retrieved August 5, 2018, from <http://uis.unesco.org/country/SA>

More info on this criterion

# Mark feedback as **useful**

← DEMO\_Maxwell\_Turner\_sector\_research

In general, an associate's degree is two-year, a bachelor's degree is four-year in most disciplines and master's degrees are two-years. There are both public and private institutions and the number of institutions grew rapidly in the past decade. The first was King Saud University founded in 1957, and currently, 1.7 million students are enrolled at 28 public universities (of which three were founded in 2017) and 10 licensed private universities with different colleges and faculties. There are more men than women enrolled in higher education, while there are more women pursuing a bachelor's degree. 42 mostly private junior colleges/community

HIGHER ED IN KSA

colleges across the country also offer two- to three-year degree programs in different fields. In addition, there are over 900 mostly private centers and institutes providing short-term courses or certificate and diplomas at different levels starting in secondary education. There is more gender segregation by institutions in this sector than in general universities.

With 40% of its population below the age of 24 and an annual growth rate of 2.5%, the youth-dominated population and the transforming economy demand more higher education opportunities (UNESCO Institute of Statistics). To accommodate this need but with only limited capacity in the country, the King Abdullah Scholarship Program (KASP) was founded in 2005 to provide study abroad access for Saudi students. With a six-billion-dollar budget, it became the driving force behind the growing numbers of Saudi students overseas. In its peak year of 2014/15, there were about 110,000 Saudi students in the United States alone (KSA General

3

Active voice - Suggestion  
**Sentence uses passive voice**

It seems you are using passive voice here, which is discouraged. We suggest you rephrase this sentence to avoid using passive voice.

[More info on this criterion](#)

MARK AS INCORRECT

Was this useful? ★★★★★

Grammar - Suggestion  
**Sentence contains a grammatical mistake**

6

# Mark feedback as incorrect

← DEMO\_Maxwell\_Turner\_sector\_research

In general, an associate's degree is two-year, a bachelor's degree is four-year in most disciplines and master's degrees are two-years. There are both public and private institutions and the number of institutions grew rapidly in the just decade. The first was King Saud University founded in 1957, and currently, 1.7 million students are enrolled at 28 public universities (of which three were founded in 2017) and 10 private universities. There are more men than women and faculties. There are more men than women pursuing a bachelor's degree.

HIGHER ED IN KSA  
colleges across the country also offer two-year degrees. In addition, there are over 900 mostly private colleges offering certificate and diplomas at different levels and degrees. Segregation by institutions in this sector that is, public and private, is a major issue. With 40% of its population below the age of 15, the country's youth-dominated population and the transforming economy demand more higher education opportunities (UNESCO Institute of Statistics). To accommodate this need but with only limited capacity in the country, the King Abdullah Scholarship Program (KASP) was founded in 2005 to provide study abroad access for Saudi students. With a six-billion-dollar budget, it became the driving force behind the growing numbers of Saudi students overseas. In its peak year of 2014/15, there were about 110,000 Saudi students in the United States alone (KSA General

Active voice Suggestion  
Sentence uses passive voice  
It seems you are using passive voice here, which is discouraged. We suggest you rephrase this sentence to avoid using passive voice.  
More info on this citation  
MARK AS INCORRECT  
Was this useful? ★★★★★

Mark feedback as incorrect

Selected feedback

Active voice Rate  
Passive voice should be avoided and replaced with active voice  
3 suggestions

Optionally, explain why you think this feedback is incorrect, so we can understand the problem

Your explanation

CANCEL SUBMIT

Grammar Suggestion  
Sentence contains a grammatical mistake

# Usage, engagement, feedback

**75**

institutions

**300**

teachers

**9000**

students

**15,000**

submissions

**400,000**

annotations

Average feedback usefulness

**4.55/5** (n=37k)



Objection (error) rate

**1.4%**



# Feedback



*Ultimately, I'd like to provide detailed feedback for every single assignment, but that's unrealistic. **Automated Feedback did something I couldn't provide for students.***



*It reduced the amount of students that quit because it diminished their anxiety level while writing their thesis. **It provided a big confidence boost to ensure they believe they could actually deliver good work.***



# We embrace EU Guidelines for **Trustworthy AI** [4][5][6]

Celebrate **ethics by design**

The AI **does not have access to student data** without explicit consent

Provides **formative and constructive** feedback:  
grading is a human action

Students and teachers can always **object to incorrect feedback** at any time and give feedback to **help improve the system**



# EdTech Dotank

Co-creating the future of education



# Looking **ahead**

- Centralized institution wide frameworks
- Meaningful competency development
- Actionable analytics for learning designers, instructors, and students
- Improving student autonomy using AI

*and more*

