

# Development of a handwritten note-taking system for the support of hard-of-hearing students participating in lectures



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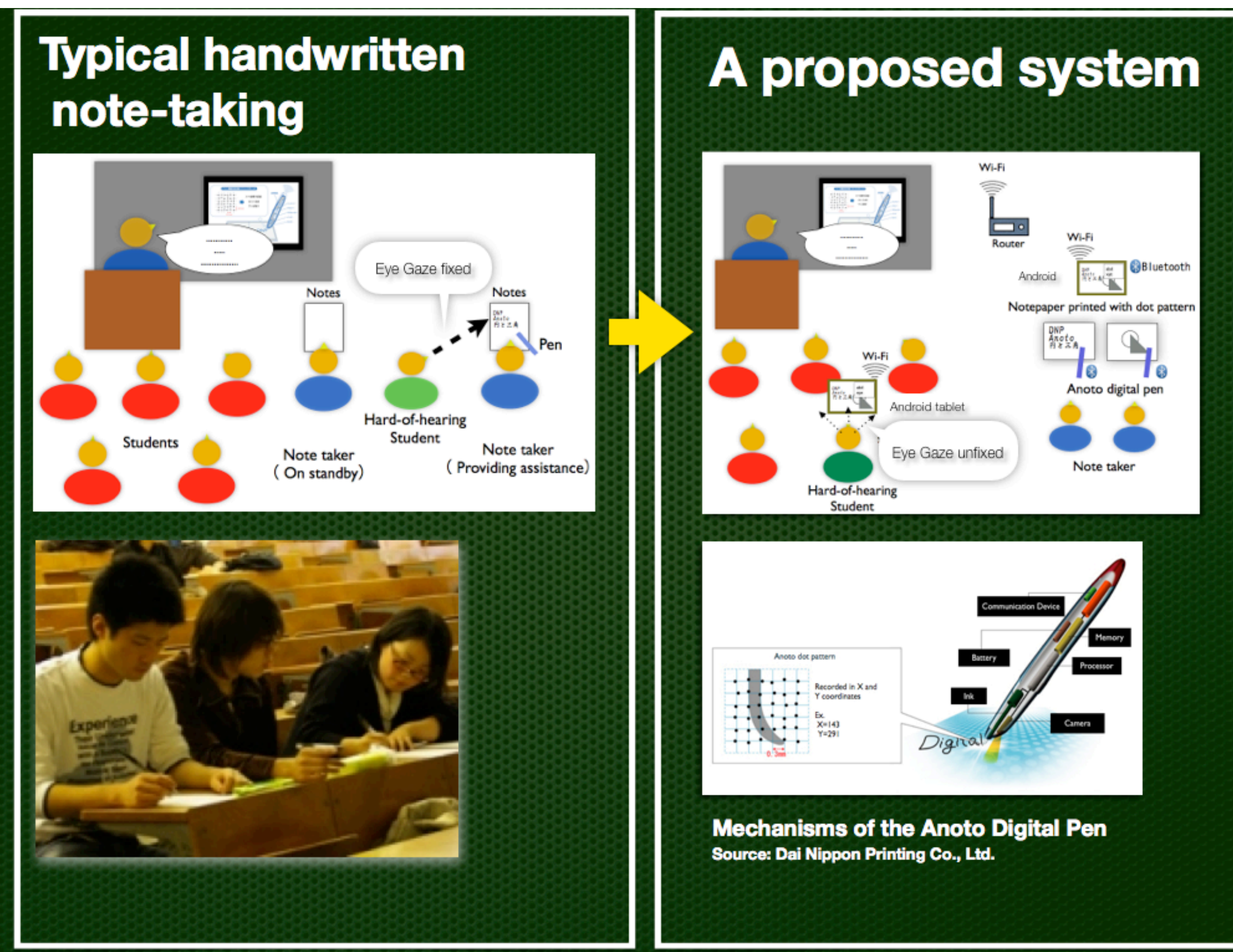
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## 1 Background

There are some types of accommodations for students with hard-of-hearing in class room. Typically, in case of handwritten note-taking, three-person group typically sits in the first row of the classroom, away from the rest of the class. The eyes of students with hard-of-hearing often focus on their notes and tend to miss the subtle facial expressions of the instructor as well as any visual aids that may be projected on the classroom screen.

