



# Developing a Smartphone-based Integrated Student Assessment Data Collection System to Enhance Yamagata University's Education

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*2017 Assessment Institute*

# Slides are available!

Go to Google and search “**Yamagata OIRE**”

山形大学 Office of Institutional Research & Effectiveness

<https://ir.yamagata-u.ac.jp/>

山形大学 Office of Institutional Research & Effectiveness  
動を広く ... 山形大学. OIRE. 次  
RESEARCH & EFFECTIVENESS

The screenshot shows the homepage of the Yamagata University Office of Institutional Research & Effectiveness (OIRE). The header includes the university logo and the text '次世代形成・評価開発機構' (Next Generation Formation, Evaluation, and Development Organization) and 'OIRE Yamagata University'. The main content area features a navigation menu on the left with items like 'APプロジェクトについて', 'OIREについて', 'IRとは? IEとは?', 'What's New?', 'Events', 'APシンポジウム', 'IR勉強会', and 'IR Activities'. The central graphic displays the acronym 'OIRE' with 'O' in pink, 'I' in blue, and 'R' in purple, and 'E' in grey. Text around the graphic includes '山形大学 OIRE の想い', '山形大学で学んで本当に良かった!! そう言ってもらえるために', 'もっと学生や大学のことを知り抜いて', and '継続的改善を支援する'. A red box highlights a 'NEW Assessment Institute 2017' link, and another red box with an arrow points to the word 'Here'.

Or type <https://ir.yamagata-u.ac.jp/AI2017.pdf>

Or scan with QR Code Reader



# Agenda

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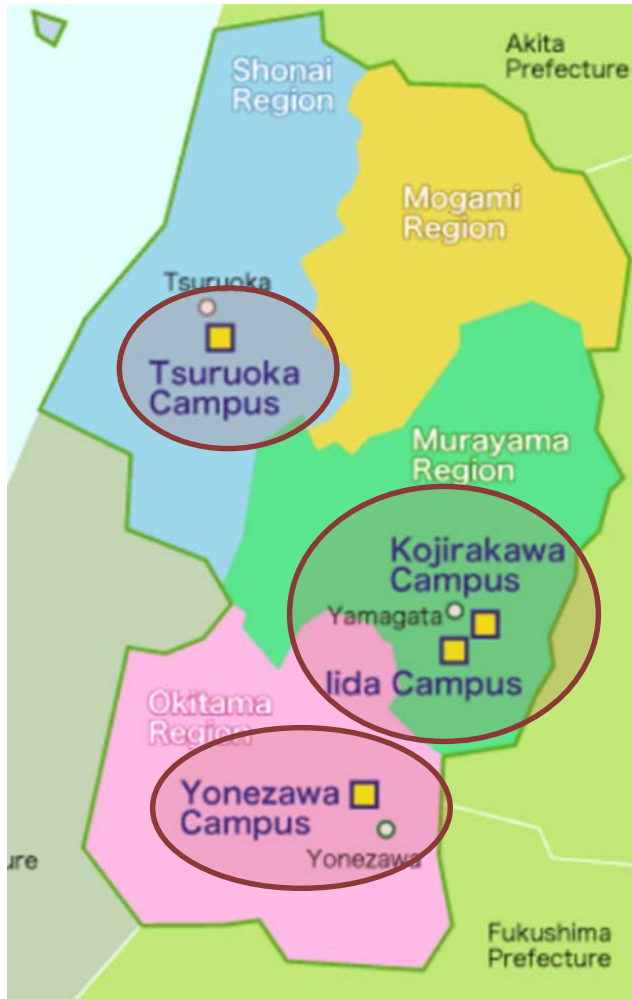
1. About Us
  2. Educational Stages in Japan
  3. Key Characteristics of Higher Education in Japan
  4. Assessment Plan at Yamagata University (YU)
  5. Assessment via Smartphone
    - a. YU-Portal Demonstration
  6. Conclusions
- } Koji
- } Shigeru
- } Katsumi
- } Takao

