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Invited Session on ICT-based Alternative and
Augmentative Communication (ICT-AAC 2012)
The User's Perspective



Invited Session on ICT-based Alternative and Augmentative
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The User's Perspective

Editor:

Zeljka Car

University of Zagreb

Faculty of Electrical Engineering and Computing

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Prepared by:

Zeljka Car

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Invited Session on ICT-based Alternative and Augmentative Communication

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Alternative and Augmentative Communication (AAC) combines different methods that can be used to help people with complex communication needs by replacing or supplementing natural speech and/or writing with symbols. ICT-based AAC services refer to services utilizing specific know-how on symbol-based human-to-human and human-to-machine communication in a computer and networking environment.

Advances in technology provide more opportunities and cost effective solutions for AAC. By using tablet, smartphone or any other mobile device adapted to their needs, AAC users may be effectively included in the information society if they are provided with appropriate high quality AAC service. As the opportunities rise, more challenges appear on the horizon. New initiatives, models, methods and pilot services come out from different research centers or enterprises. On the other side, users often experience inconsistency in user interfaces when using the same service on different devices, low usability and adaptation features of these services. Developers face new challenges in different phases of the service design.

The goal of this special session is to share and exchange research results on ICT-based alternative and augmentative communication (AAC) targeted for persons with complex communication needs. Multidisciplinary approach is beneficial, involving the aspects of electrical engineering, computer science, education and rehabilitation sciences, speech therapy, psychology, and graphic design. The original submissions are solicited on topics related to the R&D issues and solutions in the field of AAC services, applicability of new mainstream technology (smartphone, tablet) and user experience.

List of topics includes (but is not limited to):

- Concepts of eAccessibility and e-Inclusion in general
- AAC in mobile network – opportunities and challenges
- Touchscreen mobile devices in AAC
- AAC tools, solutions and software platforms
- AAC in social networks
- Context aware agents and applications for AAC
- User interface and content adaptation in AAC services

Instructions for Authors

Submitted papers must follow the format requirements as detailed in the Conference Web Site.

Paper Publications

Accepted papers will be included in conference proceedings published by Springer-Verlag in Lecture Notes in AI as part of the LNCS/LNAI series. Regarding formatting papers, please refer to the conference web site. Selected papers may also be published as book chapters in a volume of their Engineering Series and indexed in ISI conference publications, EI, INSPEC or appropriate journals, etc.

Important Dates

Submission of Papers:	January 22, 2012
Notification of Acceptance:	February 20, 2012
Upload of Final Publication Files:	March 10, 2012

Session Chair

Dr. Željka Car
University of Zagreb
Faculty of Electrical Engineering and Computing
Unska 3, HR-10000 Zagreb, Croatia
E-mail: zeljka.car@fer.hr
Phone: +385 1 6129 787
Fax: +385 1 6129 832

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Introducing Session on ICT-based Alternative and Augmentative Communication

Željka Car¹, Dinka Vuković², Nadica Bjelčić³, Goran Karas⁴ and Velimir Karas⁴

¹ University of Zagreb, Croatia

Zeljka.Car@fer.hr

² Croatian Down Syndrome Association

dinka.vukovic@gmail.com

³ OKO Association of Parents of Visually Impaired and Multi Disabilities Children

nadicab@gmail.com

⁴ AmoReVera - Association for persons with intellectual and communication impairments

amorevera.hr@gmail.com

Persons with complex communication needs are individuals who are unable to use speech as their primary method of communication. Reasons for complex communication needs differ widely, such as physical and/or intellectual impairment, Down syndrome, Autistic Spectrum Disease etc. Alternative and augmentative communication (AAC) is based on the use of graphic and textual symbols to represent certain objects, actions, or concepts. AAC has been proven as highly beneficial for improving speech, literacy, learning, employment, and quality of life for persons with complex communication needs. ICT-based AAC services refer to services that enable symbol-based human-to-human and human-to-machine communication in a computer and networking environment.

Alternate and augmentative communication offers children with developmental delays an instant preview of typical communication situations; it encourages expressive and receptive language development and serves as a bridge to future speech development. Children who used *Picture Communication Symbols* (PCS) were more efficient in speech.

Based on research, as well as on the basis of parental experience in the independent use of AAC, it is recommended to apply AAC as the first means of fostering the development of speech, where a child is provided information via three different channels: speech (auditory) + image (visually) + gesture (body language).

Children with Down syndrome are ready to communicate much earlier than they speak and they better understand language than they can use it. The disproportion between understanding and speaking a language at an early age can be two to three years and in some cases even more. For that reason it is necessary to develop language understanding in parallel with the development of alternative and augmentative communication skills.

