Involving end-users in the design of a digital platform for Including People with Intellectual and Developmental Disabilities in Higher Education and Employment: preliminary findings

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ABSTRACT

Although the inclusion of People with Intellectual and Developmental Disabilities (IDD) is a current issue, it is still something that faces many challenges, since not all the population understands this need and not all institutions are prepared to welcome them. Therefore, it is essential to understand the needs of individuals with IDD when they wish to enter the Higher Education Institution or the job market, as well as access to digital platforms. Designing such a platform is considered a challenge, in this sense, it becomes crucial to involve end-users in this process. This paper portrays the experience of involving People with IDD, as well as other stakeholders, in gathering requirements and design for the prototype of a digital platform "Hilives". A digital resource that can recommend connections between different stakeholders (in a dynamic way) and that can play a crucial role in networking opportunities that allow people with IDD to attend Higher Education and find a job. Preliminary findings are presented highlighting the benefits of using a person-centred approach when developing research involving people with IDD and surveying different types of stakeholders.

KEYWORDS

Opportunity, Accessibility, Intellectual and developmental disability, Inclusion, Business, Higher Education, Person-centered design

1 INTRODUCTION

One of the current main concerns of governments, institutions and organizations, such as the European Commission and UNESCO, has been the promotion of more inclusive societies [1]. In order to meet

this challenge, there have been a number of initiatives and calls, directed at all sectors of society, aiming at the development of innovative solutions that allow all citizens to achieve full participation in all aspects of life and society [2]. Higher Education Institutions (HEI) have been called to contribute to these challenges, mainly through the expansion of participation initiatives [3].

HEI settings are increasingly characterized by scenarios of heterogeneity, particularly regarding the diverse profile of their students. Besides this response to international policies and recommendations, capturing new students might even be an internal need of HEI [3]. In addition to diversifying the students that come to HEI, it is important to keep them involved, by providing experiences that meet their expectations and experiences of life and that are capable of overcoming barriers that often prevent students from participating in HEI and even leading them to abandon this education system [4].

Despite the progress of the last years, people with IDD still have the barriers in participating in social activities and access work, because of the lack of inclusion and the difficulties to learn, understand and perform activities, like interpersonal relationships [4]. In the specific case of students with IDD, and although their inclusion in regular schools is already implemented, the opportunity for these students to accede to HE is still in the process of being achieved. It is, therefore, time to foster the transition of people with IDD to institutions of higher education and to employment, guaranteeing the opportunity to continue their socialization process, actively participating in the community, developing socio-professional skills together with their peers.

According to [4] and [5], despite being already integrated in the business environment, some of the people with IDD work many times in inferior conditions when compared to other employees, ending up receiving lower pay; besides this, there is often a devaluation of their skills. The academic environment is a strong instrument to diminish the exclusion of people with IDD [6] as education institutions are a richer territory to explore life experiences, learning opportunities, knowledge networks and educational resources, being a fertile ground to promote human growth and potential.

Indeed, a big part of this population has the greatest difficulty in obtaining and maintaining a job, which has led to their social isolation. However, it is also evident that these people, with the support of their families, intend to invest in their training to enter the labour market more easily, gaining their financial independence and increasing their social participation. This paper aims to share knowledge and practices in this field, presenting some preliminary

findings of the European project - Hilives -, that aims creating opportunities for a strategic partnership in the area of inclusion of students with IDD in HE Institutions, and transition to an active and independent life, exploring the role that digital media (such as online platforms) can play in this process. HE is valued in our society and can lead to a meaningful career, new friendships, and interests, as well as a rewarding life, and should be an opportunity for all students.

Besides other outputs, HILIVES, "Including and Connecting in Higher Education - networking opportunities for independent lives", aims to developing a prototype of a digital tool to connect and network opportunities, tackling gaps and mismatches between the expectations, skills and needs of young adults with IDD, and both the HE offers and the employment opportunities. In addition, this project will enable eight partners from four countries to cooperate, innovate and share experiences, knowledge and good practices. Four of these partners are higher education institutions (University of Aveiro, Portugal; University of Ghent, Belgium; University of Salamanca, Spain; and University of Iceland, Iceland). The other four partners are institutions and associations working directly with young adults with IDD and their families (ASSOL, Parents-in-Network, FORMEM and AvisPT21) and are based in Portugal.

