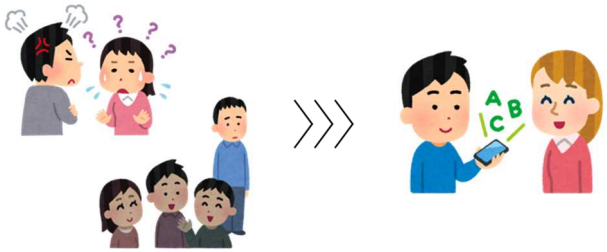
R&D item

4／5. Social implementation of *Jizai Hon-yaku-ki* (neurodiversity / education)

Progress until FY2023

1. Outline of the project

In R&D items 4 and 5, we analyze and solve problems in *Jizai Hon-yaku-ki* implemented in the following two contexts. R&D item 4 focuses on using *Jizai Hon-yaku-ki* as **supported communication, especially involving people with developmental conditions**. While our R&D project is not dedicated specifically to disabled people, it may have the social benefit of improving our communication while respecting neurodiversity.



Communication problems can be alleviated by Jizai Hon-yaku-ki.

R&D item 5 addresses **classroom use of *Jizai Hon-yaku-ki* for education**. Along with the MEXT initiative to install up-to-date devices for students to utilize in their study, our R&Ditem 5 aims at providing proof-of-concept cases of educational application.

Close engagement with the relevant parties (like those with developmental conditions, their supporters, children, and teachers) is necessary from the very beginning of our R&D. The common task of these two R&D items is to incorporate their viewpoints to make *Jizai Hon-yaku-ki* useful to them.

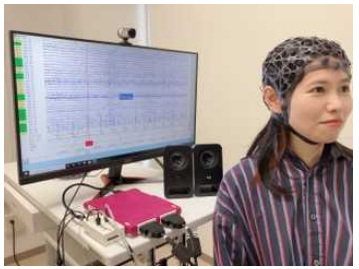
2. Outcome so far

1. *Conducted a Delphi survey to deliver stakeholders'voices to researchers and developers*
2. *Acquisition of EEG/behavior data from individuals with developmental disabilities*

Outcome 1: We collected opinions on communication difficulties and ideas for features and functions to be included in the devices from stakeholders and those around them. The issues were classified into four categories, and the ideas were organized accordingly. In addition to the need to understand others, the need to "understand one's own internal state (mind and body)" was also identified. By sharing and discussing these needs with the research and development team, we are considering which features and functions should be prioritized for inclusion in the " Jizai Hon-yaku-ki."

Outcome 1 — summay of interim Delphy survey results

Outcome 2: Using the system we have developed that simultaneously records EEG and behavioral data from multiple perspectives with minimal burden, we have measured various physiological and behavioral data from individuals with developmental disabilities. In addition to scalp EEG, we are recording electromyograms (EMG), electrocardiograms (ECG), respiration, and video recordings of behavioral data during developmental psychological assessments. This allows for a more comprehensive analysis of the users' brain activity during interpersonal communication.



Outcome 2 — measurement scene of physiological data (64ch EEG and autonomic indicators)

So far, we are engaging with potential users — especially those with developmental conditions — in various ways to lead our R&D better.

3. Future plans

We continue the ongoing engagement with users in every stage of our R&D, from basic research to trial and assessment of the products.

Our R&D project also plans to build partnerships with educational sectors to proceed to trial implementations of *Jizai Hon-yaku-ki* for educational use. (Tokyo U: S. Kumagaya, Showa U: M. Nakamura, Tohoku U: K.I. Tsutsui)