# Where is Yamagata Prefecture?



- 2.5 hours by bullet train
- 70 min by airplane

# Yamagata University (YU)



## ■ **Type:** National University

- multi-campus (4 campuses)

## ■ **Students:** 8,800

- 7,500 undergraduates
  - 1,700 new incoming/year
- 1,300 graduates

## ■ **Full-time Faculty:** 900

## ■ **Six Distinct Colleges:**

- Agriculture
- Literature and Social Science
- Education, Arts and Science
- Sciences
- Medicine
- Engineering

- Yamagata City – Tsuruoka City: 60 miles
- Yamagata City – Yonezawa City: 30 miles

# Educational Stages in Japan

Stage	Year	Ages
Kindergarten	1	3-4
	2	4-5
	3	5-6
Elementary (Compulsory)	1	6-7
	2	7-8
	3	8-9
	4	9-10
	5	10-11
	6	11-12
Junior High (Compulsory)	1	12-13
	2	13-14
	3	14-15
Senior High	1	15-16
	2	16-17
	3	17-18
Higher Education ↓		

## Notes:

- Continuation Rates  
Junior High → Senior High: **97%+**  
Senior High → College\*: **57%**
- Graduation Rates  
Senior High: **99%**  
College (in 4 Years): **90%+**
- **No Grade Skipping**
- **No Dual Enrollment**

\* Degree-Granting Institutions

# Assessment in Japanese Higher Education

## ■ Required by accrediting agencies

- Quality assurance  
(**continuous quality improvement in education**)
- Program review
- General education assessment
- Program-level assessment
- 「Direct」 vs. 「Indirect」
- Struggling with **“closing the loop”**

How to collect the data?



## ■ Research Grant Program by MEXT\*

- Our proposal is accepted!!  
(\$700,000/year)

\* Ministry of Education, Culture, Sports, Science and Technology

# Key Characteristics of Higher Education in Japan

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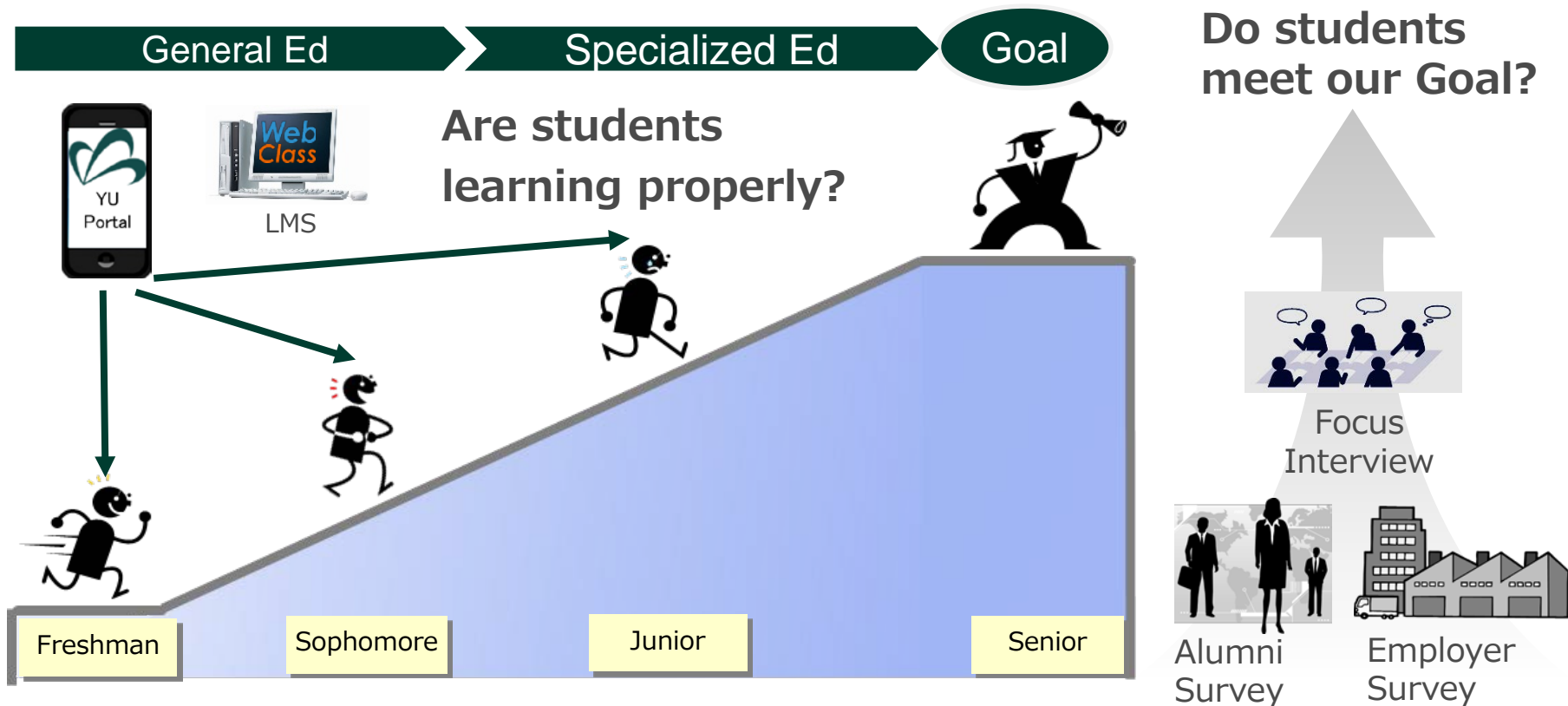
- Enrollment caps are set by MEXT.
  - Budget
  - Tuition
  - # of Fac/Staff
- Students **must decide on their major** when they apply for admission.
  - **Can't change the major after enrollment**
  - No double majors
  - No pre- program (e.g., Pre-Med, Pre-Vet, etc.)
  - Almost impossible to transfer to another school