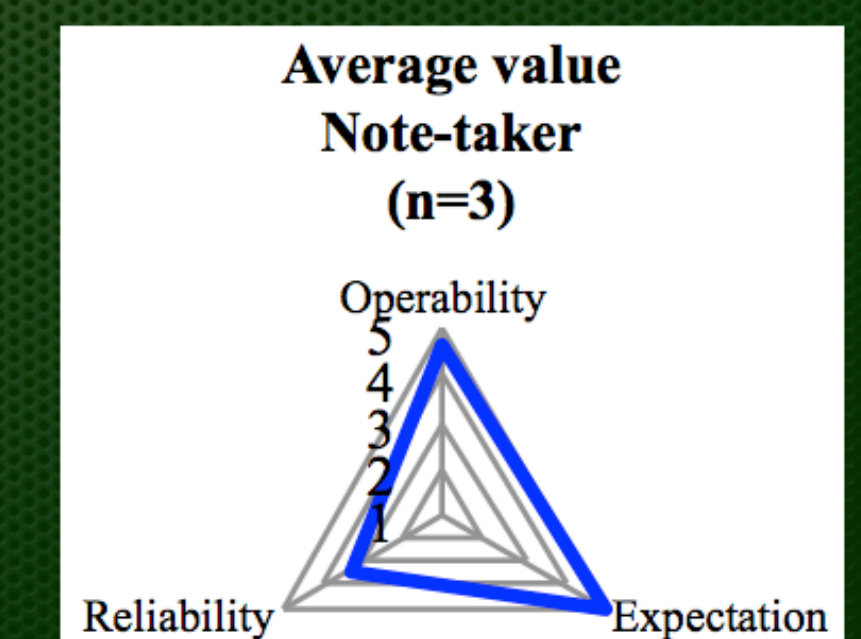
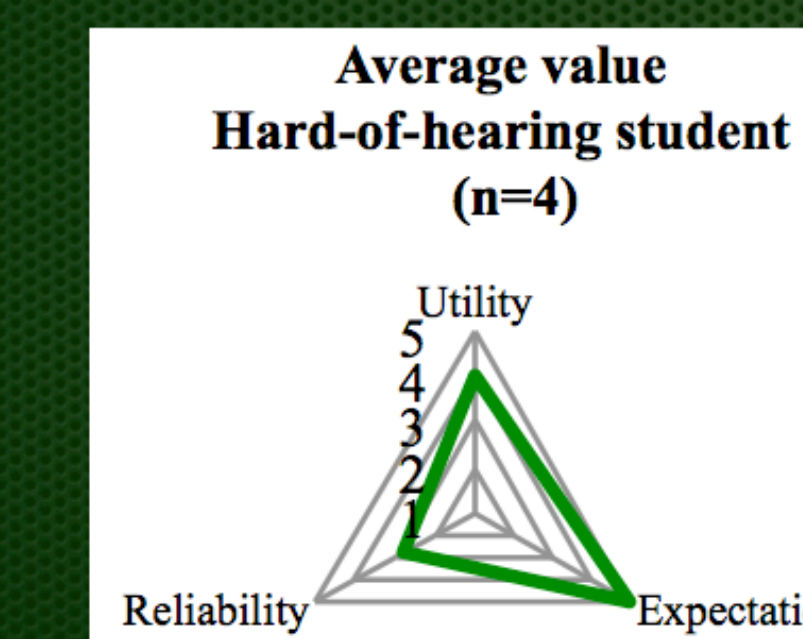
These classroom conditions may decrease the sense of involvement or participation in the class for students with hard-of-hearing. To overcome this barrier, we developed a new handwritten note-taking system.