Communications skills of children with multiple impairments, including serious motor disabilities and/or vision impairment, lag behind the skills of their peers. It is also very difficult to introduce the sign language because of the motor problems. At an early age the stress is usually placed on improving a child's

motor abilities, so other areas such as sensor, communication, oral skills and fine facial motor skills are neglected. In most cases parents seek support of speech therapist when their child is at the age of three.

Unfortunately, parents still have to navigate on their own through the system of communication and education habilitation. Experts who know how to initiate communication with children with motor impairments are few, especially where children of multiple impairments, including vision impairment, are concerned. There is no systematic plan to develop communication skills, i.e. basic terminology to start mastering communication has not been devised.

Persons with intellectual and communication impairments are considered as one of the most socially isolated people in the society, mainly caused by the strong presence of stigmatization which sets certain rules and behaviour patterns. In the last 50 years, they have gained many legal rights that improved various aspects of their lives. However, these rights cannot ensure acceptance from their peers, neighbours, colleagues or any other group which directly affects the lives of persons with the impairments.

So far, persons with intellectual and communication impairments haven't got a real chance to have friends out of their special educational environment. We are witnessing that deinstitutionalization and implementation of the ICT based augmentative and alternative communication solutions is improving these chances thus removing the barriers that separate them from other parts of the society.

Involving the parents in the research and development of ICT-based AAC service aims at better identification of research problems, efficient requirements definition and obtaining experienced quality feedback for service evolution and improvement. Recommendations for development of interface for AAC applications based on parents experience are the following: Alternative communication should be based on big images without distracting details. Secondary motives should be avoided. It is advisable to use Arial font because of its simplicity and visual clarity. Red colour is the quickest to reach the brain due to its frequency so it can be used to emphasize individual letters or words.

Parental activities go beyond recommendations: a family with the 22 year old son with autism and facing the lack of IT services in Croatian was encouraged to develop Croatian AAC communicator, including AAC portal with the Web-Communicator as its essential part. The name of the portal is an abbreviation for "*I communicate*" in Croatian language, which puts emphasis on its primary purpose.

Collaboration efforts of multidisciplinary researchers, software developers and parental associations is crucial for designing interoperable and scalable AAC services by using smart information and communication technologies including software agents.

Five papers within this invited session cover original submissions on technical and non-technical aspects of developing and using ICT-based AAC services and investigate potential of applying tablet devices and tangible user interfaces in this field. The overall goal of all undertaken researches is to advance social inclusion of people with complex communication needs by using teamwork synergy of experts from different fields and grasping new technology potential.

Users Outline: Parents' View on Current Situation with Alternative and Augmentative Communication

Dinka Vuković¹ and Nadica Bjelčić²

¹ Croatian Down Syndrome Association (CDSA)
dinka.vukovic@gmail.com

² OKO Association of Parents of Visually Impaired and Multi Disabilities Children
nadicab@gmail.com

Abstract – Parents of children with complex communications needs, who are also representatives of parental organizations, describe the situation in the fields of AAC and their experiences based on which they define the main requests for symbol based teaching materials and related ICT services.

Keywords: parents, Down syndrome, children with multiple impairments, symbols, ICT services.

1 Introduction

Alternate and augmentative communication offers children with developmental delays an instant preview of typical communication situations; it encourages expressive and receptive language development and serves as a bridge to future speech development [1]. Children who used *Picture Communication Symbols* (PCS) were more efficient in speech [2].

Children with Down syndrome are ready to communicate much earlier than they speak and they better understand language than they can use it. The disproportion between understanding and speaking a language at an early age can be two to three years and in some cases even more. For that reason it is necessary to develop language understanding in parallel with the development of alternative and augmentative communication skills.

Communications skills of children with multiple impairments, including serious motor disabilities and/or vision impairment, lag behind the skills of their peers. It is also very difficult to introduce the sign language because of the motor problems. At an early age the stress is usually placed on improving a child's motor abilities, so other areas such as sensor, communication, oral skills and fine facial motor skills are neglected. In most cases parents seek support of speech therapist when their child is at the age of three.

Based on research, as well as on the basis of parental experience in the independent use of AAC, it is recommended to apply AAC as the first means of fostering the development of speech, where a child is provided information via three different channels: speech (auditory) + image (visually) + gesture (body

language).

2 Current situation in Croatia with AAC

Unfortunately, parents still have to navigate on their own through the system of communication and education habilitation. Experts who know how to initiate communication with children with motor impairments are few, especially where children of multiple impairments, including vision impairment, are concerned. There is no systematic plan to develop communication skills, i.e. basic terminology to start mastering communication has not been devised.

