Usability of Electronic Communication Aids in the Light of Daily Use

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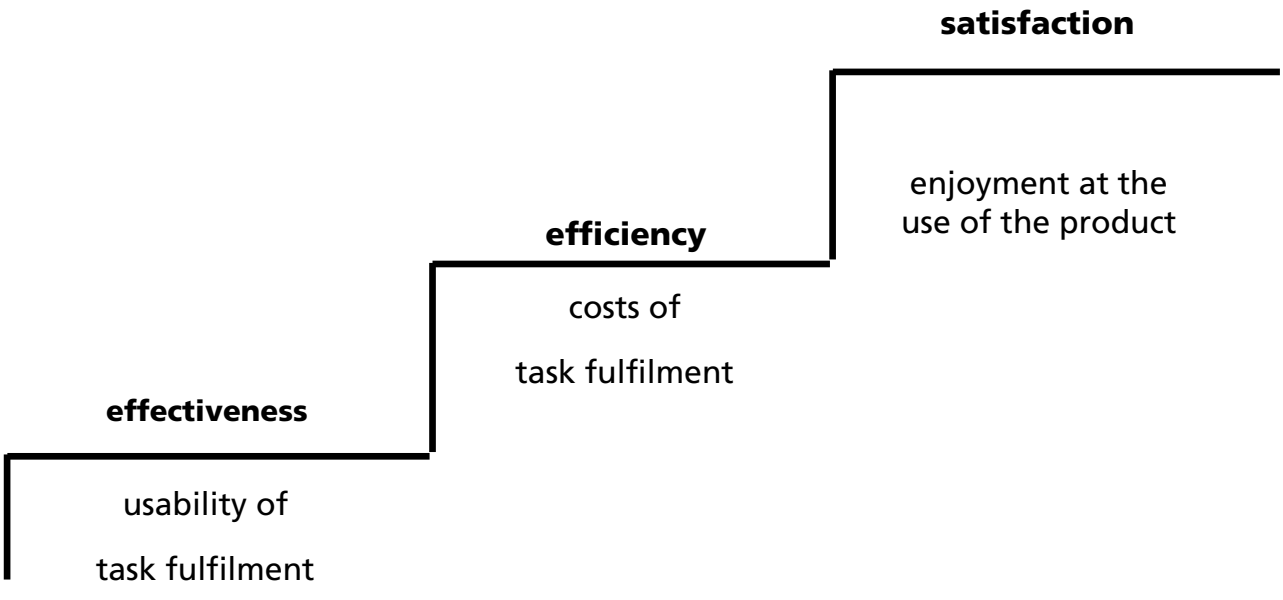
Electronic communication aids (ECA) are daily used devices by people with specific needs. Daily used devices have to fulfil some standards like the ISO 9241 part 11. We deployed an online-survey and interviewed users of such ECAs in order to show how usable they are. As we can show, electronic communication aids have low usability values corresponding to the measurement of effectiveness, efficiency, and satisfaction. Optimisation has necessarily to be done, e.g. concerning voice output, weight, and handling.

Introduction

It is well known that a product like a computer or a mobile phone must be usable – would it be used otherwise? It probably would not.
But if we restrict the consumer group and look at electronic devices which are designed for people with specific needs, in our case for people who cannot communicate without communication boards or electronic communication aids (ECA), the question *"would it be used"* cannot be answered easily. This is due to the fact that there is a fundamental difference between products like mobile phones and ECAs: ECA users do not have the possibility to choose whether they want to use an ECA or not. They have to use it in order to be able to communicate. Furthermore they cannot decide which kind of ECA they would like to use. They have to use the product they are given by their health insurance fond. Nevertheless the usability seems to play an important role for the efficient communication with an ECA. Unfortunately there was not much work done in this field during the last two decades, as Scherer [1] points out. The vocabulary and grammar have been improved. However, other aspects that affect usability were not optimized.

And that is the point we are interested in: Which role plays the usability of a product in the world of ECAs at all? Are the devices effectively and efficiently usable and even give some sort of satisfaction to the people who use them?

Usability is defined as the "extent to which goals are achieved with effectiveness, efficiency and satisfaction." [2]



If we look at electronic communication aids this means that the user can use their devices to communicate with other people around them effectively – as accurate as possible – and efficiently – as fast as possible. The user aims at a satisfactory communication process.