## 4 Typical handwritten note-taking



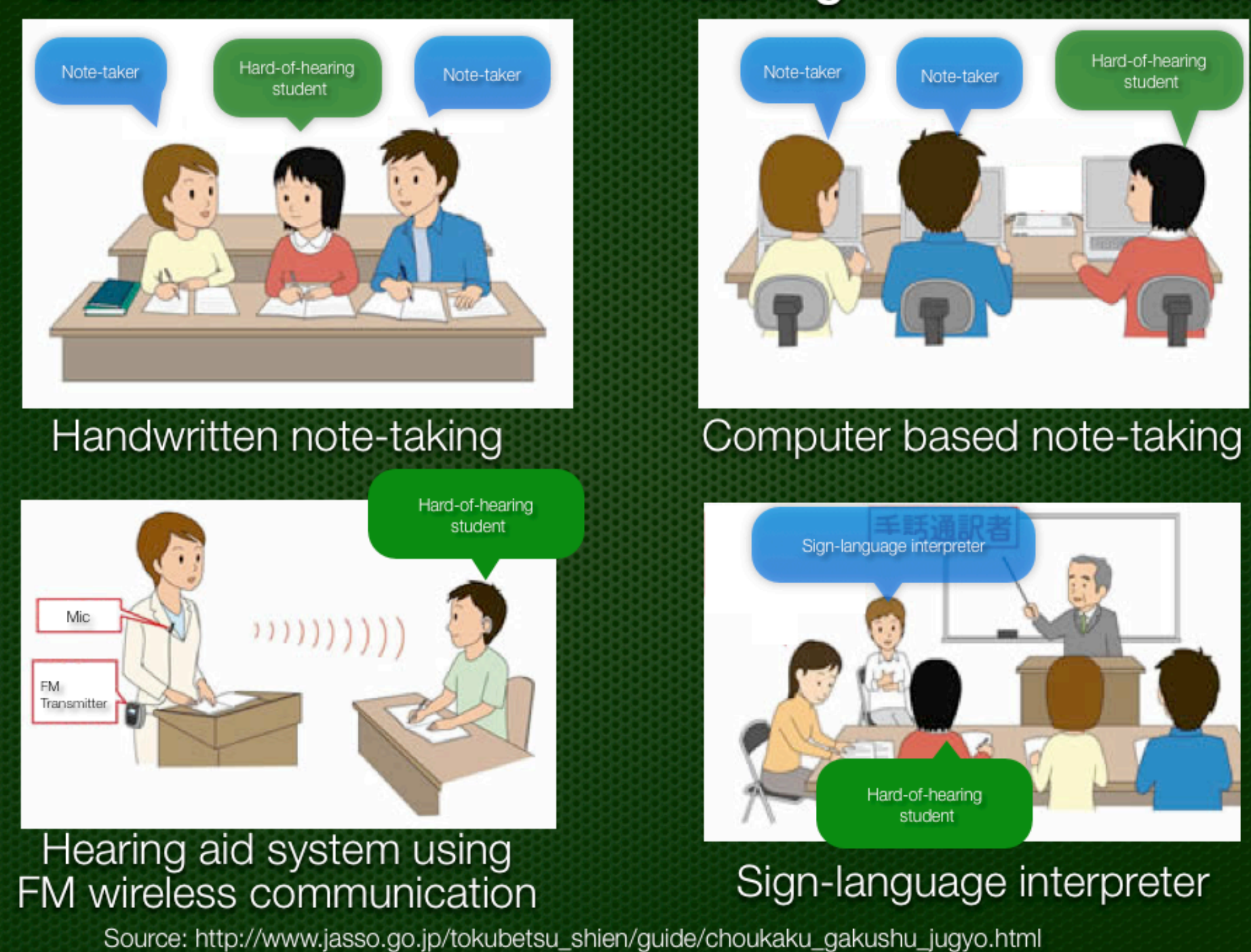
## 7 Results

We conducted a four-month assessment of the note-taking system in an actual classroom environment. We asked the assisted students and note-taker to assess the system with regards to three aspects: Utility/Operability, Reliability, Expectation. The graphs show a high value both the utility, the operability, and the expectation in common use. Shortly after the start of the experiment, failure of the system has been frequent. As a result, reliability in the system is low. However, this problem has been resolved now.

