



# Selecting AAC Tools and Strategies for Interactions with Teachers and Students at Special Needs School for Children with Intellectual Disabilities

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**Abstract.** Successful communication between children with complex communication needs and their partners often relies on selecting appropriate augmentative and alternative communication (AAC) tools and strategies to fit their opportunity. Mobile apps are powerful AAC tools for presenting visual aids with synthesized voice. However, special needs school teachers sometimes do not use these apps actively even they recognize the usefulness. The purpose of this study is to examine the teacher's selection process of AAC tools and strategies at special needs schools for children with intellectual disabilities. We had developed STalk2 mobile app and unstructured focus group interviews were conducted at the end of 8–11 months of STalk2 trial use. The results suggest that teachers select AAC tools and strategies for interaction with their students based on characteristics of communication tools and strategies, environments, and/or knowledge and experience on the use of communication tools and strategies.

**Keywords:** Augmentative and alternative communication ·  
Special needs school for children with intellectual disabilities ·  
Complex communication needs · Selection of AAC tools and strategies

## 1 Introduction

If children with pervasive developmental and/or intellectual disabilities have complex communication needs caused by the limitation in the use of speech, a set of augmentative and alternative communication (AAC) tools and strategies are used with their communication partners to solve everyday communication challenges [1, 12]. Printed cards of pictorial symbols and photographs are popular tools [3, 4]. Mobile apps are more powerful tools because they can present these visual aids with synthesized voice. These tools are used along with vocalizations, facial expressions, and gestures in order to express and/or understand messages more intelligibly and specifically.

Communicative competence of children who requires AAC consists of intrinsic factors related to them and extrinsic factors related to the environment [10]. Communication partners, a part of the environment, play an important role to facilitate or impede the realization of communicative competence [2].

We focused on communication partner’s process to select AAC tools and strategies because school teachers sometimes do not use AAC apps actively even they recognize the usefulness [6]. The purpose of this study is to examine the teacher’s selection process at special needs schools for children with intellectual disabilities.

## 2 STalk2 Mobile App

We had developed STalk2 mobile app running on Android OS [7]. We adopted “reduction” and “self-monitoring” persuasive technology principles [5, 11] for increasing opportunities to present visual aids with verbal messages to children with complex communication needs.

Figure 1 shows an overview of the app. The users can compose a message as a set of visual aids, i.e., images with captions, allocated into five columns for answering the following questions: when (time), where (place), who (subject), how (feeling, language, method, tool, transportation, or material), and what (action).

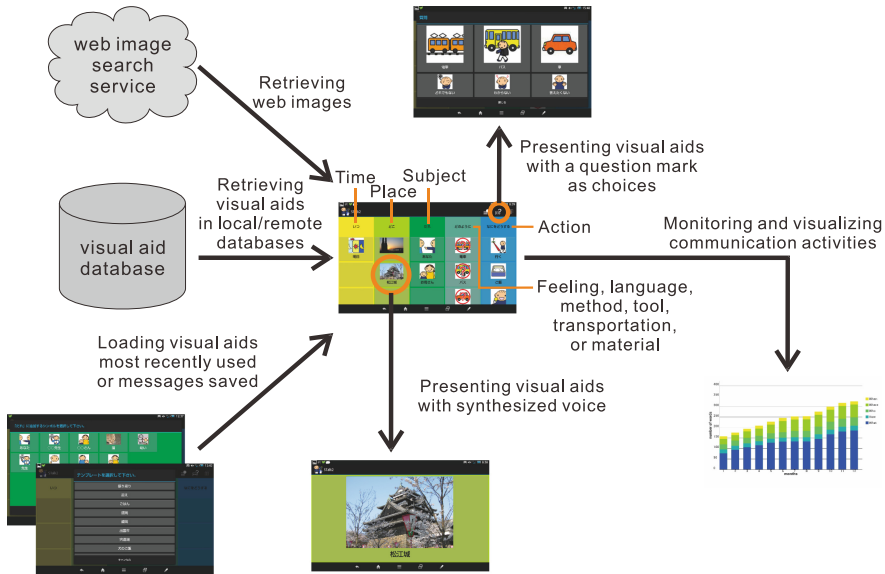


Fig. 1. Overview of STalk2 mobile app

To compose a message, the users can retrieve web images and visual aids in local/remote databases by speech recognition or typing keywords. They can also load visual aids most recently used or messages saved. They can place a question mark or slash symbol over any visual aid. By touching one of the visual aids in the message, STalk2 presents its enlarged image, caption, and synthesized voice of the caption. They can also open a dialog designed for choosing among several visual aids with a question mark. STalk2 has a special function to visualize data by monitoring and analyzing user activities.

### 3 Method

Unstructured focus group interviews were conducted to gather the usage of AAC tools and strategies at the end of 8–11 months of STalk2 trial use. The interviewees were five school teachers of special needs schools. They had in charge of students with complex communication needs ages 8, 11 and 12. The interview for each class lasted approximately one hour. Interviews were digitally recorded and transcribed verbatim. We performed grounded theory analysis of the interview transcripts and examined the selection process of AAC tools and strategies for interactions with teachers and students.