Although this project focuses on the need for inclusion of people with IDD, it also intends to include other two different stakeholders: higher education institutions and companies. Promoting the participation of these three stakeholders is fundamental when using a Person-Centered Design, and when aiming at developing a prototype of an accessible digital solution.

People with IDD need greater attention regarding accessibility issues, particularly when considering the platforms, they visit in order to apply both to HEI and to job vacancies. As such, a great effort is being made in the project that frames this study, especially considering easy-to-read language. Accessibility issues are being considering implementing the UserWay plugin [7].

2 METHODS AND PROCEDURES

As this is a platform aiming to include people with IDD in higher education and the employment market, it was essential to use a person-centred design. Several methods were adopted to ensure the direct participation of both the target audience of the platform and all partners involved in the project: interviews, usability tests and questionnaires. This type of approach has allowed the design of a platform adapted to the needs and specificities of the target audience and the identification of errors at an early stage of the project, making their correction easier.

The participants in the data collection moments focused on four different types of people: People with IDD, HEIs, companies and the project's partner HEIs and associations. Therefore, depending on the evaluation stage, partners, end users or both were involved, selected through the non-probabilistic method, more specifically, using the convenience sampling technique [8] [8][[10].

2.1 Interviews

Interviews played a particularly important role in the development of the project, as it was through them that it became possible to contact the groups of the target audience. This method was adopted in the first phase of the project and allowed the identification of the prototype's requirements. It is important to emphasise that it was only possible to apply this method with two representatives from the University of Aveiro and with three people with IDD, however, it was fundamental to understand needs of the final users.

The interviews were conducted in the face-to-face modality and were structured, meaning the questions and the flow of the interviews were the same for all interviewees. This method was preferred as uniformity was needed in the information that was intended to be collected. As such, the questions focused more on the features that each end-user expected to see considering the concept of the platform that had been presented. In addition, questions were asked at the design level to understand what kind of platform, styles, format and colours were expected. The interviews with the representatives of the University of Aveiro lasted about 1 hour, while the interviews with the people with IDD lasted only 30 minutes.

2.2 Usability and Accessibility tests

The usability and accessibility tests have been applied in several stages of the prototype and were carried out with the HiLives partners and target audience. These tests were used to verify, at an early stage, if there were any interaction errors and if the platform was complex or not for people with IDD. In addition, it was also possible to understand if it contained the necessary functionalities for the remaining stakeholders. In a more advanced stage of the prototype development, the application of usability tests allowed to evaluate the complexity of the interaction and to validate, once again, all the functionalities. As a complement to the usability tests, surveys were also applied, not only because they facilitate the analysis and collection of data, but also because they simplify obtaining data in a uniform way among all partners.

In a first phase, the application of the usability tests was done asynchronously, where the respondents should watch a video demo of the application prototype and, at the end, answer a survey by questionnaire that was based on some of the questions of the System Usability Scale (SUS) [11]. The SUS, according to [12], provides a quick tool to measure the level of usability of a system. It consists of a questionnaire of 10 questions, each of which has five response options, ranging from "Strongly Agree" to "Strongly Disagree". Considering that what was being evaluated was a demo video and not a product, it was decided to select only five questions from this scale that could be measured by viewing the video. To complement the questionnaire, six more open-ended questions were created so that the partners could give a wider opinion and contribute to the improvement of the prototype. This strategy enabled the involvement of partners and end-users from each of the different countries: all contributed with data regarding the requirements of people with IDD, of HEIs, and of Companies. General requirements were also collected, and new suggestions were welcomed during the process. Moreover, to harmonize data collection from end-users among all project partners, three protocols were created for each type of end-user: one for people with IDD; one for HEIs; and one for companies. This was a key step to ensure that the tests were all conducted in a comparable way and to overcome language barriers. At this moment of data collection, it was possible to collect feedback
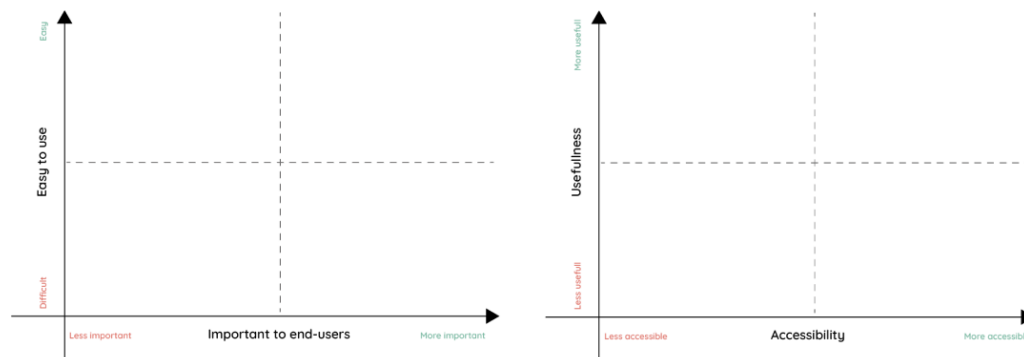
Involving end-users in the design of a digital platform for Including People with Intellectual and
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DSAI 2022, August 31–September 02, 2022, Lisbon, Portugal