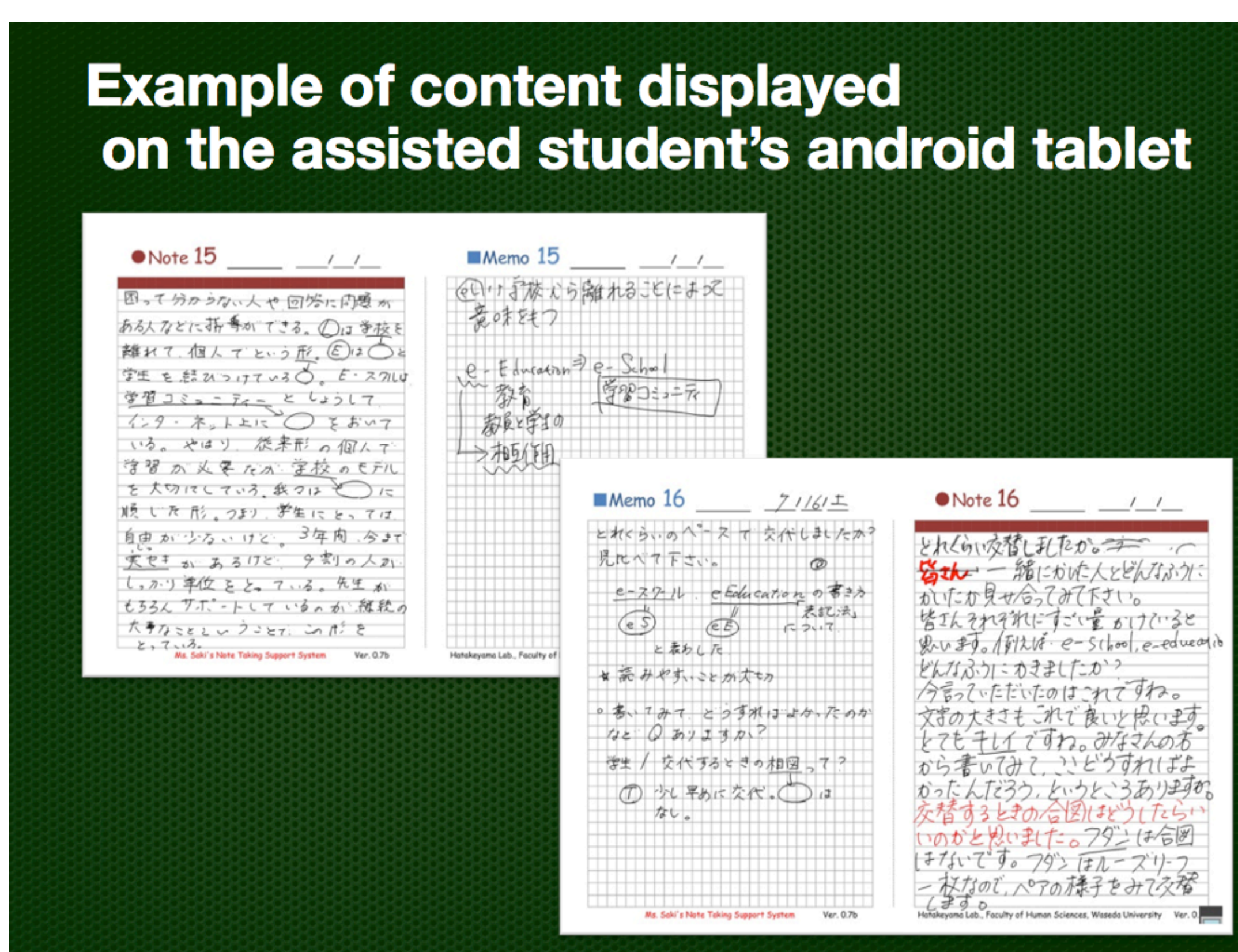


## 2 Types of accommodations for students with hard-of-hearing in the classroom

Types of accommodations for students with hard-of-hearing in the classroom



## 5 Example of content displayed on the assisted student's android tablet



## 8 Benefits

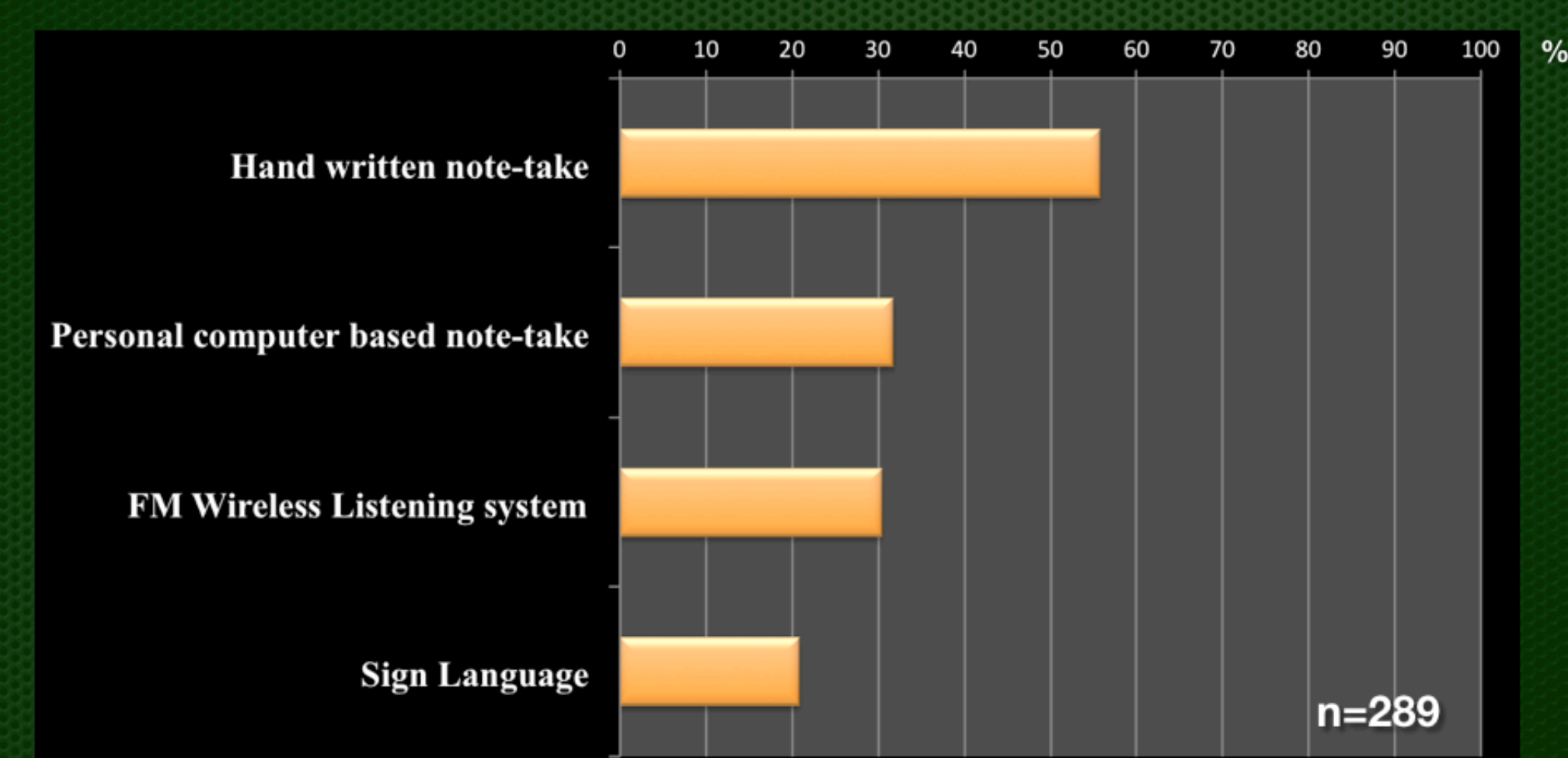
- a) Students with hard-of-hearing
  - Nice to be able to sit with friends.
  - Makes things much easier to understand.
  - Easier on my neck.
- b) Note-taker
  - Can see what the other assistant has written.
  - Makes note-taking quite a bit easier, in that we no longer have to contort ourselves into strange posture so that the assisted student can see what we write

## Points for improvement

- a) Students with hard-of-hearing
  - What if something wrong at the occurrence of system trouble
  - Could you combine the handwritten text with the keyboard input?
- b) Note-taker
  - The digital pen grip is too thick
  - The weight of the note-taking system as light as possible

## 3 Executing rate about types of accommodations for students with hard-of-hearing in the classroom in Japan, 2012

Executing rate about types of accommodations for students with hard-of-hearing in the classroom in Japan, 2012



Source: [http://www.jasso.go.jp/tokubetsu\\_shien/documents/report\\_2012.pdf](http://www.jasso.go.jp/tokubetsu_shien/documents/report_2012.pdf) (P36 Fig.10)

## 6 Scene from a classroom pilot test



## 9 Future Work

- Input the lecture notes beforehand to the note-taking system
- Support multiple students with hard-of-hearing at once
- Combine Keyboard input

## Acknowledgment

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