State of the Art

Allen [3] mentioned that the language is the oppressor in Augmentative and Alternative Communication (AAC). However, is this true or is it rather the technology? If the ECA does not exactly match the unique needs of its user, the ECA is worthless. It could even be possible that the user rejects the ECA.
Though, there are some improvements like Pennington´s et al. [4] compansion-technique to enhance the rate of communication per minute (efficiency), it is little effort done in respect to the effective use of such devices. Only both types, effectiveness and efficiency, would have a greater impact on satisfaction.

Our Survey

In order to get a picture of the usability of ECAs and to show lines of possible improvements, we had three different approaches. First of all, we interviewed users of ECAs and caretakers (occupational therapists, parents …). We asked manufacturers about their experience in order to increase the usability and we did literature research as well.
We also composed two explorative online-surveys, one for adults and one for children and adolescents which was easier to understand for this user group. These surveys were divided into three parts. One part for general information on e.g. age and sex. A second part which was intended for people who already use electronic communication aids and/or remote control switching devices, and the third part which was intended for people who do not use any of these devices because they can manage their life in a different way or they just do not know that those electronic aids are available.
129 people took part in the survey. It has to be highlighted that it was a cross-generation survey so the youngest participant was in primary school age and the oldest was in a home for the elderly age. Not surprisingly, our findings of the online-survey resemble the outcome of the interview with the users and their caretakers.
We are interested in the usability aspects of these ECA-devices. Many of the adults said that they have problems with weight, handling, display, and that it is not possible to combine ECAs with other devices (e.g. mobile devices). It is not always possible to move around with the ECA and to use them at every location at school, in the office building, and not to mention the leisure time. If we look at the display, it is almost always hard to recognise anything on the display in the sun. So, the people are very limited in their choice where to be. The children and adolescents responded in a similar way.
One interesting finding is that ECAs – at least in Germany - do not offer a childish voice as the output voice. It is not feasible to express utterances in a prosodic way as well. The user cannot use the device to express utterances in an emotional manner – the voice sounds always the same. Furthermore it is even hard to discriminate between a statement and a question - only the word order is different. Obviously, this is a great challenge which needs to be solved.

Our findings includes – at least – the opinion of the manufacturers that their podructs would improve the quality of life. This is an important point in respect to the sponsor due to short-hand fact that they always want to save money and give them a cheaper or used and hence older ECA instead of giving people the opportunity to enhance their quality of life even more with a higher-level device.

Future Work and Conclusion

Summing up it can be said that ECAs have manifold usability problems that should be eliminated in order to provide a usable tool for people with limited communication alternatives. The users of ECAs feel a kind of satisfaction because the devices allow them to communicate with all the people around them, strangers as well. However, they cannot communicate in an efficient and effective way in the daily use. This emphasises the necessity of research in the area of usability of electronic communication aids.
As mentioned in the introduction, if we look back at the last 20 years we see that the electronic communication aids did not improve very much compared to the electronic optimisation of other devices (e.g. telephone, TV/hifi or computers).
To show first lines of improvements, it will be useful to equip ECAs additionally with a childish voice, to add the possibility of prosodic tags or markers to the output voice, and to lower the size and weight but not at the expense of the usability.
For children, who use ECAs, it is easier to get in contact with other children outside their school, if the ECA can emulate a childish voice.
Prosodic tags can help the listerner – be it the parent, a friend, the teacher/employer, or the salesclerk – to discriminate between the emotional state of the speaker. In return, the listener has the opportunity to act appropriately or as put by Murray and Arnott:"Speech is the principal mode of communication between humans, both for transfer of information and for social interaction.“ [5]
A pleasant stream of speech and a faster access to word combination and phrases will improve not only the usability but also the social interaction - the quality of life.

Our future work will especially focus on concrete ways for optimisation of ECAs in order to achieve a product which fulfill the user´s needs depending on her/his skills corresponding to ISO 9241-11 [2].

References

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Hoffmann, L. & Wülfing, J.-O. (2010). *Usability of Electronic Communication Aids in the Light of Daily Use.* In: Proceedings of the 14th Biennial Conference of the International Society for Augmentative and Alternative Communication (259). Barcelona, Spain