Figure 1: Evaluation Matrix

from 48 participants, out of which 15 were project partners, 13 were HEIs, 11 were companies and nine were people with IDD.

In a second moment, the application of the usability tests occurred synchronously through Zoom video calls, in which the respondents should explore the prototype freely and, at the end, fill out a PowerPoint document that contained two evaluation matrices and a survey by SUPR-Q questionnaire [13]. A matrix was created (Figure 1), working as a recording grid: it has two axes (X and Y) and four quadrants, serving to compare two values at the same time. In this case, the matrices created were intended to assess both the accessibility and usefulness of the main functionalities, as well as the importance for end users and the ease of use of the main functionalities. In turn, SUPR-Q (Standardized User Experience Percentile Rank) is a questionnaire that contains eight standard questions that assist in measuring users' perceptions of usability, trust, credibility, appearance and loyalty of a web platform, according to [13]. Similar to SUS, SUPR-Q also has five response options ranging from "Strongly Agree" to "Strongly Disagree" [13]. To complement the questionnaire, two more open-response questions were created so that respondents could provide a broader opinion and contribute to the improvement of the prototype. At this stage of data collection, it was possible to gather feedback from 29 participants, of which 21 were project partners and eight were people with IDD.

Finally, it is important to mention that the respondents performed all the data collection moments individually, so that they could give their true opinion about the presented prototype. This was also the reason for the choice of the various data collection instruments and the way they were applied. In addition to these tests, the construction of the low fidelity prototype underwent some tests to ensure that the accessibility standards of WCAG 2.1 were fulfilled. As such, to ensure that the main colours of the prototype had at least a contrast of seven, the Color.review platform [14] was used to evaluate the behaviour of colours on a white background. Thus, several colours were tested until the final shade of blue and pink was reached.

3 RESULTS

The data collected during this first phase of the prototype evaluation allowed to obtain the platform's main requirements, in particular its

main challenge: recommending learning paths and job vacancies for people with IDD. New and adjusted requirements were considered to improve the prototype: data collected during the usability tests were used to correct the platform.

Listing requirements is an important step when it comes to creating digital projects, since it allows to manage early on what the project priorities are, as mentioned by [15]. In this study, the requirements emerged not only from the needs of the target audience, but also from what was collected during the state-of-the-art survey. Tables 2, 3 and 4 present the current list of requirements organized by stakeholders: people with IDD, Higher Education Institutions, and Companies.

In addition to the requirements' adjustment, the usability tests allowed for the validation of the design of the platform. The main results of these tests were:

- The need to ensure cleaner and easier-to-use design solutions on the interface for the registration of people with IDD, reducing the number of fields they needed to fill in. This modification implied the creation of a new user profile – the tutor: as all the registration fields were necessary for the prototype's algorithm, this new user is a mediator between the prototype and the people with IDD, being the tutor who fills in the more complex fields during or after an interview with the users with IDD;
- Users should have easy access to the main pages of the platform, avoiding the use of dropdown menus;
- The prototype should contain more images and icons to make it more appealing to people with IDD;
- The need to simplify some of the terms used so that people with IDD could understand them better;
- When it comes to publishing stories of the experience of people with IDD, this should be possible to do through different formats such as text, images and audio, besides videos.

