

*A Study of Communication Needs in Medical Interventions Using AAC for
Critical Care Recovery Patients*

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Abstract

This study explores the communication needs of ICU patients who have lost verbal abilities due to trauma or treatment. It proposes an Augmentative and Alternative Communication (AAC) system to facilitate communication between patients, medical staff, and caregivers during recovery. The aim is to overcome communication barriers, enhance nursing quality, and prevent adverse hospital incidents caused by poor communication. This research fills a gap in AAC design for this specific healthcare domain, offering valuable insights for future development and testing of assistive devices. This qualitative study investigates the communication needs of critical patients, medical personnel, and family members in an ICU setting. The study found that patients have simpler communication needs, mostly related to sensation and physiological needs. However, when these needs arise, they become urgent. Overly complex communication systems can be burdensome and may be rejected by patients and caregivers. The advantages of AAC include improved communication efficiency and accuracy. Key design considerations for AAC include ease of use, simplicity, context-specific content, and language selection. A four-level AAC design prototype was proposed based on these findings, focusing on sensation expression, physiological needs, and emergency assistance. Future work will involve testing the prototype with patients, medical teams, and family members in the ICU.

Keywords: AAC, ICU Patients, User Requirement, Universal Design, Communication Design

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Introduction

Communication is a crucial behavior in daily human life. When communication abilities are impaired, we need to rely on Augmentative and Alternative Communication (AAC) as a temporary or permanent compensatory method (ASHS, 2005). However, the market demand for AAC is relatively small, resulting in fewer studies and less effectiveness research targeted at patients with special disabilities (Costello, Patak, & Pritchard, 2010; Tseng & Chou, 2016).

For patients who have lost their communication abilities due to temporary trauma or treatment interventions, AAC systems are not specifically designed for their needs, and they often find it difficult to operate these systems on their own. These patients might temporarily or permanently lose their ability to communicate and could be in an Intensive Care Unit (ICU), which poses a significant challenge for their families (Holm & Dreyer, 2018).

Therefore, this study aims to design and provide a patient-centered AAC system that also considers the needs of clinical care experts and the patients' families. During this special recovery period and within the unique care environment, the development of appropriate AAC tools and strategies is crucial and valuable for all three stakeholders.

Currently, there is no design research in Taiwan specifically addressing the unique needs of such patients. Most studies focus on the guidance provided by therapists, without discussing the design and development of the system from the users' perspective (Wang Yunchun, 2018). The research by Ma Ruiju et al. (2011) highlights that some high-tech assistive devices are powerful but expensive and complex, while low-tech assistive devices are cheaper, customizable, and more suitable for different patients' conditions.

Thus, providing a communication aid centered around the patient that also meets the clinical caregivers' needs and considerations is essential during this unique recovery period and care environment. Using more user-friendly AAC tools and strategies can be significant for both patients and caregivers. It can assist the medical team in offering safer and more accurate medical care, enhance patients' confidence during the recovery period, and strengthen their willingness to undergo rehabilitation (Santiago & Costello, 2013).

Development of AAC Systems

Research by Happ et al. (2015) indicates that there is a lack of studies documenting the provision of language response and communication aids to conscious patients during their medical recovery period. Thus, the design of AAC systems should integrate their communication strategies more comprehensively with medical professionals and clinical needs to have a more positive impact on public healthcare environments (Ten Hoorn et al., 2016; Blackstone & Pressman, 2016).

Personalized communication methods have evolved from traditional face-to-face, one-on-one interactions, and the use of pictorial symbols, speech, and writing to the utilization of the internet, text messaging, and social media applications. AAC systems themselves have transformed from traditional tangible devices into applications within computers or mobile devices (Light & McNaughton, 2012; Ganz et al., 2012). According to Handberg & Voss (2018), beyond creating communication possibilities for patients with communication impairments, there is also a need to provide a safer and more proactive healthcare experience. They emphasize designing communication content tailored to patients at different stages of

care, aiming to focus communication on the varying objectives at each stage and reducing unnecessary complexity in the system caused by extraneous communication needs (Handberg & Voss, 2018; Shady, Phillips, & Newman, 2022).

Studies further indicate that a healthcare system focused solely on physiological care is the real barrier to the implementation and use of AAC by healthcare professionals (Carruthers, Astin, & Munro, 2017; Vaeza et al., 2020). In such a “biomedical” cultural framework, healthcare professionals often overlook the actual needs of patients and lack the time and patience to teach and assist them in using AAC (Handberg & Voss, 2018; Zaga, Berney, & Vogel, 2019). Therefore, the education of healthcare professionals should emphasize patient-centered care to provide better nursing and enhanced communication. Healthcare professionals can play a crucial role in promoting AAC, but this requires further education, training, and follow-up actions (Hemsley, Balandin, & Worrall, 2012; Moorcroft, Scarinci, & Meyer, 2019). Consequently, the ease of learning and use of AAC is essential not only for patients but also for the healthcare teams.

