An adaptive interface based on the player's abilities

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Keywords: abilities · adaptive interface · video games

During this workshop, we aim to discuss the definition and characterization of the necessary abilities in the context of video game practice.
Our ambition is to develop a testing interface that allows us to define the player's abilities and offer them interactions based on these abilities. Our approach is based on a abilities-centered perspective of the player. Thus, the stance proposed in this research is to provide interactions that rely on the user's abilities rather than compensating for their deficiencies.

This approach aligns with the principles of Ability-Based Design (ABD), which aims to create technologies that leverage a person's abilities to interact with available resources [1]. This method emphasizes adapting the interface to the individual needs of the user [2]. ABD's goal is to design adaptive interfaces, particularly interactive technologies that detect the user's abilities and adjust accordingly [1] [2]. This method is based on seven principles, which may be optional or required, and cover aspects related to the stance (1. Ability, 2. Accountability, 3. Availability), the interface (4. Adaptability, 5. Transparency), and the system (6. Performance, 7. Context)[3].
While the ABD principles seem aligned with our thinking, it appears that although this method offers various elements concerning the stance to be adopted as a designer, few elements are provided regarding the characterization of abilities. Indeed, this method lacks a proposed framework for defining abilities, and studies that employ this approach offer minimal development of this aspect in their articles.[4]. A thesis currently in progress focuses on modeling abilities and integrating them into the design process as requirements that systems must meet [5]. However, to our knowledge, no publication has yet reported on this modeling.
Moreover, since our field of study is focused on video games, we are questioning the impact of this specific context on the definition of abilities and the potential other components of the situation to be considered in proposing interactions tailored to the user.

In order to respond to these questions, we began a study in collaboration with

occupational therapists working at Raymond Poincaré Hospital, France. For this study, we have chosen to initially focus on motor abilities. The general idea is to define and assess the motor abilities required during video game practice. To this end, we developed a semi-structured interview guide for occupational therapists from different structures and services, working with patients who have motor impairments. The purpose of these interviews is to identify the motor assessments conducted by the therapists, the evaluation criteria, the factors guiding the choice of assessments according to the patients, and the impact of these evaluations on the recommendation of assistive devices or adaptations.

Thus, the interviews broadly cover the motor assessments carried out by therapists, the factors guiding the choice of these assessments, and the evaluation criteria. Then the interview specifically addresses new technologies and the criteria for implementing assistive devices to enable or facilitate access to them. The goal is to draw inspiration from the logic followed by therapists when conducting assessments in order to select and prioritize the tests proposed by the interface.

This initial study will provide insights into questions regarding the evaluation and definition of user abilities, however, other factors must also be considered in optimizing interactions, such as the context of use, the individual's preferences and habits, as well as the available equipment and the constraints imposed by the video game and the console used, for example. These questions can be addressed during the workshop.

References

1. Wobbrock, J. O., Kane, S. K., Gajos, K. Z., Harada, S., Froehlich, J. (2011). Ability-based design: Concept, principles and examples. ACM Transactions on Accessible Computing (TACCESS), 3(3), 1-27.
2. Gajos, K. Z., Wobbrock, J. O., Weld, D. S. (2007, October). Automatically generating user interfaces adapted to users' motor and vision capabilities. In Proceedings of the 20th annual ACM symposium on User interface software and technology (pp. 231-240).
3. Wobbrock, J. O., Gajos, K. Z., Kane, S. K., Vanderheiden, G. C. (2018). Ability-based design. Communications of the ACM, 61(6), 62-71.
4. Nolte, A., Wobbrock, J., Volkmann, T., Jochems, N. (2022). Implementing ability-based design: A systematic approach to conceptual user modeling. ACM Transactions on Accessible Computing, 15(4), 1-26.
5. Nolte, A. (2023, June). How To Model Users Through Their Abilities: A Methodological Perspective On Ability-Based Design. In Proceedings of the 31st ACM Conference on User Modeling, Adaptation and Personalization (pp. 280-284).