# Assessment at Yamagata University



# Assessment Plan at Yamagata University



- Combination of **Direct** (Own developed test carry out by smartphone App 3 times) and Indirect (Course Evaluation, GPA, Surveys, etc.) Measurement for SLOA.

# Assessment Plan (contd.)

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## ■ Focus more on **Direct Assessment**

### • Internally Developed Tests:

- Quantitative and Logical Reasoning
- Mathematics
- Physics
- Chemistry
- Biology

- Multiple-choice Tests with IRT Models
- For each subject:
  - Up to 5 questions
  - 5 min. to complete

### • Memorizing vs. **Understanding**

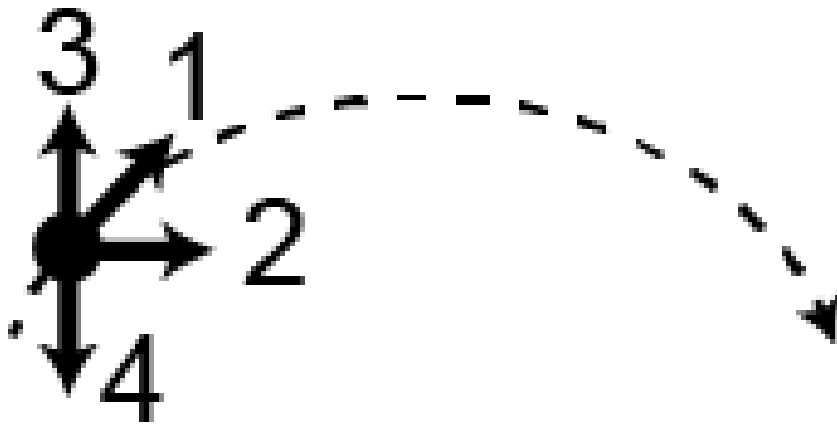
- Memorizing facts does not guarantee understanding of a concept.
- e.g., Force Concept Inventory (FCI, Physics/Mechanics )

# What do we assess?

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Naive Conception: frequently misunderstood concepts in physics field

Which is the correct force direction in a parabolic motion?