- There is no support in the education system in terms of a knowledge catalog for a particular subject, class, nor there is a systematic overview of individual teaching units which are to be transferred to an alternative communication mode.
- There are only a few parents who were educated by foreign experts (Slovenia) and a couple of them who apply AAC.
- Different tools available in the market (mostly *Boardmaker* with *Speaking Dynamically*) are bought by parent associations whose members use them to work with their children. Some institutions have limited supplies of supportive tools and too few experts in the field.

5 User requirements

The *functional requirements* for preparing teaching materials and developing related ICT services are the following:

- Croatian symbol dictionary
- Generating symbol based sentences
- Grammar exercises
- Global reading by the English language learning principle
- Global reading by the Croatian 1st grade curriculum
- Exercises for letter, syllable and short text writing and reading
- Exercises for mastering quantity, counting, addition, subtraction, multiplication, division, fractions, understanding the concepts and learning the words used in mathematics

Additional *high priority requirements* related to the teaching materials are:

- Prepared and categorized according the communication disabilities and frequency of use
- Incorporated pictures, text and audio record (voice recording or text to speech option)
- School teaching material prepared and categorized according to the subjects

and by Croatian National Educational Standard program, where materials for different subject should provide visual, textual and audio support for explanation of new words and concepts.

5 Recommendations for development of interface for AAC application

Alternative communication should be based on big images without distracting details. Secondary motives should be avoided. It is advisable to use Arial font because of its simplicity and visual clarity. Red color is the quickest to reach the brain due to its frequency so it can be used to emphasize individual letters or words.

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Tool demo: Augmentative and Alternative Portal JA-KOM with Web-Communicator

Goran Karas and Velimir Karas

AmoReVera - Association for persons with intellectual and communication impairments
amorevera.hr@gmail.com

Abstract - This paper presents first Croatian non-commercial alternative and augmentative communication interactive web portal JA-KOM. It is developed by the parent of a child with communication impairments and within the parent association AmoReVera. Web-communicator is implemented as a part of the portal thus providing one aspect of the communication support to persons with these impairments.

Keywords: augmentative and alternative communication, persons with impairments, AAC portal, web-communicator, menu, symbols, voice presentation of the symbols.

1 Introduction

Persons with intellectual and communication impairments are considered as one of the most socially isolated people in the society, mainly caused by the strong presence of stigmatization which sets certain rules and behavior patterns. In the last 50 years, they have gained many legal rights that improved various aspects of their lives. However, these rights cannot ensure acceptance from their peers, neighbors, colleagues or any other group which directly affects the lives of persons with the impairments.

So far, persons with intellectual and communication impairments haven't got a chance to have friends out of their special educational environment. We are witnessing that deinstitutionalization and implementation of the IT based augmentative and alternative communication (AAC) solutions is improving these chances thus removing the barriers that separate them from other parts of the society. Being a parent of the 22 year old son with autism and facing the lack of IT services in the Croatian language, encouraged me to develop Croatian AAC communicator in cooperation with my older son. We have also started AAC portal with the Web-Communicator as its essential part. The name of the portal is an abbreviation for "*communicate*" in Croatian language, which puts emphasis on its primary purpose.

2 JA-KOM AAC portal

Considering its structure and content, JA-KOM [1] portal is primarily focused on

the people with intellectual impairments. Except the Web-Communicator, its content includes interesting facts, photos, educative animations and games. Secondary purpose is to serve the parents and professionals as a source of services and information related to AAC.

The following implemented functionalities and content are specific to the portal:

- Option "Attracting the attention" - Audible button plays a short pleasant bell and serves an user to divert attention to himself.
- Menu of various interests - Various interests and useful instructions adapted for persons with impairments are presented using symbols and photos ("In traffic", "How to make", "Small school", "Games").
- Urgent and indispensable aid - This audible button plays an alarm sound for the three minutes. Its purpose is to assist the user so he/she can inform the environment in the case of delicate and disturbing situations with one click.

As a part of this portal, several interactive games are implemented for developing and improving cognitive and language skills. User is supposed to categorize different objects and to name distinguishing concepts. Each of these games is divided into three levels according to its complexity.

3 Web-Communicator

Communicator's interface (Figure 1), functionality and targeted content simplifies and facilitates access for persons that, besides communication impairments, have limited motor skills.



Figure 1 Start page of the Web-Communicator

Web-Communicator is developed as interactive web service with audio records, symbols, animations and images. Person using the Communicator can, for example, express his/her hunger by pointing to the photo of milk and cookies while, on the other hand, teachers can create simple lessons and instructions, communicate or affect behavior of the class by using photos and symbols. Communicator contains symbols and their associated audio records. User chooses one of the galleries that fits his/her current needs and searches for desired word or phrase inside the gallery.

