AAC in ICU: Text or Symbols

Judson, A., Ricketts, I.W.,Waller, A. Alm, N., Ashraf, S., & Gordon, B.
University of Dundee, Dundee, DD1 4HN
MacAulay, F., Etchels, M., Brodie, J.K., Shearer, A.J., & Warden, A.
Ninewells Hospital, Dundee, Scotland, U.K

Keywords: Research, Communication, Technology, Intensive Care

Abstract

The Intensive Care Unit (ICU) patient is an extreme example of an Augmentative and Alternative Communication (AAC) user; their requirement for an AAC device is typically 2-3 days whilst their cognitive abilities are often significantly impaired because of the combination of their presenting condition, medical sedation and the ICU environment. AAC device complexity and training requirements must therefore be kept to an absolute minimum or eliminated. This session will discuss the complexities of AAC intervention for non-elective adult patients in ICU, comparing in particular off-the-shelf AAC devices versus a solution specifically developed for the ICU adult patient.

AAC Intervention in ICU

To date, research investigating augmentative communication methods for the ICU patient has been limited – the nature of the ICU environment makes introduction of yet more equipment difficult; patients rarely stay in ICU for an extended period of time and may only need assistive communication for a few hours or days. Current AAC methods used by patients in ICU include mouthing, gesture, and alphabet charts. However, these have been shown to be time consuming and frustrating for the patient, largely because they require the untrained nurse or communication partner to be part of the augmentation process [3, 1, 12].

Voice Output Communication Aids (VOCAs) have been used with limited success in ICU. Costello [4] investigated the use of a VOCA by children who were elective ICU patients, i.e. an ICU stay was anticipated, for instance, following planned surgery. This allowed Costello to customise the device to the patient requirments and to offer appropriate training before their visit to the unit. Happ et al [10] investigated the use of 2 commercial VOCAs with the general population of ICU. In Happ's study, 20 minutes of training was delivered to patients once they were attempting to communicate. Both studies reported successful interventions, although Happ et al reported that, in 10 of the 11 observed sessions of patients using the VOCAs, patients required assistance, and in some cases resorted to typing messages rather than selecting from pre-stored symbol-linked messages.

Existing VOCAs are designed for the long term user and in many instances use symbolic representations of language concepts or symbolic representation to link to pre-stored conversational items. Although VOCAs can be used for non-elective ICU patients, the environment, impact of medication on the patient's ability to concentrate and the limited duration of stay means that the patient is not able to receive the time needed for training [6, 5]. Training ICU patients to use VOCAs that require hours of training is thus difficult, if not impossible to deliver.

The Design of ICUTalk

The alternative to using an off-the-shelf VOCA system is to develop a solution which is specifically designed for the ICU patient. ICUTalk [11, 7, 2] is one such system. The aim of the ICUTalk research was to develop a VOCA specifically designed for adult patients in intensive care that requires minimal training, is simple and intuitive to use but still provides the patient with sufficient communication capabilities.

The ICUTalk system provides patients with three possible interfaces: two provide alternative layouts to approximately 200 pre-stored text-based utterances, organised into 8 categories; while a third offers an alphabet board. The first interface, boxes (figures 1a, 1b) features a grid layout of content, similar to that used in commercial VOCAs. The second interface, bubbles (figure 2a, 2b) was designed to use a simpler layout which would be more intuitive, especially for scanning access. The third interface is an alphabet board (figure 3).

Figure 1a

Figure 1b

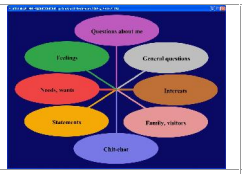

Figure 2a

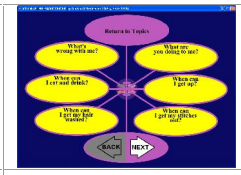

Figure 2b

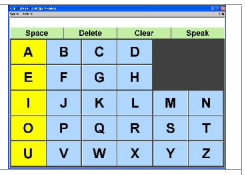

Figure 3

Following ICUTalk's development and pilot evaluation, the system was introduced to the Ninewells Hospital ICU, for evaluation by patients over a 1 year period (at this stage, just the boxes and bubbles interfaces were available). Based on evidence collected through various questionnaires and automated recording of use, ICUTalk was shown to be successful after 5-10 minutes of training with 19 patients [11, 7].