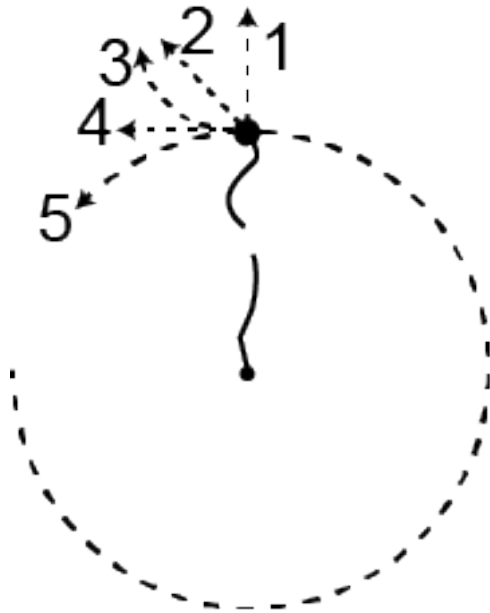


# What do we assess?

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Naive Conception: frequently misunderstood concepts in physics field

Which path is observed in a horizontal plane?

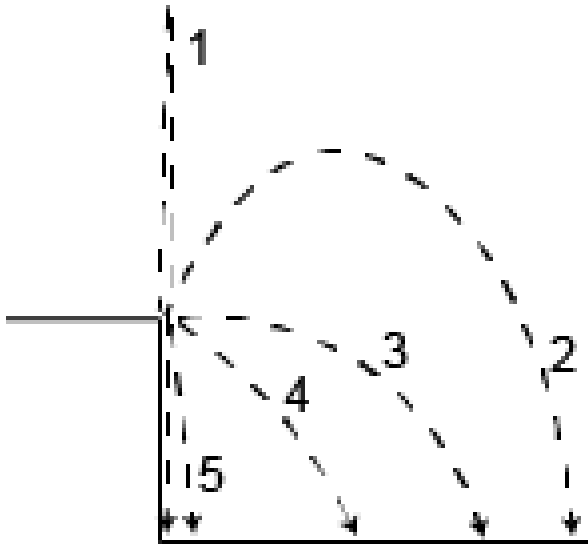


# What do we assess?

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Naive Conception: frequently misunderstood concepts in physics field

Which is the fastest at ground level with the same initial velocity?



# Assessment Plan (contd.)

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## ■ Big Five Personality Test

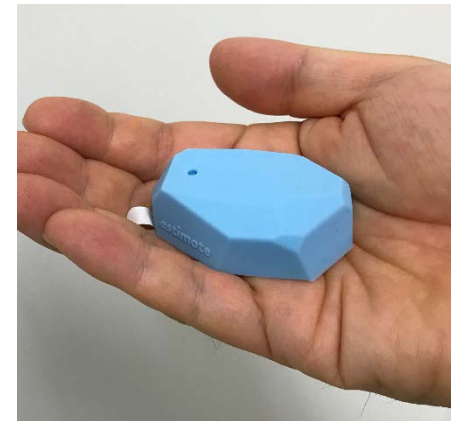
- 70 Yes-No Questions
- Localized version developed by Professor Chieko and Yoshihiro Murakami
  - Openness to Experience
  - Conscientiousness
  - Extraversion
  - Agreeableness
  - Emotional Stability

# Assessment via Smartphone

- **FACT: 99+%** of YU students own a smartphone with Bluetooth4.0.
- We would like to...
  - a. Collect assessment data more **effectively**.
  - b. Provide the personalized info. more **efficiently**.
    - At YU, the data/info. is **not** centralized.
  - c. Track classroom attendance more **cost-effectively**.
    - Previously:  
NFC-based reader &  
IC chip-embedded student ID card
    - Ongoing:  
**Bluetooth4.0(BLE) based beacon &  
students' smartphone**