Interview Study

To understand the needs of different types of users, this study conducted interviews with doctors, occupational therapists related to AAC use at National Taiwan University Hospital, recovered patients, and their families. By understanding the possible conditions of patients and the process of screening and background comprehension, we observed the patients' physical and verbal abilities and analyzed their current problems. Based on literature review, we conducted qualitative research targeting three stakeholders: the target patient group, experienced healthcare providers (occupational therapists), and patients' families. The aim was to understand the practical problems faced by these types of patients during their recovery period, including the communication needs among medical, caregiving, and patient groups during the ICU and recovery period.

The medical team interviews were conducted through focus group discussions with six ICU nurses and occupational therapists with over 10 years of clinical experience. Additionally, semi-structured interviews were conducted with three recovering patients and two family members. The selection of frontline healthcare providers and patient families aimed to understand the practical communication needs of critical patients during their rehabilitation period, maintaining objectivity in user needs research.

All interviews were conducted with the approval of the hospital. Focus group discussions lasted 120 minutes, while individual interviews were limited to 45-60 minutes. The interview data were analyzed using interpretive description research. Thorne (2016) suggests that interpretive description is particularly suitable for clinically relevant research and requires clinical experience and knowledge in the research questions. This method seeks a coherent conceptual description that identifies connections, relationships, and patterns in practice phenomena. Many researchers advocate using interpretive description for qualitative research in medical professional and caregiving experience studies (Handberg & Voss, 2018; Svenningsen, Egerod, & Dreyer, 2016).

Using this analytical method helps clarify the communication needs and practical issues of patients during their recovery period. It also identifies key items and vocabulary for communication needs, seeking the best form of AAC intervention in medical care.

Throughout the research process, discussions were held with the occupational therapy team at National Taiwan University Hospital to ensure data accuracy and correct research direction.

Discussion

Using traditional methods combined with binary eye-blink communication to guess and understand patient needs and intentions can lead to misjudgments in medical care. Over time, this may cause emotional distress in patients, reducing their rehabilitation motivation and will to live.

For most ICU patients, unless they are blind or have eye injuries, the eyes remain the last controllable means of communication. Compared to general communication-impaired patients, critically ill patients have relatively simple communication needs. Most patients during the recovery period focus on intuitive sensory needs and physiological issues such as pain, scalp itchiness, dizziness, and sensitivity to light and sound. Many critically ill patients are in a temporarily or permanently paralyzed state, so they do not have many daily living needs.

Overly simplistic communication designs can lead to patient discomfort, which may increase the burden on caregivers due to the patient's excessive use. When equipment and functions are too complicated, patients may lack the energy and strength to learn and adapt, leading to resistance to use. Medical caregivers may also find it difficult to learn. Communication issues that prevent caregivers from understanding patient needs can hinder the caregiving process.

Conclusion

This study aims to design and develop an eye-controlled communication assistance system specifically for ICU patients who experience temporary communication loss during medical recovery. A simple tablet as a communication device is chosen for its affordability, ease of installation, and use, thus serving as the core hardware of this system.

- 1) Firstly, the system's design must be easy to learn and use for both patients and caregivers. In addition to adhering to the principles of Augmentative and Alternative Communication (AAC) needs, the system should be designed with "user-friendliness" in mind, utilizing eye control to reduce operational difficulty and meet communication assistance needs.
- 2) Secondly, the design process should avoid overly complicated and daily life-oriented designs, and instead, focus on the specific communication needs of critically ill patients. These needs include:
 - 3) Sensory needs: pain, itchiness, dizziness, sensitivity to hot/cold, light, and sound.
 - 4) Physiological needs: hunger, thirst.
 - 5) Assistance needs: suctioning, emergency calls.

Instructional needs: language selection, labeled body diagrams, day/night reminders, etc.

Finally, considering the characteristics of ICU patients and caregivers in Taiwan, the system should provide options in Mandarin, English, and Taiwanese Hokkien to ensure wider language accessibility and ease of use. In conclusion, the eye-controlled communication assistance system developed in this study will, through its simple and user-friendly design, meet the diverse needs of ICU patients experiencing temporary communication loss, providing effective communication support.

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