Chapter 13
Development of Ambient Assisted Living Products and Services: The Role of International Classification of Functioning, Disability, and Health

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ABSTRACT
Background: the involvement of the potential end users in the development processes is a relevant issue for the acceptance of Ambient Assisted Living (AAL) products and services. Objective: this study aimed to use the conceptual framework of the International Classification of Functioning, Disability and Health (ICF) to conceptualize instruments for the different phases of the AAL development processes. Methods: personas and scenarios were modified, considering the fundamental concepts of the ICF in order to highlight end user’s functioning and health conditions, and an ICF based instrument for usability assessment was defined and validated. Results: the results of several observational studies suggest the adequacy of the ICF based instruments (personas and scenarios and usability assessment instrument). Conclusion: the present study indicates that the ICF based instruments can be useful tools for the development of Ambient Assisted Living products or services.

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INTRODUCTION

The active ageing paradigm aims to contribute to the expectation of a healthy, autonomous and independent life with quality, as well as to a continuous participation in social, economic, cultural, civil or spiritual matters, as people get older, not forgetting those who are vulnerable, physically disabled or in need of care (World Health Organization, 1998; World Health Organization, 2002).

In this context, the technological solutions might have a key role in the promotion of human functioning and in the mitigation of disabilities, particularly those resulting from the natural ageing process. This perspective is evident in the development of Ambient Assisted Living (AAL) products and services (Calvaresi et al., 2016).

One obvious way to get knowledge about the potential end users of new AAL products and services is to involve them in the development process. Flynn and Jazi (1998) argue that the involvement of the end users is a complex approach and, in general, the level of communication between those that develop the technological solutions and those that might use them is very low, namely because developers and end users have different contexts and expectations. This is in opposition to the supposition that the end users’ requirements can be fully understood at the beginning of any development process.

In fact, the end users may not even be aware of their needs or be able to express them. Additionally, the end users have difficulties to understand the solutions proposed by developers due to their unfamiliarity with development methods and other technical aspects (Flynn & Jazi, 1998). Another important issue is that the requirements and needs of the end users evolve over time as they acquire knowledge about what can be achieved with the technological solutions being proposed (Ståhlbröst, 2008).

AAL solutions, by their nature and complexity, require efficient development methods that should consider a broad range of aspects such as the personal characteristics of the end users, including their functioning capabilities.

There are several models to better represent and explain how human functioning and incapacity interact. In particular, the International Classification of Functioning, Disability and Health (ICF) is a key element because it presents a conceptual framework for functioning and disability with consolidated concepts and terminologies that allows a multidisciplinary approach centered on the individuals (World Health Organization, 2001).

Considering the current maturity of AAL products and services, many of the developments are still oriented to the technological perspective and not to the characteristics of end users, namely functioning capabilities (Queiros, Silva, Alvarelhão, Rocha, & Teixeira, 2015). The development processes of AAL products and services should have different phases, including the conceptual validation, prototype test and pilot test, which should be supported by adequate and consistent instruments (Teixeira et al., 2011). In addition, given that the AAL products and services aim to improve individual performance in carrying out daily activities as well as the participation in life situations, then AAL products and services are, according to the ICF perspective, environmental factors that influence the functioning of the individuals. Therefore, the authors argue that the ICF conceptual framework can be used to conceptualize instruments for the different phases of the AAL products and services development processes.

In this context, this chapter shows that ICF concepts can be used to support the definition of personas, scenarios, and usability assessment instruments intended to be used during the AAL products and services development processes. For that, several observational studies were conducted. In addition, this