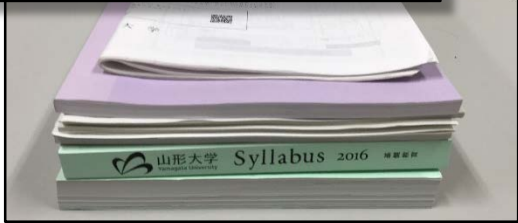
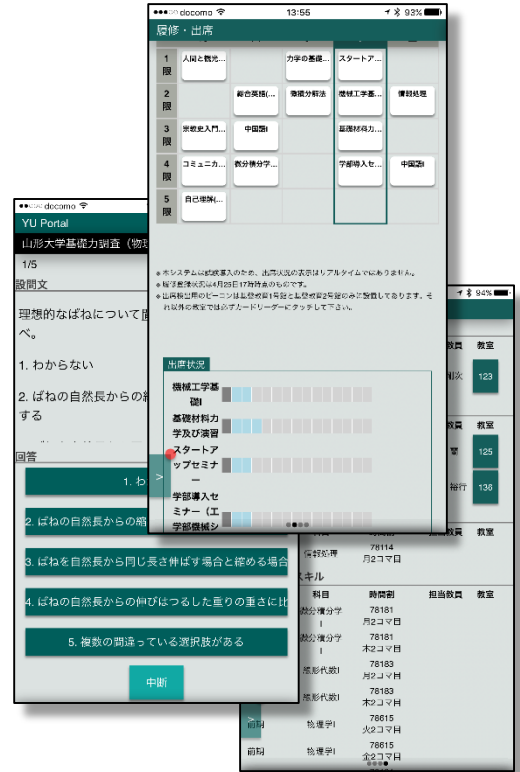
**Much info. collected & provided**





# Smartphone Application: YU Portal

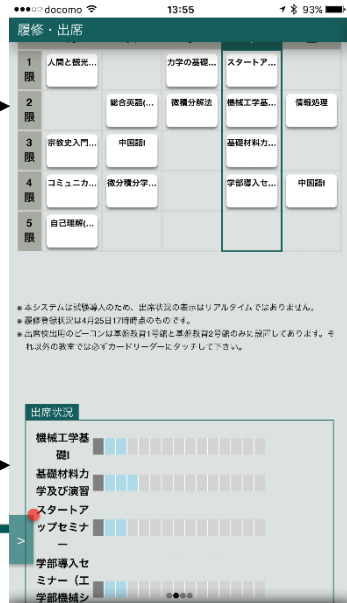
## ■ Important Info. is now centralized!!



# Main Features

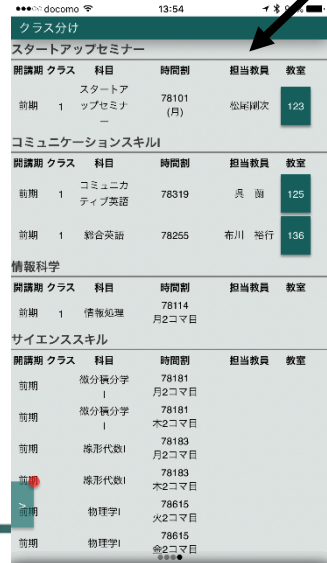
- Test
- Survey
- Personalized Class Schedule
- Class Attendance Record
- Personalized Notification
  - e.g., Class Cancellations