4 CONCLUSIONS, LIMITATIONS, AND FUTURE WORK

There is still a lot of work ahead to raise awareness in Higher Education Institutions and Companies for the inclusion of people with

Table 1: List of requirements of persons with IDD

Requirements – Persons with IDD
R1 - Person Register: Information about personal, academic, and professional experience.
R2 - Manage Profile: To edit /complement the information about courses, new work experiences and all the information available on the register.
R3 - History Upload: The platform indicates that the person can record a video, talking about their interests, experiences, and expectations.
R4 - Links with HEs: The result of matching with the HEs courses, according to the areas of interest, country, and region.
R5 - Links with Companies: The result of matching between person profile and job vacancies requirements. The considered parameters are areas of interest, country, region, favourite working environments, academic qualifications and working hours.
R6 - Recommendation of learning paths: When the match between persons and job vacancies is not 100%, the platform shows recommendation of courses. This requirement is one of main features of this platform, because it can indicate to the persons which paths, they can follow to improve their qualifications and to correspond to the needs of the companies' combined with their respective profiles.
R7 - View Courses/Vacancies: The users can access vacancies published by Companies or courses available at HEs, even if they are not the result of the platform matching.
R8 - Notification of connections: When there is a new connection with job vacancy or course, the person receives a notification.

Table 2: List of requirements of Higher Education Institutions

Requirements – Higher Education Institutions
R1 - HEI Register: Basic information about HEI.
R2 - Complete the profile: To fill the lack of information about the HEI's profile.
R3 - Register the course(s): To register the course(s) details for IDD people.
R4 - Manage course(s): It's possible to update/delete the published course(s).
R5 - View the Connections: It´s possible to see all connections created automatically for this platform, according to the parameters filled by people with IDD.
R6 - View the HiLives stories: Page to see the videos that demonstrate the academic and professional experiences of other HiLives users, like environments of companies or universities.

IDD. The Hilives platform intends to contribute to this path and show that these people have a lot to offer, both at academic and business level. This study also proved that people with IDD have a very important role during the development of digital solutions, being of major importance to include them in all stages of the process. It is also important to give them full access to digital platforms: many of the solutions analysed are not prepared for people with disabilities, not complying with the Web Content Accessibility Guidelines 2.1 (WCAG 2.1), from the W3C. The need for the development of a platform that is as inclusive as possible has become more and more of a priority over time. Additionally, it is of utmost importance to create a platform that considers standards for people with cognitive and learning disabilities, following the recently published WC3 standards [16].

Although the current output of this study is still a prototype, HiLives can be seen, in the future, as a platform capable of functioning in a real context meeting the needs of People with IDD, HEI and Companies. As such, it is certain that this platform can present an important contribution to positively modify the way inclusion is seen in academic and professional contexts, making it increasingly a priority. One of the reasons why it is so promising for this audience is because it has the recommendation of learning paths, as it can indicate to people which paths, they can follow to

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Table 3: List of requirements of Companies

Requirements − Companies

R1 - Company Register: Basic information about company.

R2 - Job Vacancy Register: Job vacancy creation with information and requirements.

R3 - Manage Vacancies: It's possible to update/delete the published vacancies.

R4 - Manage Profile: It's possible to see and edit the data about the company.

R5 - See My Candidates: All links to candidates for job vacancies, where they fulfil all the requirements and capabilities needed to apply and the candidates for vacancies where only two or three skills are missing.

R6 - View the HiLives stories: Page to see the videos that demonstrate the academic and professional experiences of other HiLives users, like environments of companies or universities.

Table 4: List of general requirements

Requirements − General Platform

R1 - Tutorial: When logging in for the first time, the users have access to a short video explaining how to use the application.

R2 - Contact: If the user has a Doubt/Suggestion, he/she can send a message via contact form.

R3 - Accessibility Link: The accessibility link is available on the page footer and describes the accessibility of the platform and how it is organised with the links and page structure.

R4 - Accessibility Icon: There is an accessibility icon available on the bottom of the pages, with different features

improve their qualifications and to match the needs of companies combined with their respective profiles.

This platform is still under development: it is now being tested with end-users and the final prototype will be validated by all the stakeholders involved. It's expected that these preliminary results can be improved and used to boost the development of the final version of the platform to be used at a European level. The person-based approach that guided this study is also an important dimension to be further developed in the following stages of the project: the direct involvement of People with IDD is the most important lesson learned in all this process.

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