Discussion

The evaluation of ICUTalk indicated that contrary to research which used conventional VOCAs with non-elective ICU patients, this bespoke system could be used with minimal training and assistance. The design team focused on the needs of this particular user group and via a series of observational studies and user evaluations the following design evolved:

- Topic-based vocabulary organisation can be navigated by users without training. This approach relies on the user knowing, or being able to identify, the access route to the utterance they require. Inevitably not all required utterances will be available. The data collected indicates that although such a categorisation approach is not ideal (users do not know the vocabulary content and may search for non-existent utterances or fail to locate target utterances), patients were still able to locate vocabulary more successfully than instances reported in other studies because they can read the topics and the target utterances. As ICUTalk users explore the vocabulary, they are able to read and recognise content that is of use to them, whereas with a symbol based system the user cannot see what they are selecting because the utterance is linked via an abstract symbolic representation. The user therefore

requires time to learn the relationship between the symbols and the utterances they represent. Unfortunately time to learn is severely restricted for the majority of ICU patients.

- The ICUTalk system is adaptable, supporting different user capabilities and requirements in the same system. This allows staff to easily select the most appropriate interface for individual patients without having to introduce different devices to the patient. For instance the boxes interface provides more vocabulary, while the bubbles interface is more appropriate for scanning.
- In the past low-tech intervention, such as alphabet boards, have required considerable input from both patient and communication partner. With ICUTalk, little or no involvement from the communication partner is required. For instance, the integrated alphabet board maintains a record of the letters selected. When the patient is ready, they can press a button to speak the phrase, negating the need for the communication partner to remember the characters chosen.

Conclusions

The results of the ICUTalk research show that VOCAs can be used by ICU patients. However, conventional VOCAs may not always be the most appropriate solution as they are usually designed for a vastly different user group; but by designing a product specifically for the ICU patient, and considering the points raised above, a suitable solution can be developed. The ICUTalk research is continuing: new hardware has become available which is sufficiently rugged to withstand the cleaning requirements of the ICU the software has been updated to further simplify the user interfaces and the system is currently being returned to ICU at Ninewells Hospital Dundee for regular use.

References

[01] Albarran, J.W. (1991). “A review of communication with intubated patients and those with tracheostomies within an intensive care environment”. *Intensive Care Nursing*, 1991, vol.7, pp. 179-186.

[02] Ashraf, S. (2005). *“The Automated Generation of Topical Utterances for a Communication Aid”*. Ph.D. Thesis, University of Dundee, Scotland, UK, 2005.

[03] Ashworth, P. (1980). *“Care to communicate. An Investigation into the problems of communication between patients and nurses in ITUs"*. Royal College of Nursing (London), 1980.

[04] Costello, J.M. (2000). “AAC Intervention in the Intensive Care Unit: The Children’s Hospital Boston Model.” *Augmentative & Alternative Communication (AAC)*, 2000, vol. 16, no. 9, pp. 137-153.

[05] Dowden, P.A., Honsinger, M.J., & Beukelman, D.R. (1986). “Serving Nonspeaking Patients in Acute Care Settings: An Intervention Approach”. *Augmentative and Alternative Communication (AAC)*, 1986, vol. 2, no. 1, pp. 25-32.

[06] Easton, J. (1988). “Alternative Communication for Patients in Intensive Care” *Intensive Care Nursing*, 1998, vol. 4, pp. 47-55.

[07] Etchels, M., MacAulay, F., Judson, A., Ashraf, S., Ricketts, I.W., Waller, A., Alm, N., Warden, A., Gordon, B., Brodie, J., & Shearer, A.J. (2003). “ICU-Talk: the development of a computerised communication aid for patients in ICU” *Care of the Critically Ill*, 2003, vol. 19, no. 1, pp. 4-9.

[08] Granberg-Axèll, A., Bergbom, I., & Lundberg, D. (2001). “Clinical signs of ICU syndrome / delirium: an observational study” *Intensive and Critical Care Nursing*, 2001, vol. 17, pp. 72-93.

[09] Hafsteindóttir, T.B. (1996). “Patient’s experiences of communication duration the respirator treatment period”. *Intensive and Critical Care Nursing*, 1996, vol. 12, pp. 261-271.

[10] Happ, M.B., Roesch, T.K., & Garrett. K. (2004). “Electronic voice-output communication aids for temporary nonspeaking patients in a medical intensive care unit: a feasibility study”. *Heart & Lung*, 2004, March / April, pp. 92-101.

[11] Judson, A., (2005). *“Access to Communication for Adult Patients in Hospital Intensive Care Units: A Comparison of Vocabulary Retrieval Techniques”*. Ph.D. Thesis, University of Dundee, Scotland, UK, 2005.

[12] Leathart, A.J. (1994). “Communication and socialisation: an exploratory study and explanation for nurse-patient communication in an ITU”. *Intensive and Critical Care Nursing*, 1994, vol. 10, pp. 93-104.

[13] Russell, S., (1999) “An exploratory study of patients’ perceptions, memories and experiences of an intensive care unit”. *Advanced Nursing*, 1999, vol. 29, no. 4, pp. 783-791.