Class Schedule

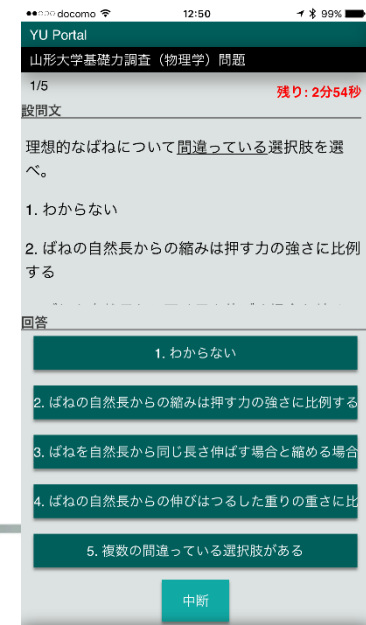


Attendance Record

Semester Course Schedule



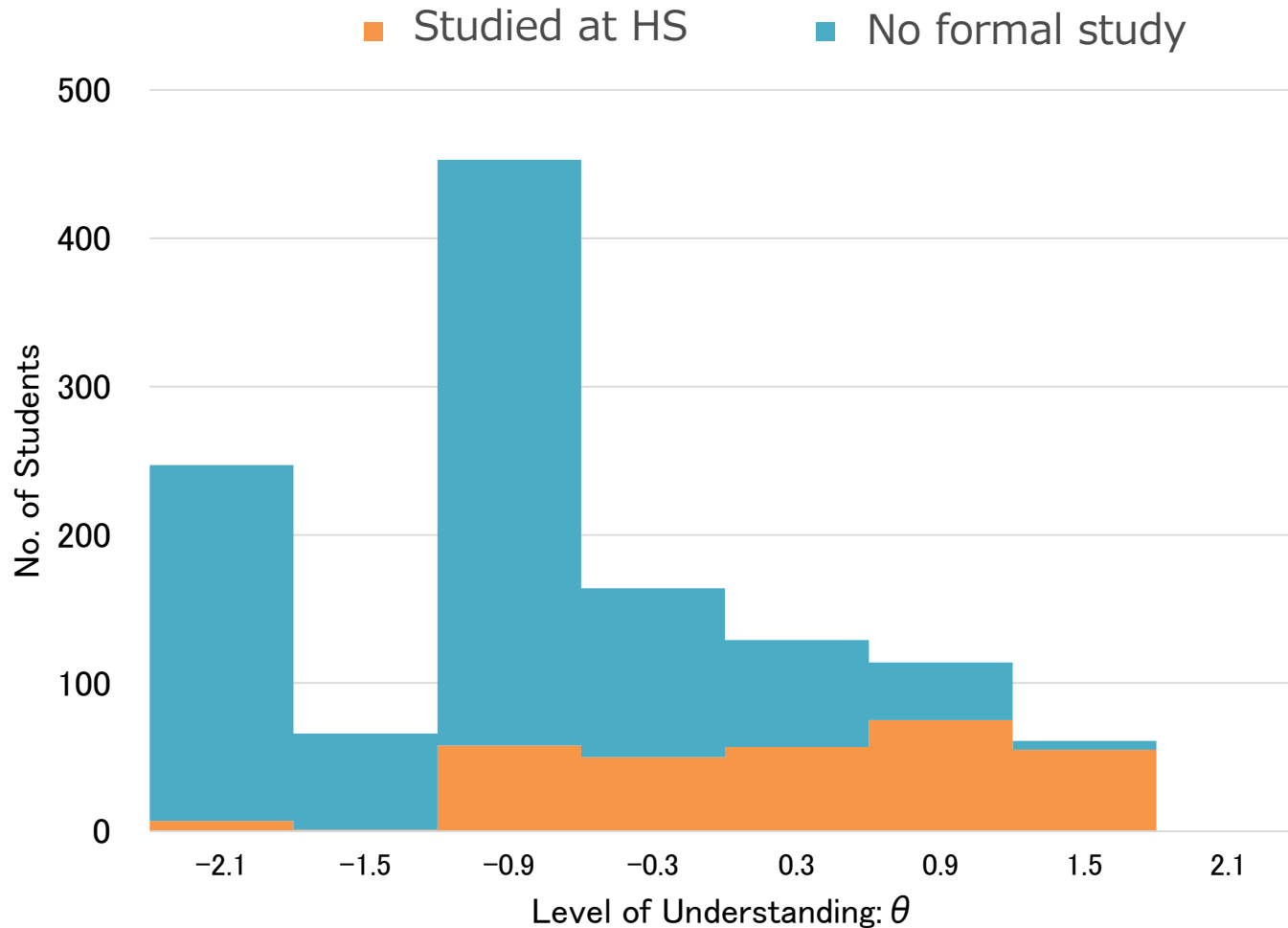
Test



# YU Portal Demonstration



# Preliminary Results: Biology



# Conclusions

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- **First Japanese University to implement direct assessment via smartphone for all student body**
- **Ongoing development with initial results positive**
- **Results help with continuous improvement**

# Acknowledgements

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大学教育再生加速プログラム

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The smartphone App is developed with



## Special Thanks (in alphabetical order) to:

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