### 4 Results and Discussion

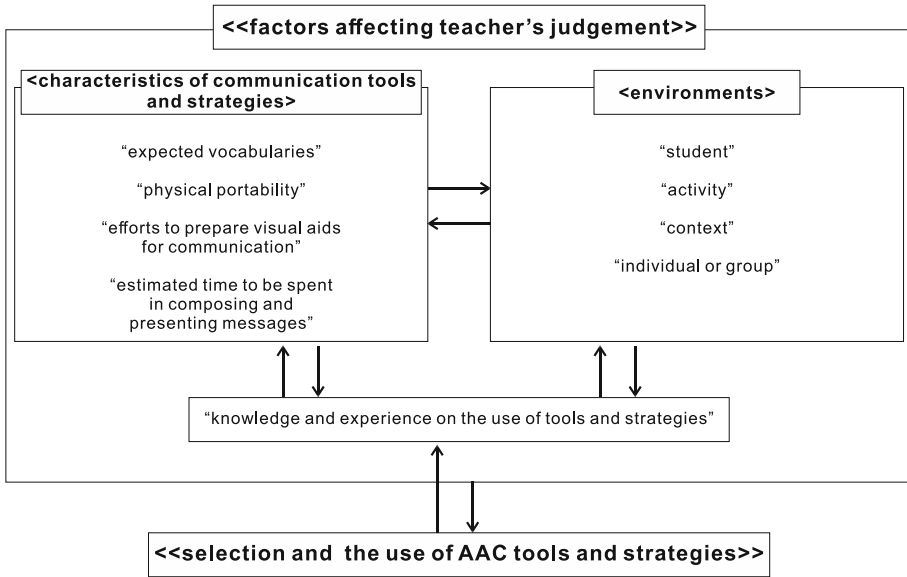
In grounded theory [9], collection of codes that describe similar contents are grouped together to form higher level concepts. Concepts can then be grouped to form categories (and subcategories). After that, relationships between categories and concepts are identified.

Our study outcomes include identification of AAC tools and strategies used in interaction with teachers and students as well as their selection process. First, STalk2 app, printed cards, real objects, hand-written schedule, and speech were identified as AAC tools and strategies used. Consequently, Fig. 2 was derived as the process for selecting one or a few of them. In this figure, « », < >, and “ ” denote categories, subcategories, and concepts, respectively. Rectangles and arrows indicate inclusion and interaction between them.

Teachers conduct «selection and the use of AAC tools and strategies» for interaction with a student. «Factors affecting teacher’s judgement» are <characteristics of communication tools and strategies>, <environments>, and/or “knowledge and experience on the use of communication tools and strategies.” <Characteristics of communication tools and strategies> are comprised of “expected vocabularies,” “physical portability,” “efforts to prepare visual aids for communication (e.g., taking photographs in advance),” and “estimated time to be spent in composing and presenting messages.” <Environments> are comprised of characteristics of “student” with whom teachers try to communicate, “activity” that AAC tools and strategies are applied, and “context” including supports from other teachers and behaviors and attitudes of other students in a classroom, as well as AAC tools and strategies are used to interact with “individual or group.” As a result of the communication, “knowledge and experience on the use of communication tools and strategies” will be updated for future selections.

In our former study, STalk2’s simple steps for creating, searching, editing, and presenting visual aids reduced the burden of communication partners and increased the frequency of presenting visual aids with verbal messages [7]. In other words, that study examines the effects of the improvements on time and efforts in <characteristics of communication tools and strategies>.

In Fujino and Noh’s survey, 61% of special needs school teachers responded that computers were necessary for their communication with students, but only 34% of



**Fig. 2.** Teacher’s process for selecting AAC tools and strategies to interact with a student of special needs school for intellectual disabilities

them used [6]. They also reported that the usage rate in high school was higher than that in elementary school. These facts can be explained by “knowledge and experience on the use of tools and strategies” and different <environments>. That is why, communication partner instruction can be an effective intervention component for individuals with complex communication needs as Kent-Walsh et al. reported [8].

The development of AAC apps are usually focusing on how to improve <characteristics of communication tools and strategies> and how to support a variety <environments>. The results suggest that more attention should be directed toward accommodating with the diversity of teacher’s knowledge and experience on AAC apps.

## 5 Conclusion

In this study, we have examined the teacher’s selection process of AAC tools and strategies at special needs schools for children with intellectual disabilities. The results of grounded theory analysis on transcripts of focus groups suggest that teachers select AAC tools and strategies for interaction with their students based on characteristics of communication tools and strategies, environments, and/or knowledge and experience on the use of communication tools and strategies. Our future work will be the development of adaptive AAC apps to improve behaviors of teachers with a variety of knowledge and experience.

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